Conemaugh Generating Station
1442 Power Plant Road
New Florence, Pennsylvania 15944-9154

December 7, 2020

Sent via email

Mr. Andrew R. Wheeler
EPA Administrator
Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Mail Code 5304-P
Washington, DC 20460

Application for Alternate Liner Demonstration (Revision No. 1)
Coal Combustion Residuals Rule Compliance
Ash Filter Ponds A, B, C, and D
Conemaugh Generating Station
West Wheatfield Township, Indiana County, Pennsylvania

Dear Administrator Wheeler:

Conemaugh Generating Station (Station) and our engineering firm, GAI Consultants, Inc., are pleased to submit this electronic application to the U.S. Environmental Protection Agency (EPA) for consideration and hopeful approval. This application for an Alternate Liner Demonstration (Revision No. 1) was prepared pursuant to 40 C.F.R. § 257.71(d)(1)(i) for Ash Filter Ponds (AFPs) A, B, C, and D located at the Station in Indiana County, Pennsylvania (PA) and in response to comments received from the EPA on November 25, 2020 to the previously-submitted application (which is now superseded by the Revision No. 1 application). If approved, the Station intends to submit an Alternate Liner Demonstration package pursuant to § 257.71(d)(1)(ii) for AFPs A, B, C, and D. The entire application package will be forwarded to designated EPA staff copied below.

The AFPs comprise a multi-unit facility of coal combustion residuals (CCR) surface impoundments. The existing AFPs were designed and constructed with engineered clay liners under the guidance of a registered professional engineer in the mid-1980s. The engineered clay liner was designed and constructed to meet the performance requirements of the PA code and the PA Department of Environmental Protection (PaDEP), known at that time as the PA Department of Environmental Resources.

Included as attachments to this letter are documents supporting the lines of evidence designated by EPA to demonstrate the AFPs meet the requirements to submit an Alternate Liner Demonstration package. Attachment 1 contains an executive summary and narrative description of the rest of the Application contents (Attachments 2 through 7) and is included to provide ease of review for EPA.

As stated at § 257.73(b), periodic structural stability assessments and periodic safety factor assessments shall only be required for existing CCR surface impoundments that either: (1) have a height of five feet or more and a storage volume of 20 acre-feet or more; or (2) have a height of 20 feet or more. The AFPs are less than 20 feet in height and impound less than 20 acre-feet of CCRs and/or water; therefore, the Station is not required to complete periodic structural stability assessments or periodic safety factor assessments. As such, these items are not included herein.

The AFPs remain in the detection monitoring program. The Station successfully completed an Alternate Source Demonstration (ASD) for sulfate and calcium, as presented in the 2019 and 2018 annual groundwater reports included in Attachment 4. In addition to this effort, the Station has begun proactively investigating the AFPs and surrounding area for potential causes of a select Appendix IV constituent (cobalt) that was identified as part of the initial background sampling program for the AFPs. The results of this investigation indicate that this Appendix IV constituent occurs naturally in the on-site soils. Additionally, the Station has determined there is no correlation between concentration of the subject Appendix IV constituent in the monitoring wells and the water contained in the AFPs. A summary report of this investigation is included as Attachment 4G. The Station plans to expand upon this investigation to further document that the AFPs are not causing adverse impacts to the groundwater as part of the full Alternate Liner Demonstration.

Closing

Conemaugh Station and GAI Consultants, Inc. are grateful to EPA for their attention to this submittal. To aid your review, any interim requests for additional information or comments will be appreciated and addressed immediately. If you have any questions or concerns regarding this application, then please contact either Mr. Joseph G. Kushner, P.E., Strategy & Compliance Manager at (724) 235-4529 or jkushner@keyconops.com or me at (724) 235-4596 or jshimshock@keyconops.com.

Respectfully submitted,

John P. Shimshock
Environmental Specialist, Conemaugh Generating Station

Attachments:
1 – Executive Summary of Application Contents
2 – Certification of CCR Rule Compliance per § 257.71(d)(1)(i)(A)
3 – Documentation of Groundwater Monitoring Network per §§ 257.71(d)(1)(i)(B)(1)(i) through (iv)
4 – Documentation that AFPs Remain in Detection Monitoring per §257.71(d)(1)(i)(B)(2)
5 – Documentation that AFPs Meet Location Restrictions per § 257.71(d)(1)(i)(B)(3)
6 – Documentation of Design Specifications, Material Suitability, and Construction Quality for Engineered Clay Liner per § 257.71(d)(1)(i)(C)
7 – Demonstration of No Reasonable Probability of Complete and Direct Transport Pathway per § 257.71(d)(1)(i)(D)

cc: Mr. Richard Huggins, Huggins.Richard@epa.gov
Ms. Michelle Long, Long.Michelle@epa.gov
Ms. Mary Jackson, Jackson.Mary@epa.gov
Mr. Jason Mills, Mills.Jason@epa.gov
Mr. Joseph Kushner, Conemaugh Generating Station
Mr. Patrick Brosnan, CAMS eSPARC, LLC
Mr. Adam B. Scheller, GAI Consultants, Inc.
All listed above with the entire application package

ATTACHMENT 1

Executive Summary of Application Contents

Attachment 2 – Certification of CCR Rule Compliance

The Station's General Manager certifies that the AFPs are in compliance with the requirements of 40 C.F.R. Part 257, Subpart D – *Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments*, except for those requirements related to liner construction, as presented under 257.71(a)(1), for which this application for alternate liner approval is being submitted.

A signed and dated certification statement is provided in Attachment 2.

Attachment 3 – Documentation of Groundwater Monitoring Network

The groundwater monitoring network for the AFPs consists of five wells (MW-1B, MW-2, MW-3, MW-4, and MW-23). MW-1B and MW-2 are located upgradient of the AFPs, and MW-3, MW-4, and MW-23 are located downgradient of the AFPs. The locations of the wells, along with groundwater elevations, contours, and estimated direction of groundwater flow are provided in Attachment 3A. All five wells communicate with the alluvium, which is the uppermost aquifer.

Well construction diagrams and drilling logs for the monitoring wells are provided in Attachment 3B. The screened depth of the wells are 40 feet (MW-1B), 43 feet (MW-2), and 30 feet (MW-3, MW-4, and MW-23). MW-1B, MW-2, MW-3 and MW-4 are constructed with two-inch PVC screens, while MW-23 is constructed with a 4-inch PVC screen. Well MW-1B and MW-2 have 30 feet of screen, and MW-3, MW-4, and MW-23 have 20-feet of screen. The annular materials surrounding the PVC screen and riser for all five monitoring wells, in ascending order, consist of coarse sand and gravel, a bentonite pellet seal, and cement grout or concrete to the surface. The wells are completed with an aboveground locking steel protective casing.

The original monitoring well network consisted of four wells, two upgradient (MW-1 and MW-2) and two downgradient (MW-3 and MW-4). The well locations were selected as part of the 1984 application for a Water Quality Management (WQM) Permit from the Pennsylvania (PA) Department of Environmental Resources (PaDER) for construction of the AFPs. The well locations were established based on the assumed direction of groundwater flow considering the original site topography and assuming that groundwater will flow from higher elevations toward the Conemaugh River. The wells were installed in 1986 (installation specifications included as Attachment 3C). Subsequent monitoring of the water level elevation in the groundwater monitoring network confirmed that the placement of the wells was appropriate for detecting upgradient and downgradient constituents.

In 1998, MW-2 was removed from the state monitoring program at the request of the permitting agency, although the well remained on-site and is currently utilized as part of the CCR Rule monitoring network. In 1998, a third downgradient well, MW-23 was added, such that the network would be compliant with the requirements of the updated PA residual waste regulations (minimum 1 upgradient well and 3 downgradient wells). This monitoring well network, and associated Groundwater Monitoring Plan, was approved by the PA Department of Environmental Protection (PaDEP) on July 22, 1998. In 2003, MW-1 was replaced by MW-1B. The groundwater contour maps included in Attachment 3A further establish the sufficiency of the groundwater monitoring network. The existing groundwater network meets the PaDEP requirements that the monitoring wells be sufficient in number, location, and depth to be representative of the facility, located so that they do not interfere with routine facility operations, and located within 200 feet of the permitted storage area.

In 2017, APTIM Environmental and Infrastructure, Inc. (APTIM) certified that the groundwater monitoring system for the AFPs was adequate and appropriate to monitor groundwater conditions (Attachment 3D). This certification stated that the system utilized more than the required minimum number of monitoring wells (minimum requirement per the CCR Rule is 1 upgradient, 3 downgradient; Conemaugh Station has two upgradient and three downgradient) and that the construction and orientation of the wells was sufficient to satisfy the performance standards outlined in Section 257.91(a)(1-2) of the CCR Rule.

Attachment 4 – Documentation that the AFPs Remain in Detection Monitoring

The Station is compliant with the groundwater monitoring and reporting requirements of the CCR Rule. Based on the data that has been collected, analyzed, and reported (as summarized below and included herein), and in accordance with the procedures presented in the CCR Rule, the AFPs remain in detection monitoring.

In 2017, APTIM completed the Statistical Method for Groundwater Data Evaluation (Attachment 4A), which presented the statistical method selected for use in groundwater monitoring network. As described in Attachment 4A, an interwell prediction limit approach was selected. This method is among those recommended in the Environmental Protection Agency's (EPA's) Unified Guidance document ("Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities", March 2009). This approach has been used to analyze the results of all subsequent sampling events and is further described in the Statement of Recent Statistical Methods Conducted (Attachment 4B).

The Station's first Groundwater Monitoring and Corrective Action Annual Report (2017 Report, Attachment 4C) was completed in January 2018 by APTIM. This report describes the efforts to obtain the minimum of eight independent samples from each of the monitoring wells associated with the AFPs. This report also includes the results of a ninth round of samples that were collected in the fourth quarter of 2017 that would serve as the first data to be compared against the calculated background values from upgradient wells.

In the 2018 Groundwater Monitoring and Corrective Action Annual Report (2018 Report, Attachment 4D), which was the first year where monitoring data was compared against background values, a Statistically Significant Increase (SSI) was identified for sulfate at downgradient monitoring well MW-4. Pursuant to the SSI, and in accordance with the CCR Rule, the Station chose to conduct an Alternate Source Demonstration (ASD). The ASD, which is included as an Attachment to the 2018 Report, identified that the source of the elevated sulfate was incidental gypsum accumulation around MW-4. This was observed visually, and the chemical composition of the groundwater was consistent with the "fingerprint" of gypsum in the form of elevated calcium and sulfate. The ASD also utilized Piper diagrams to show differences in the chemical composition of the groundwater sampled at MW-4 and the liquid contents of the AFPs and identified that Boron, a very mobile constituent, was not elevated in the downgradient wells, even though significant levels of boron were present in the liquid contained in the AFPs. Based on this information, the ASD was deemed to be successful, therefore resolving the observed SSI for sulfate in MW-4 and confirming that the AFPs were not causing unacceptable impacts to groundwater. As such, per 257.94(e)(2) of the Rule, the AFPs remained in Detection Monitoring.

The findings of the 2018 Report and associated ASD have been consistent with the groundwater data collected to-date, including the information presented in the 2019 Groundwater Monitoring and

Corrective Action Annual Report (Attachment 4E) and the data that has been collected throughout the 2020 (Attachment 4F). As such, the ASD remains effective at identifying the source of elevated sulfate and calcium levels at downgradient well MW-4, and no new constituents have been identified that would require additional measures to be taken.

Recently, the Station contracted with APTIM to develop and implement a site investigation at the Station to evaluate groundwater in areas approximate to the AFPs. This work was initiated as part of a proactive measure to investigate the presence of cobalt, which was detected at elevated levels in downgradient monitoring wells during background sampling events conducted from 2015 to 2017. A summary of this investigation is included as Attachment 4G. This investigation concluded that the cause of the elevated cobalt concentrations is due to the presence of cobalt in the native soil, and not due to the AFPs. This finding is supported by several lines of evidence, including the absence of cobalt in the AFP surface water, non-detect levels of cobalt found to leach from the AFP solids, and the pervasive presence of cobalt in naturally occurring soils.

Attachment 5 – Documentation that the AFPs Meet Location Restrictions

In 2018, APTIM certified that the AFPs met the location restrictions presented in Sections 257.60(a), 257.61(a), 257.62(a), 257.63(a), and 257.64(a) of the CCR Rule. This certification statement is included in the Location Restriction Demonstration Report, prepared in October 2018 and included as Attachment 5 to this application. Specifically, the report demonstrated that:

- There is not an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the AFPs and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high-water table).
- Wetlands are not present in the location of the AFPs.
- No known faults were identified within 200 feet of the AFPs.
- The AFPs are not located within a seismic impact zone.
- The AFPs are not located within an unstable area.

Attachment 6 – Documentation of Design and Construction Quality

The original AFPs (Ponds A, B, and C) were constructed in the early 1970s as part of the construction for the Station. In 1986 the ponds were reconstructed and a fourth pond (Pond D) was added to address operational and regulatory requirements at that time. This reconstruction established the ponds as they exist today, as presented on the drawings in Attachment 6A. As shown on the drawings, and in subsequent references, the AFPs were constructed with engineered clay liners having a minimum thickness of two feet. The construction specifications for the 1985-1986 Reconstruction Project (Attachment 6B) provided specific requirements for the engineered liner, including material properties of impervious fill, bentonite, protective cover, and filter media. Conformance with the design drawings and specifications was enforced through a testing and inspection program, as presented in Attachment 6C. The inspection program was carried out by a third-party firm.

Reconstruction of the AFPs included significant input from the state permitting authority, which at the time was the PaDER. The PaDER enforced specific requirements regarding the liner material and required that the permeability be no greater than $1x10^{-7}$ centimeters per second (cm/sec). Refer to Attachment 6D for a letter from the PaDER (January 1984) identifying this requirement in association

with the WQM Permit required to obtain approval for the Reconstruction Project. Pursuant to these requirements, the Station designed the proposed liner system, as summarized in a Preliminary Engineering Report, dated March 1984 (Attachment 6E). The WQM Permit Application (April 1984, Attachment 5F) was then submitted, which presented the proposed design to the PaDER for review and approval. The WQM Permit was granted on November 5, 1984.

To provide further information supporting the Station's engineering design and construction quality assurance related to the AFP Reconstruction Project, copies of the engineering scope of services and purchase requisitions for the lab and field testing to support construction have also been included (Attachments 6G and 6H, respectively).

In 2015, CB&I Environmental and Infrastructure Inc. (now APTIM) was retained by the Station to evaluate and certify the existing AFP liners under the requirements of the original CCR Rule. As part of this effort, APTIM reviewed the reference information for the design and construction of the AFPs. APTIM also performed a field investigation in August 2015 which included taking borings at six locations across the bottom and side slopes of the dewatered AFP B. This information was used to confirm that the liner section in the ponds matched that which was presented on the design drawings and specifications, both in material composition and thickness. The sampled material was also tested for hydraulic conductivity, which ranged from 1.6×10^{-8} to 4.1×10^{-8} cm/sec, exceeding the requirements of both the original CCR Rule and the requirement imposed by the PaDER at the time of construction. Pursuant to these findings, APTIM certified that the liner system was compliant with the design criteria outlined in 257.71(a)(1)(i). The certification statement was included in the Liner Certification Report, prepared in August 2016 and included as Attachment 6I to this application.

Attachment 7 – Demonstration of No Reasonable Probability of Transport Pathway

The Conemaugh Generating Station property is located adjacent to the Conemaugh River. The Ash Filter Ponds (AFPs) are set back from the river by approximately 0.2 – 0.3 miles. Based on the design and location of the AFPs, there is no reasonable probability that a complete and direct transport pathway (i.e., not mediated by groundwater) could exist between the AFPs and the nearby Conemaugh River. The following list of items provides evidence for this statement, in accordance with § 257.71(d)(1)(i)(4).

- The AFPs are located approximately 0.2 – 0.3 miles from the Conemaugh River.
- The AFPs are located outside of the 100-year and 500-year floodplain boundaries, as established by the Federal Emergency Management Agency (FEMA), as shown in Figure A7-1.
- Surface drainage downstream of the AFP embankments is topographically separated from the river by a railroad embankment, and the area between the AFPs and the river is well vegetated (Figure A7-1). Additionally, the drainage features downgradient of the AFPs do not discharge to the river. As such, potential discharge to surface water would be impeded by site topography and existing drainage features and be required to re-enter the groundwater prior to discharge to the Conemaugh River.
- No seeps have been observed emanating from the embankments of the AFPs.
- Low conductivity soil is not present between the AFP liners and the uppermost aquifer (refer to boring logs included in Attachment 3B). As such, the soil conditions beneath the pond liners are not anticipated to prevent AFP water from entering the monitored

aquifer or direct AFP water laterally towards the Conemaugh River in a pathway not mediated by groundwater.

ATTACHMENT 2

Certification of CCR Rule Compliance per § 257.71(d)(1)(i)(A)

Owner's Certification of Compliance - § 257.71(d)(1)(i)(A)

In accordance with 40 C.F.R. § 257.71(d)(1)(i)(A), I hereby certify that, based on my inquiry of those persons who are immediately responsible for compliance with environmental regulations for the Ash Filter Ponds at Conemaugh Generating Station, the facilities are in compliance with all of the requirements contained in 40 C.F.R. Part 257, Subpart D – Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments except for those requirements under § 257.71(a)(1) [related to existing CCR surface impoundments with a composite liner or alternate composite liner]. Conemaugh's CCR compliance website is up-to-date and contains all the necessary documentation and notification postings.

Keystone – Conemaugh Projects, LLC

Barry J. Hunt

Barry J. Hunt

General Manager, Conemaugh Generating Station

12-7-20

December 7, 2020

ATTACHMENT 3	Documentation of Groundwater Monitoring Network per §§ 257.71(d)(1)(i)(B)(1)(i) through (iv)
Attachment 3A	Groundwater Well Location and Contour Maps
Attachment 3B	Well Construction Diagrams and Drilling Logs for Monitoring Network
Attachment 3C	Monitoring Well Installation Specifications, March 1986
Attachment 3D	CCR Groundwater Monitoring System Design Report, October 2017

ATTACHMENT 3A

Groundwater Well Location and Contour Maps

LEGEND:

MW-23 (1071.43')	MONITORING WELL LOCATION (GROUNDWATER ELEVATION)
1072	GROUNDWATER CONTOURS (DASHED WHERE APPROXIMATE)
→	DIRECTION OF GROUNDWATER FLOW

NOTE:

1. GROUNDWATER ELEVATIONS FROM MEASUREMENTS MADE DURING JANUARY 17–30, 2017.
2. DURING A 2020 SURVEY OF THE AFP MONITORING WELLS, IT WAS DISCOVERED THAT THE TOP OF CASING ELELVATION FOR MW–3 REQUIRED A CORRECTION OF 4.25 FEET. THIS CHANGE HAS BEEN IMPLEMENTED ON THE CURRENT DRAWING AND WILL BE UPDATED IN THE STATION'S ANNUAL GROUNDWATER MONITORING REPORTS.

SCALE: 1" = 200'

200 0 200 400

NO.:	DATE:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DESCRIPTION:

REVISION RECORD

DRAWING TITLE: Groundwater Contours - Q1 2017

PROJECT: **GROUNDWATER FLOW DIRECTION**
ASH FILTER PONDS
FIRST QUARTER 2017

gai consultants

CLIENT: **CONEMAUGH GENERATING STATION**
NEW FLORENCE, PENNSYLVANIA

ISSUE DATE: 11/2/2020	DRAWN BY: M.DOYLE
SCALE: AS SHOWN	CHECKED BY: R.TURKA
REVISION	APPROVED BY: A.SCHELLER
	SHEET NO.: 1 OF 4

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GAI FILE NUMBER: C190459-01-003-C-MW-Q1

GAI DRAWING NUMBER: MW-Q1

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LEGEND:

MW-23 (1069.68')	MONITORING WELL LOCATION (GROUNDWATER ELEVATION)
1072	GROUNDWATER CONTOURS (DASHED WHERE APPROXIMATE)
→	DIRECTION OF GROUNDWATER FLOW

NOTE:

1. GROUNDWATER ELEVATIONS FROM MEASUREMENTS MADE DURING APRIL 24–26, 2017.
2. DURING A 2020 SURVEY OF THE AFP MONITORING WELLS, IT WAS DISCOVERED THAT THE TOP OF CASING ELELVATION FOR MW–3 REQUIRED A CORRECTION OF 4.25 FEET. THIS CHANGE HAS BEEN IMPLEMENTED ON THE CURRENT DRAWING AND WILL BE UPDATED IN THE STATION'S ANNUAL GROUNDWATER MONITORING REPORTS.

SCALE: 1" = 200'

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NO.:	DATE:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DESCRIPTION:

REVISION RECORD

DRAWING TITLE: GROUNDWATER CONTOURS - Q2 2017

PROJECT: **GROUNDWATER FLOW DIRECTION**
ASH FILTER PONDS
SECOND QUARTER 2017

gai consultants

CLIENT: **CONEMAUGH GENERATING STATION**
NEW FLORENCE, PENNSYLVANIA

ISSUE DATE: 11/2/2020	DRAWN BY: M.DOYLE
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REVISION	APPROVED BY: A.SCHELLER
	SHEET NO.: 2 OF 4

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GAI FILE NUMBER: C190459-01-003-C-MW-Q2

GAI DRAWING NUMBER: MW-Q2

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LEGEND:

MW-23 (1069.18') — MONITORING WELL LOCATION (GROUNDWATER ELEVATION)

1072 — GROUNDWATER CONTOURS (DASHED WHERE APPROXIMATE)

→ DIRECTION OF GROUNDWATER FLOW

NOTE:

1. GROUNDWATER ELEVATIONS FROM MEASUREMENTS MADE DURING JULY 20–27, 2017.
2. DURING A 2020 SURVEY OF THE AFP MONITORING WELLS, IT WAS DISCOVERED THAT THE TOP OF CASING ELELVATION FOR MW–3 REQUIRED A CORRECTION OF 4.25 FEET. THIS CHANGE HAS BEEN IMPLEMENTED ON THE CURRENT DRAWING AND WILL BE UPDATED IN THE STATION'S ANNUAL GROUNDWATER MONITORING REPORTS.

SCALE: 1" = 200'

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NO.:	DATE:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DESCRIPTION:

REVISION RECORD

DRAWING TITLE: GROUNDWATER CONTOURS - Q3 2017

PROJECT: GROUNDWATER FLOW DIRECTION
ASH FILTER PONDS
THIRD QUARTER 2017

gai consultants

CLIENT: CONEMAUGH GENERATING STATION
NEW FLORENCE, PENNSYLVANIA

ISSUE DATE:	DRAWN BY:
11/2/2020	M.DOYLE
SCALE: AS SHOWN	CHECKED BY: R.TURKA
REVISION	APPROVED BY: A.SCHELLER
	SHEET NO.: 3 OF 4

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GAI FILE NUMBER: C190459-01-003-C-MW-Q3

GAI DRAWING NUMBER: MW-Q3

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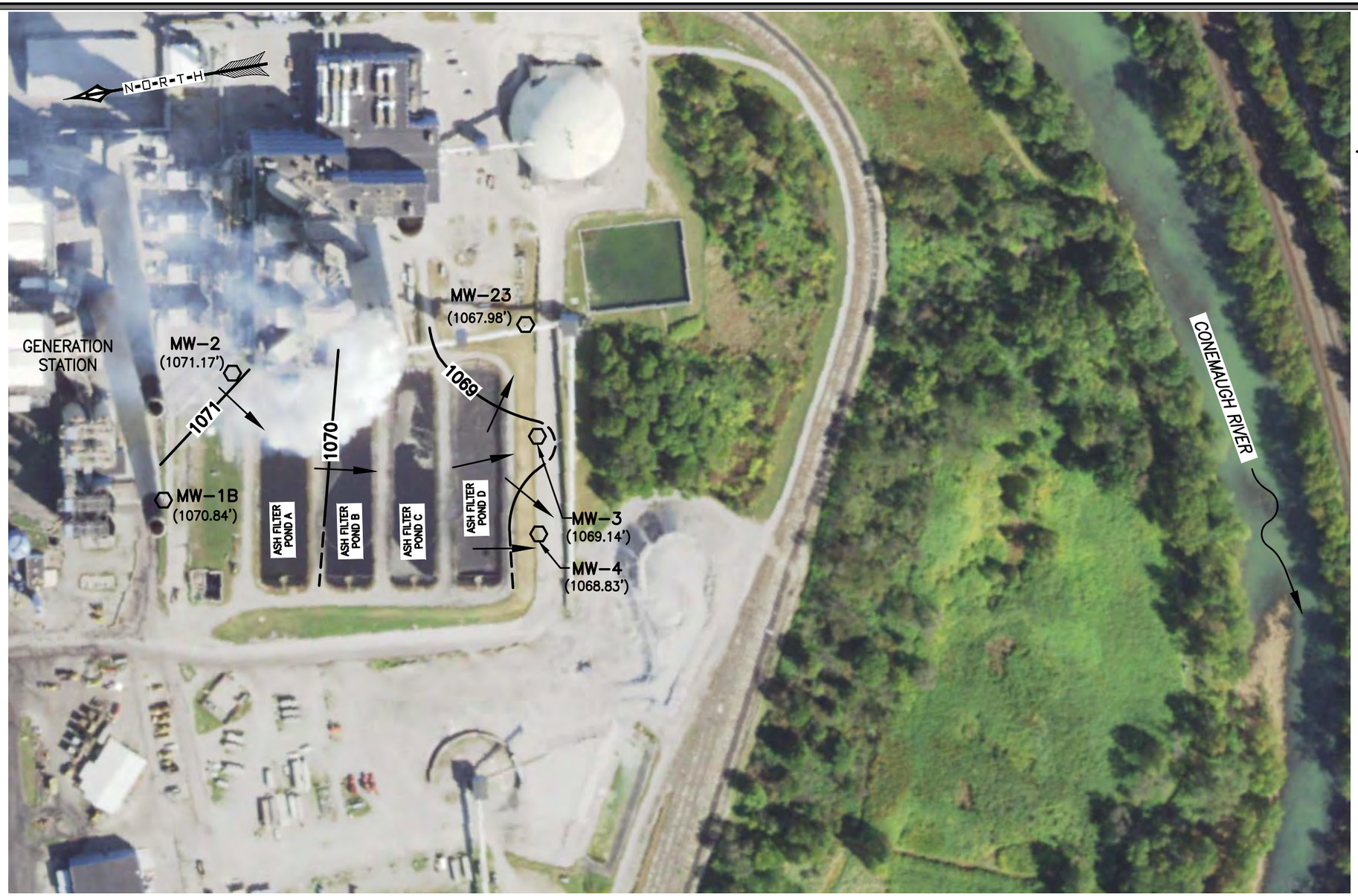

LEGEND:

MW-23 (1067.98') — MONITORING WELL LOCATION (GROUNDWATER ELEVATION)

1072 — GROUNDWATER CONTOURS (DASHED WHERE APPROXIMATE)

→ DIRECTION OF GROUNDWATER FLOW

NOTE:

1. GROUNDWATER ELEVATIONS FROM MEASUREMENTS MADE DURING OCTOBER 1–4, 2017.
2. DURING A 2020 SURVEY OF THE AFP MONITORING WELLS, IT WAS DISCOVERED THAT THE TOP OF CASING ELELVATION FOR MW–3 REQUIRED A CORRECTION OF 4.25 FEET. THIS CHANGE HAS BEEN IMPLEMENTED ON THE CURRENT DRAWING AND WILL BE UPDATED IN THE STATION'S ANNUAL GROUNDWATER MONITORING REPORTS.

SCALE: 1" = 200'

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NO.:	DATE:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DESCRIPTION:

REVISION RECORD

DRAWING TITLE: GROUNDWATER CONTOURS - Q4 2017

PROJECT: GROUNDWATER FLOW DIRECTION
ASH FILTER PONDS
FOURTH QUARTER 2017

gai consultants

CLIENT: CONEMAUGH GENERATING STATION
NEW FLORENCE, PENNSYLVANIA

ISSUE DATE:	10/23/2020
DRAWN BY:	M.DOYLE
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CHECKED BY:	R.TURKA
REVISION	
APPROVED BY:	A.SCHELLER
SHEET NO.:	4 OF 4

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GAI FILE NUMBER: C190459-01-003-C-MW-Q4

GAI DRAWING NUMBER: MW-Q4

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ATTACHMENT 3B

Well Construction Diagrams and Drilling Logs for Monitoring Network

Note: MW-1 was replaced by MW-1B in 2003.

GILBERT ASSOCIATES, INC.

SOIL AND ROCK CLASSIFICATION SHEET

SHEET 1 OF 2

PROJECT: Ash Filter Ponds W.O. 04-4479-158 SITE AREA Conemaugh Station

DRILL HOLE NO. MW-1

CONTRACTOR: Penn. Drilling Co. COORDINATES

ELEVATION 1086.7'

DRILLER: Tom Stewart

GWL 0 HRS ---

CLASSIFIED BY: Yogesh Shah DATE: 5/28,29/86

24 HRS 15'-7" (6/12/

Depth Ft.	Sample No.	SPT Blows/ 6 In. (6 12 18)	Ft. Rec.	Profile	DESCRIPTION Density (or Consistency), Color Rock Or Soil Type - Accessories	U.S.C.S.	R.Q.D.	Soil Or Rock: Range Size / Core Run	Soil Or Rock: Grain Shape / Rec. Core	REMARKS Chemical Comp, Geologic Data, Ground Water, Construction Problems, etc.
				2'	Gr., clayey silty sand, trace Clay, little gravel (fill)					
					Red.br., silty sand, trace clay, little gravel					1. Augered to 29½'.
10'					. Trace silt below 10'					2. Airdrilled below 29½'.
					. More gravel below 15'					3. Used 6" dia. continuous flight auger and 5" dia. air hammer.
20'										
				23'						
					Weathered sandstone (brown)					
30'				29½'						
					Gr., silty fine sandy shale or fine grained sandstone					
40'										
					Hole terminated @ 42½'					

GAI - 227 9/72

GILBERT ASSOCIATES, INC.

SOIL AND ROCK CLASSIFICATION SHEET

SHEET 2 OF 2

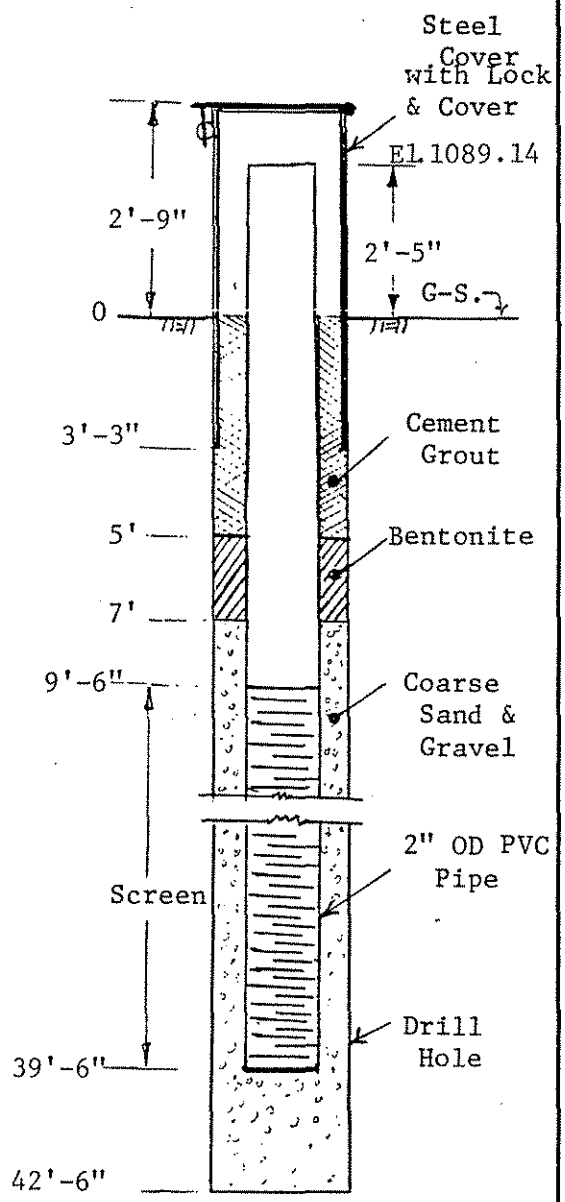
PROJECT: Ash Filter Ponds W.O. 04-4479-158 SITE AREA Conemaugh Station DRILL HOLE NO. MW-1

CONTRACTOR: Penn. Drilling Co. COORDINATES _____ ELEVATION 1086.7 (GS)

DRILLER: Tom Stewart GWL 0 HRS _____

CLASSIFIED BY: Yogesh Shah DATE: 6/11/86 24 HRS _____

Depth Ft.	Sample No.	SPT Blows/ 6 In. (6 12 18)	Ft. Rec.	Profile	DESCRIPTION Density (or Consistency), Color Rock Or Soil Type - Accessories	U.S.C.S.	R.Q.D.	Soil Or Rock: Range Size / Core Run	Soil Or Rock: Grain Shape / Rec. Core	REMARKS Chemical Comp, Geologic Data, Ground Water, Construction Problems, etc.
					Monitoring Well Data:					1. Developed for 1½ hours on 6/11/86. 2. Pump test for 1 hour on 6/12/86.



gai CONSULTANTS, INC.

PROJECT RELIANT ENERGY CONEMAUGH GENERATING STATION MW-1 REPLACEMENT PROJECT NO. 92-220-71 TASK 18

ELEVATION SAME AS MW-1 GWL 0 HRS _____ HRS BORING NO. MW-1B

DATE 9-03-03 CLASSIFIED BY S. C. WIGTON PAGE NO. 1 OF 2

DEPTH FEET	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%)	DESCRIPTION: PROFILE	DESCRIPTION: SOIL DENSITY—CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: COLOR	DESCRIPTION: MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
						GRY/BRN	GRAVEL/LIMESTONE/CINDERS/TOPSOIL		START 9-3-03
				1.4		BRN	SAND, SILT, AND CLAY (FILL)		
5.0									WET @ 5.0 FT
							VERY LITTLE RETURN OF CUTTINGS		
10.0									
							LARGE BOULDER (>1 FT. Ø) TEARDROP SHAPED		
15.0							WEDGED INTO HOLLOW STEM AUGERS MAKING		
							DRILLING IMPOSSIBLE, PULL AUGERS OUT OF HOLE		
							AND USING A SLEDGE DRIVE RICK OUT OF BIT		
							THE BOULDER IS ALLUVIAL MATERIAL		
							~ BOULDERS 14 FT to 20 FT.		~ CUTTINGS ARE [illegible]
20.0									OF SATURATED [illegible]
									[illegible]
							VERY LITTLE RETURN OF CUTTINGS		
25.0									
30.0									

REMARKS** DRILLTECH D40K L.G. HEPAGER DRILLING COMPANY 0-32 FEET 6¼ I.D. HOLLOW STEM AUGERS. 32-40 FT 6" TRICONE ROLLER BIT WITH AIR.

PROJECT NO. 92-220-71 TASK 18

BORING NO. MW-1B

*POCKET PENETROMETER READINGS

**METHOD OF ADVANCING AND CLEANING BORING

gai CONSULTANTS, INC.

PROJECT Reliant Energy Conemaugh Generating Station MW-1 Replacement PROJECT NO. 92-220-71 Task 2

ELEVATION _____ GWL 0 HRS _____ BORING NO. MW-1B

HRS

DATE 9-3-03 CLASSIFIED BY S.C. Wigton PAGE NO. 2 OF 2

DEPTH FEET	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%)	DESCRIPTION: PROFILE	DESCRIPTION: SOIL DENSITY—CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: COLOR	DESCRIPTION: MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
						BRN	CLAY Some Silt and Sand		
				32.0					
						GRY	SILTSTONE		
35.0									
40.0									
							Bottom of Boring 40.0 Feet		
45.0							Well Construction		
					40-10 Ft	Sch 40	PVC 10 Slot 4"Ø Screen		As the augers were
					10-+2.5	Sch 40	PVC 4"Ø Pipe		withdrawn and the [illegible]
					Annulus	40-8	Silica Sand (430 Best Silica)		Pack was placed [illegible]
						8-5	Bentonite Pellets (1-Bucket)		Running Sand [illegible]
						5-1	Bentonite Chips		Squeezed into the annulus
						1-0	Concrete		Making placement of
							2 Ft x 2 Ft x 0.5 Ft Form around 6"Ø		the filter pack [illegible]
							6' Long Steel Protective Cover		
							Lock from MW-1 will be used again		

REMARKS** See sheet 1 of 2

PROJECT NO. 92-220-71 Task 2

BORING NO. MW-1B

*POCKET PENETROMETER READINGS

**METHOD OF ADVANCING AND CLEANING BORING

GILBERT ASSOCIATES, INC.

SOIL AND ROCK CLASSIFICATION SHEET

SHEET 1 OF 2

PROJECT: Ash Filter Ponds W.O. 04-4479-158 SITE AREA Conemaugh Station

DRILL HOLE NO. MW-2

CONTRACTOR: Penn. Drilling Co. COORDINATES

ELEVATION 1088.9'

DRILLER: Tom Stewart

GWL 0 HRS ---

CLASSIFIED BY: Yogesh Shah DATE: 5/29/86 thru 6/9/86

24 HRS 18"-4" (6/12/

Depth Ft.	Sample No.	SPT Blows/ 6 in. (6 12 18)	Ft. Rec.	Profile	DESCRIPTION Density (or Consistency), Color Rock Or Soil Type - Accessories	U.S.C.S.	R.Q.D.	Soil Or Rock: Range Size / Core Run	Soil Or Rock: Grain Shape / Rec. Core	REMARKS Chemical Comp, Geologic Data, Ground Water, Construction Problems, etc.
					Brown, clayey silty sand, little to some gravel (v. compact), probably residual.					1. Augered from 0'-12'.
10'										2. Airdrilled & augered from 12' to 24'.
				12'						
				13'	Boulder					
					Same as above 12'.					3. Airdrilled below 24'.
20'										
				24'						
					Highly weathered, brown, shale or sandstone					
30'										
				32'						
					Grey, silty fine sandy shale or fine grained sandstone					
40'										
					Hole terminated @ 46'					

GAI - 227 9/72

GILBERT ASSOCIATES, INC.

SOIL AND ROCK CLASSIFICATION SHEET

SHEET 2 OF 2

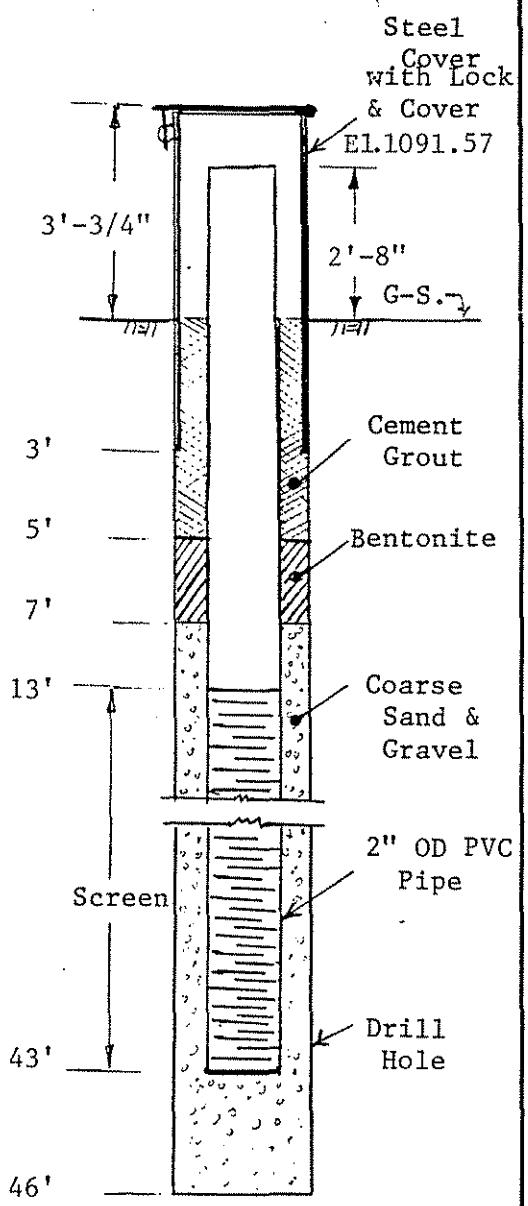
PROJECT: Ash Filter Ponds W.O. 04-4479-158 SITE AREA Conemaugh Station DRILL HOLE NO. MW-2

CONTRACTOR: Penn.Drilling Co. COORDINATES _____ ELEVATION 1088.9 (GS)

DRILLER: Tom Stewart GWL 0 HRS _____

CLASSIFIED BY: Yogesh Shah DATE: 6/11/86 24 HRS _____

Depth Ft.	Sample No.	SPT Blows/ 6 in. (6 12 18)	Ft. Rec.	Profile	DESCRIPTION Density (or Consistency), Color Rock Or Soil Type - Accessories	U.S.C.S.	R.Q.D.	Soil Or Rock: Range Size / Core Run	Soil Or Rock: Grain Shape / Rec. Core	REMARKS Chemical Comp, Geologic Data, Ground Water, Construction Problems, etc.
					Monitoring Well Data:					1. Developed for 1½ hours on 6/11/86. 2. Pump test for 1 hour on 6/12/86.



GILBERT ASSOCIATES, INC.

SOIL AND ROCK CLASSIFICATION SHEET

SHEET 1 OF 2

PROJECT: Ash Filter Ponds W.O. 04-4479-158 SITE AREA Conemaugh Station

DRILL HOLE NO. MW-3

CONTRACTOR: Penn. Drilling Co. COORDINATES

ELEVATION 1076.4'

DRILLER: Tom Stewart

GWL 0 HRS ---

CLASSIFIED BY: Yogesh Shah DATE: 6/9, 10/86

24 HRS 5'-8"(6/12/8

Depth Ft.	Sample No.	SPT Blows/ 6 In. (6 12 18)	Ft. Rec.	Profile	DESCRIPTION Density (or Consistency), Color Rock Or Soil Type - Accessories	U.S.C.S.	R.Q.D.	Soil Or Rock: Range Size / Core Run	Soil Or Rock: Grain Shape / Rec. Core	REMARKS Chemical Comp, Geologic Data, Ground Water, Construction Problems, etc.
					Dark brown silty fine to medium sand, trace clay, trace coarse sand & gravel					1. Augered to 14'.
				9'						2. Airdrilled below 14'.
10'					Decomposed, brown sandstone					
				14'						
					Weathered, brown sandstone					
20'										
				22'						
					Grey shale					
30'										
					Hole terminated @ 33'					

GILBERT ASSOCIATES, INC.

SOIL AND ROCK CLASSIFICATION SHEET

SHEET 2 OF 2

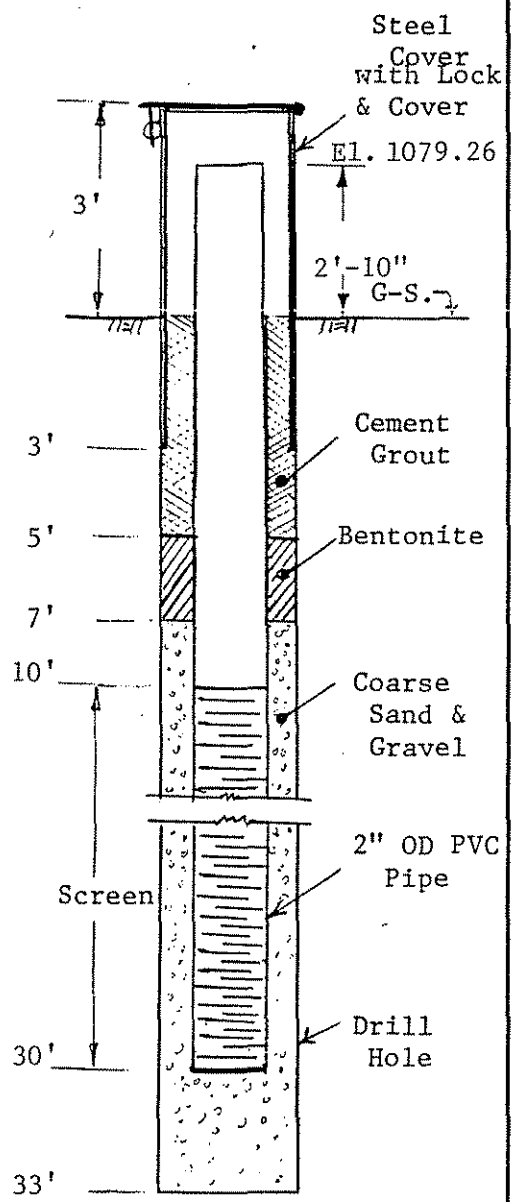
PROJECT: Ash Filter Ponds W.O. 04-4479-158 SITE AREA Conemaugh Station DRILL HOLE NO. MW-3

CONTRACTOR: Penn. Drilling Co. COORDINATES _____ ELEVATION 1076.4 (GS)

DRILLER: Tom Stewart GWL 0 HRS _____

CLASSIFIED BY: Yogesh Shah DATE: 6/12/86 24 HRS _____

Depth Ft.	Sample No.	SPT Blows/ 6 In. (6 12 18)	Ft. Rec.	Profile	DESCRIPTION Density (or Consistency), Color Rock Or Soil Type - Accessories	U.S.C.S.	R.Q.D.	Soil Or Rock: Range Size / Core Run	Soil Or Rock: Grain Shape / Rec. Core	REMARKS Chemical Comp, Geologic Data, Ground Water, Construction Problems, etc.
					Monitoring Well Data:					1. Developed for 2 hours on 6/12/86. 2. Pump test for ½ hour on 6/12/86.



GILBERT ASSOCIATES, INC.

SOIL AND ROCK CLASSIFICATION SHEET

SHEET 1 OF 2

PROJECT: Ash Filter Ponds W.O. 04-4479-158 SITE AREA Conemaugh Station

DRILL HOLE NO. MW-4

CONTRACTOR: Penn. Drilling Co. COORDINATES _____

ELEVATION 1075.6'

DRILLER: Tom Stewart

GWL 0 HRS ---

CLASSIFIED BY: Yogesh Shah DATE: 6/10, 11/86

24 HRS 4'-73/4"(6/12/

Depth Ft.	Sample No.	SPT Blows/ 6 In. (6 12 18)	Ft. Rec.	Profile	DESCRIPTION Density (or Consistency), Color Rock Or Soil Type - Accessories	U.S.C.S.	R.Q.D.	Soil Or Rock: Range Size / Core Run	Soil Or Rock: Grain Shape / Rec. Core	REMARKS Chemical Comp, Geologic Data, Ground Water, Construction Problems, etc.
					Dark brown silty fine to medium sand, trace to little clay, trace coarse sand & gravel					
10'				9½'						
					Decomposed, brown sandstone					
				14'						
					Weathered, brown sandstone					
20'										
				23'						
					Grey shale					
30'										
					Hole terminated @ 33'					

GILBERT ASSOCIATES, INC.

SOIL AND ROCK CLASSIFICATION SHEET

SHEET 2 OF 2

PROJECT: Ash Filter Ponds W.O. 04-4479-158 SITE AREA Conemaugh Station

DRILL HOLE NO. MW-4

CONTRACTOR: Penn. Drilling Co. COORDINATES

ELEVATION 1075.6 (GS)

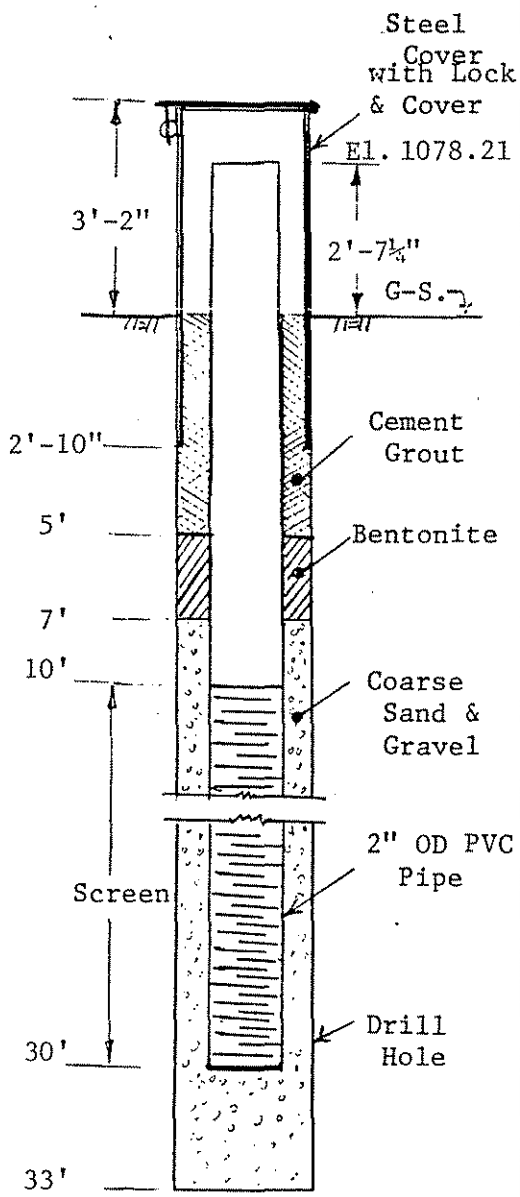
DRILLER: Tom Stewart

GWL 0 HRS

CLASSIFIED BY: Yogesh Shah DATE: 6/11/86

24 HRS

Depth Ft.	Sample No.	SPT Blows/ 6 In. (6 12 18)	Ft. Rec.	Profile	DESCRIPTION Density (or Consistency), Color Rock Or Soil Type - Accessories	U.S.C.S.	R.Q.D.	Soil Or Rock: Range Size / Core Run	Soil Or Rock: Grain Shape / Rec. Core	REMARKS Chemical Comp, Geologic Data, Ground Water, Construction Problems, etc.
					Monitoring Well Data:					1. Devleoped for 1½ hours on 6/11/86. 2. Pump test for ½ hour on 6/12/86.



gai CONSULTANTS, INC.

PROJECT GPU CONEMAUGH IMPOUNDMENTS WQMP — PROJECT NO. 92-220-71-18

ELEVATION _____ GWL 0 HRS _____ HRS — BORING NO. MW-23

DATE 10-1-98 FIELD ENGINEER S. C. WIGTON — PAGE NO. 1 OF 2

DEPTH FEET	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%)	PROFILE	SOIL DENSITY—CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
						BRN	SAND AND GRAVEL SOME BOULDERS (Fill)		BOULDERS 3"-1' Ø
2.0									BORING LOCATED IN BACKHOE
									TEST HOLE DUG TO ~6 FT
4.0									THEREFORE WILL AUGER A
							(4.5-5.1 Concrete Infill)		NON-SAMPLED HOLE TO 10'
6.0									
8.0									
10.0									
	33 32	OS-1			V. STF	GRY/BRN	SANDY CLAY SOME SS FRAGS	CL	SS FRAGS 1/8 - 3/4" Ø
12.0	24 27	0.6/2.0					Traces of ORGANIC MATERIAL (ROOTS ETC.)		Probable original Ground level
14.0									
	17 38	OS-2			DENSE	BRN	CLAYEY SAND AND SS FRAGS	SC	SAMPLE MOIST TO WET
16.0	39 39	1.0/2.0							
18.0									
	16 27	OS-3							SAMPLE WET
20.0	34 42	12/2.0							
22.0									
	22 36 43	OS-4			DENSE	BRN	CLAYEY SAND AND GRAVEL	SC/CL	SAMPLE SATURATED
24.0	50/5	1.5/2.0							
									AUGER REFUSAL 25.0 ROLLER BIT
26.0							(BOULDER 25-26 FT)		PUT IN HOLE.
									ADVANCE AUGERS TO 28 FT
28.0				28.1 TIME					
						GRY	SHALE (TOP OF ROCK 28.1)		
30.0							BOTTOM OF BORING 30 FT		

REMARKS** L.G. HETAGER DRILLING Co Driller Jim HOPKINS DRILLTECH D40K RIG. 0-25' 8¼ ID 14-INCH OD HSA 25-30' 7⅞" ROLLER BIT.

PROJECT NO. 92-220-71-18

BORING NO. MW-23

*POCKET PENETROMETER READINGS

**METHOD OF ADVANCING AND CLEANING BORING

gai CONSULTANTS, INC.

PROJECT GPA CONEMAUGH IMPOUNDMENTS WQMP — PROJECT NO. 92-220-71-18

ELEVATION _____ GWL 0 HRS _____ HRS — BORING NO. mw-23

DATE 10-2-98 FIELD ENGINEER S. C. WIGTON — PAGE NO. 2 OF 2

DEPTH FEET	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%)	DESCRIPTION: PROFILE	SOIL DENSITY—CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
							WELL CONSTRUCTION		
					- SET 20	FT 20 SLOT SCH 40 PVC SCREEN 30-10			
					- SOLID	PVC RISER 10→+2 FT			
					- 430 BEST SILICA SAND 30 FT - 9.0 FT				
					- BENTONITE PELLETS 9-7 FT				
					- Bentonite chips 7-2 FT				
					- CONCRETE 2-	SURFACE			
					- SET 10	FT LONG	Steel Protective COVER IN CONCRETE DRILLER PUTS 430 SAND between PVC and Steel		
					- Poured	2'x2'-	4 inch thick Pad around well		
							WELL DEVELOPMENT		
							- SURGE AND PUMP FOR 2 HOURS		
							WATER VERY MUDDY		
							- PUMP GETS STUCK IN WELL FOR		
							6 HOURS HAVE TO GET UPSY-DAISY		
							PUMP PULLER TO REMOVE		
							- GET PUMP OUT THEN CONFIRM THE		
							FINISHED DEPTH WITH PROBE AND		
							TREMMIE PIPE		
							- THERE IS SOME 430 BEST SILICA		
							INSIDE THE CASING BUT IT CAME FROM		
							THE SPACE BETWEEN THE STEEL PROTECTIVE		
							AND PVC DURING DEVELOPMENT		
							- WELL APPEARS TO BE O.K.		

REMARKS** _____

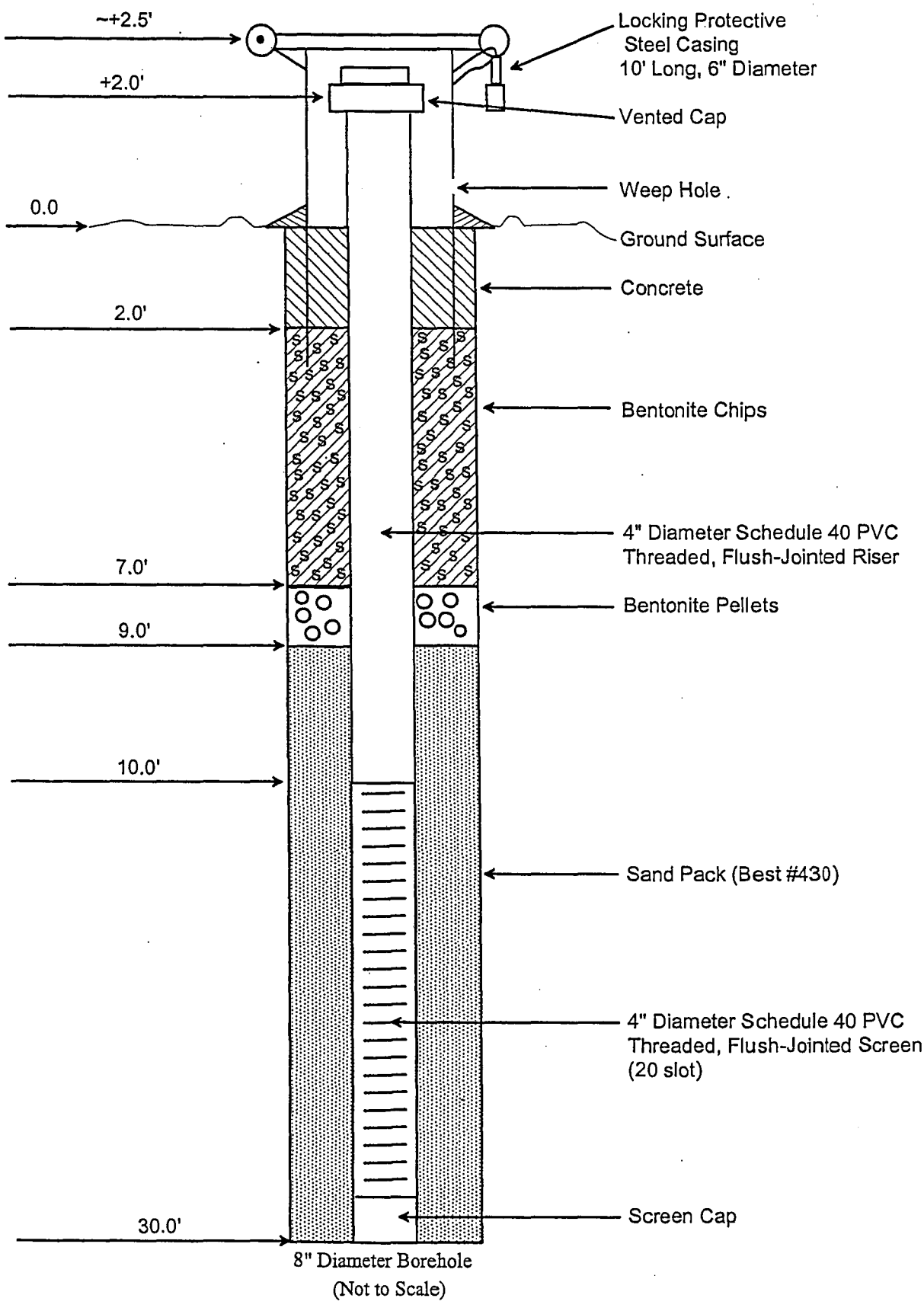
PROJECT NO. 92-220-71-18

BORING NO. mw-23

*POCKET PENETROMETER READINGS

**METHOD OF ADVANCING AND CLEANING BORING

Project 1999-220-71-18
D:wells/MW23



MW 23
CONEMAUGH RESIDUAL WASTE IMPOUNDMENTS
MONITORING WELL CONSTRUCTION DIAGRAM

ATTACHMENT 3C

Monitoring Well Installation Specifications, March 1986

Note: This document provides record of the specifications for monitoring well installations.

Gilbert/Commonwealth engineers and consultants

GILBERT/COMMONWEALTH, INC., P.O. Box 1498, Reading, PA 19603 / Tel. 215-775-2600 / Cable Gilasoc / Telex 836-431

March 11, 1986

Pennsylvania Electric Company
1001 Broad Street
Johnstown, Pennsylvania 15907

MAR 19 REC'D

Attention: J. R. King

Re: Conemaugh Station
Ash Filter Ponds New Monitoring Wells
G/C, Inc. W.O. 04-4479-158
GDE Project No. C0094
Penelec W.O. C344

Dear Jim:

Attached is a sketch and specifications for the installation of four new monitoring wells at Conemaugh Station for the Ash Filter Ponds. It is presently planned to install the wells in late spring or early summer. Based on our telephone conversation in February, it is my understanding that PaDER does not have to preapprove the well installation details. A price for installation of the wells is being obtained from Pennsylvania Drilling Company.

If you have any questions or comments, please contact me.

Very truly yours,

F. Gregory Nadeau

F. G. Nadeau
Project Civil Engineer

FGN:bmb
Attachment

cc: J. L. Greco
F. L. Straw
T. J. Simunich, Jr.
K. W. Eshbaugh (Letter Only)
R. T. Gallus
S. G. Poje
S. T. Worthington (2)
T. P. Wolff
B. L. Dore
J. E. Gritzer (Letter Only)
E. J. Zinn, Jr.
J. F. Wagner
P. K. Shewchuk (Letter Only)
O. G. Boarder (Letter Only)
D. R. Erali/F. G. Nadeau

CONEMAUGH STATION
NEW MONITORING WELLS FOR
ASH FILTER PONDS

Technical Requirements

1. Four new monitoring wells shall be installed at the locations indicated on Drawing No. D-782-023. The two upgradient wells will be approximately 45 feet deep and the two downgradient wells will be approximately 35 feet deep. The exact depth will be determined in the field.

2. The wells shall be drilled with air rotary or other approved means. Drilling fluids with Bentonite or "Revert" shall not be used. The wells shall not be contaminated with grease or other deleterious materials.

3. Pea gravel for backfill shall be non-calcareous; composed of hard, tough, durable, and uncoated particles; thoroughly cleaned by washing; and be free from clay, silt, vegetation, or other substances determined to be deleterious. It shall meet the following gradation requirements:

Sieve Size U.S. Standard	Percent Passing By Dry Weight
1/2 inch	100
No. 8	0-10

4. Bentonite tablets shall be Volclay Tablets as manufactured by American Colloid Company of Skokie, Ilinois or approved equal.

5. The riser pipe and screen shall be Schedule 40 PVC pipe flush threaded joints. No glue shall be used to join the sections together.

6. The grout mix shall consist of Portland Cement, pulverized Bentonite, and water. Portland Cement shall conform to the requirements of ASTM C150 for Type I Cement. Bentonite shall be equivalent to naturally ocurring Wyoming Bentonite, ground to pass a 200-mesh screen. Water shall be clean and free from oil, acid, organic matter, or other deleterious substances. The water/cement ratio shall be approximately 1:1. All grout shall contain a proportion of pulverized Bentonite equal to four to five percent of the weight of the cement. A smooth slurry shall first be prepared by adding and mixing Bentonite to water. Then the cement shall be added to the slurry. The grout shall be thoroughly mixed to produce a uniform, highly plastic mixture. Grout shall be placed with a hose placed sufficiently down the drill hole so that no segregation of the grout occurs and no voids are left in the space to be grouted. Grout shall be pumped down the hole until it appears at the ground surface.

7. The well shall be developed by such methods as will effectively extract from the water bearing formation the maximum practical quantity of sand and other fine materials in order to bring the well to the maximum yield per foot of drawdown and to a clear condition. Compressed air, surge plungers, high velocity setting equipment, and pumps may be used for the development work. This work shall be done in a manner that does not cause undue

settlement and disturbances of the strata above the water bearing formation or disturb the seal around the well casing. Development of the well shall be continued until water pumped from the well at maximum possible rate is clear and free from sand or silt.

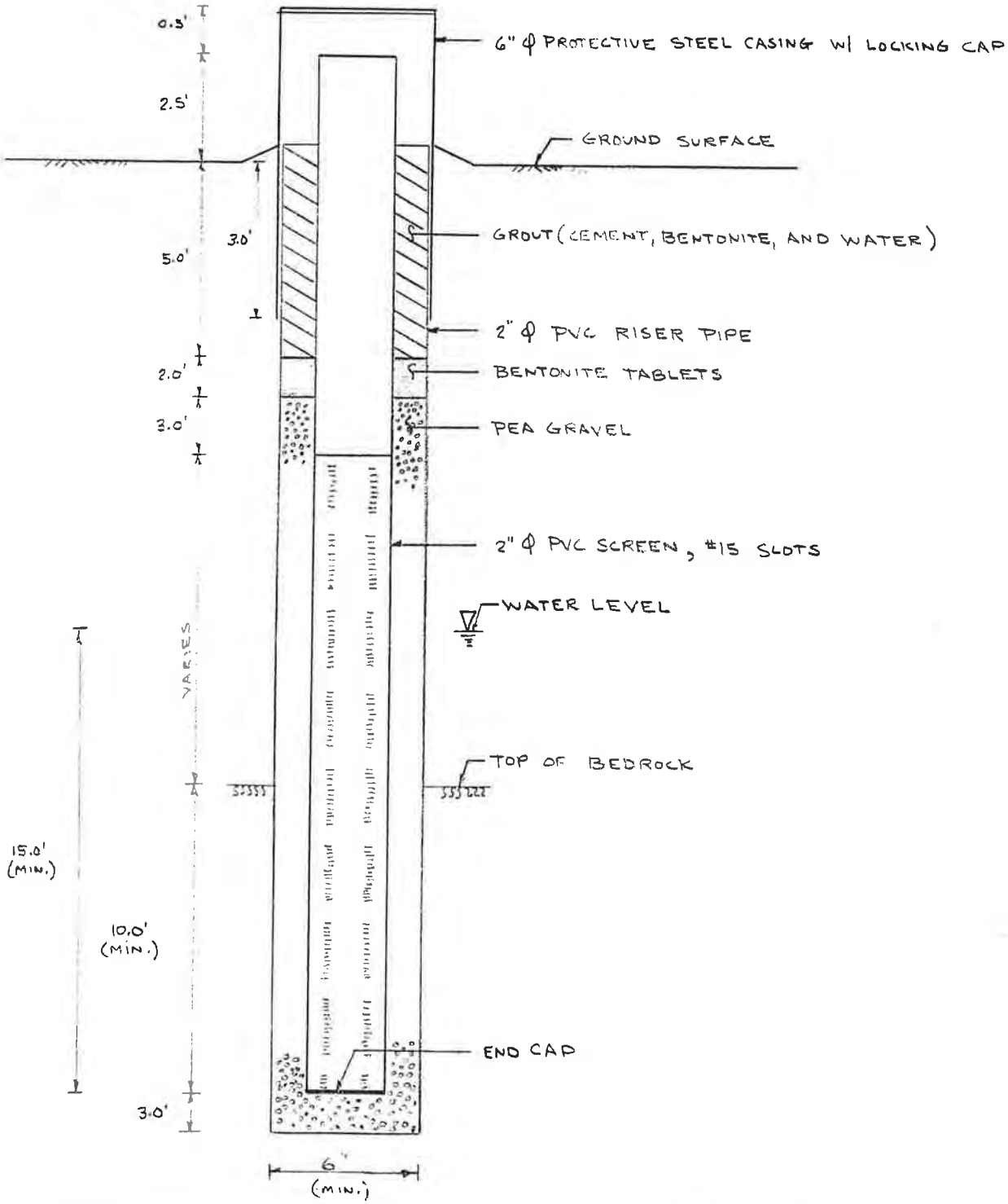
8. The area shall be cleaned of debris from the drilling operations.

9. After well development, a pump test will be performed for each well. A metering device shall be provided to measure the total volume of water evacuated from the well. The pump test will take approximately one to two hours. A bailer may be used instead of a pump.

10. The Contractor shall provide the pump or bailer for the tests.

11. All drilling and pump tests shall be done under the direction of a G/C, Inc. Engineer or Geologist.

CONEMAUGH - ASH PONDS	MADE F.G. Nadeau	GILBERT ASSOCIATES, INC. ENGINEERS AND CONSULTANTS READING, PENNA.	
TYPICAL DETAIL FOR	CHK'D.		
INSTALLATION OF MONITORING WELLS	SQ. CF.		
	CF. DFN.	04-4479-158	0
	ENG.	WORK ORDER / SIZE / DRAWING	REV.
	REV. CH. APP. DATE 12-3-84	NO SCALE	



ATTACHMENT 3D

CCR Groundwater Monitoring Network Design Report, October 2017

CCR COMPLIANCE
GROUNDWATER MONITORING SYSTEM DESIGN
ASH FILTER PONDS AND ASH/REFUSE DISPOSAL SITE

Prepared for:

GenOn Northeast Management Company
Conemaugh Generating Station
New Florence, Pennsylvania

Prepared by:

Aptim Environmental & Infrastructure, Inc.
Pittsburgh, Pennsylvania

October 2017

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Professional Engineer's Certification

In accordance with §257.91(f) of the Rule, I hereby certify, based on a review of the information contained in the "Conemaugh CCR Groundwater Monitoring Network Design Report" (APTIM, October 2017) and other information made available to me, and my knowledge and understanding of accepted hydrogeological principles, that the groundwater monitoring systems associated with the Conemaugh CCR Units are adequate and appropriate. This certification further acknowledges the utilization of the required minimum number of monitoring wells as appropriate for the Conemaugh Ash Disposal Site, and also the adoption of a multiunit monitoring system (per §257.91[d]) for the Ash Filter Ponds. The construction and orientation of the respective groundwater monitoring systems is sufficient to satisfy the performance standards outlined in §257.91(a)(1-2) of the Rule.

Certified by: _____

Richard Southorn, P.E., P.G., CPSWQ
Professional Engineer Registration No. PE 085411
Aptim Environmental & Infrastructure, Inc.

Date: 10/9/17

1.0 Introduction

Title 40 Code of Federal Regulations §257.91 requires owners or operators of Coal Combustion Residuals (CCR) landfills and surface impoundments, also known as CCR units, to implement a groundwater monitoring system. 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. The referenced groundwater monitoring system for each defined CCR unit must consist of a sufficient number of wells (minimum of one upgradient and three downgradient per §257.91[c][1]). Moreover, and per the performance standards outlined in §257.91(a)(1-2), these wells must be installed at appropriate locations to provide an accurate characterization of background groundwater quality and to be capable of accurately representing the quality of groundwater passing the downgradient boundary of the CCR unit. The overall groundwater monitoring system's ability to satisfy these elements of the Rule must be documented and certified by a registered professional engineer in accordance with §257.91(f).

The Conemaugh Generating Station (Station), operated by GenOn Northeast Management Company, is a coal-fired power plant located in New Florence, 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 Conemaugh Ash/Refuse Disposal Site and four Ash Filter Ponds (Ponds "A," "B," "C," and "D") used for the management of bottom ash. 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. Additionally, in accordance with the provisions of §257.91(d) of the Rule, the groundwater monitoring system for the Ash Filter Ponds has been designated to provide coverage in the context of a multiunit system encompassing all four ponds collectively.

This certification has been prepared to comply with the requirements of §257.91(f), addressing the adequacy and ability of the groundwater monitoring systems to satisfy the performance standards mandated by §257.91(a)(1-2) of the Rule. This Certification will be placed in the Station's operating record per §257.105(h)(3), noticed to the State Director per §257.106(h)(2), and posted to the publicly accessible internet site per §257.107(h)(2).

2.0 CCR Unit Descriptions

2.1 General Descriptions

Ash Filter Ponds

As noted above, four ash filter ponds are utilized to manage bottom ash at the Station. These four ponds are located within the Station proper, are situated immediately adjacent to one another, and are designated from north to south as Bottom Ash Filter Recycle Pond "A" and Bottom Ash Filter Ponds "B," "C," and "D" (see attached Figure 1). Each pond is approximately 405 feet long by 90 feet wide as measured at the crest and has an average depth of approximately 11 feet as measured from the crest to the top of the protective bottom ash layer. The crest elevation is approximately 1,092.0 feet above mean sea level (msl) and the elevation of the top of the protective bottom ash layer ranges from approximately 1,084.6 feet msl on the eastern end of each pond to approximately 1,083.0 feet msl on the western end.

Conemaugh Station Ash/Refuse Disposal Site

The Conemaugh Station Ash/Refuse Disposal Site (Ash Disposal Site) is a valley fill located north of the Station proper. The Ash Disposal Site consists of three stages, including Stage I (closed), Stage II (currently active), and Stage III (permitted expansion currently under construction). The location of the Ash Disposal Site is shown on Figure 2. Stage I occupies approximately 160 acres within the northernmost reaches of the valley and was brought online in 1970. Stage I was constructed as an unlined facility and was subsequently closed in 1987. Stage II (brought online in 1985) is presently maintained as the active disposal area and utilizes a single liner comprised of a 50-mil polyvinyl chloride (PVC) geomembrane with an accompanying leachate collection and detection system. Stage II occupies approximately 120 acres, and its northern side overlies the outslope of the Stage I disposal area (piggy-backs over Stage I); it extends approximately 2,000 feet southward into the valley from its interface with Stage I. Stage III will occupy an area of approximately 110 acres, will piggy-back over the Stage II disposal area, and will extend southward 2,100 feet where its outslope will terminate approximately 600 feet north of the existing Ash Disposal Site Surge Pond. The permit modification for Stage III was issued by the Pennsylvania Department of Environmental Protection on August 26, 2015.

2.2 Site Geology and Hydrogeology

Ash Filter Ponds

The ponds are underlain by recent alluvium that was deposited by the Conemaugh River. The alluvium typically ranges from 20 to 25 feet thick but can extend to depths as great as 32 feet below ground surface (bgs). The alluvium directly overlies shale and siltstone bedrock and is comprised of clayey sand to sandy clay that extends from the ground surface to depths ranging from 12 to 18 feet bgs. The alluvial materials become coarser grained with increasing depth and

grade into silty sand and sand and gravel near the upper bedrock surface. Groundwater beneath the Ash Filter Ponds resides within the alluvium. This water-bearing zone further represents the uppermost aquifer in this area and exists in an unconfined condition. Groundwater flow is topographically controlled and flows toward the Conemaugh River which is the naturally occurring groundwater discharge zone in the area of the Ash Filter Ponds. Groundwater flowing from upgradient of the Ash Filter Ponds will pass beneath the CCR unit and through the areas in which the downgradient monitoring wells are located.

Ash Disposal Site

The Ash Disposal Site is underlain by rocks of the lower part of the Casselman Formation and the entire Glenshaw Formation, both of which comprise the Conemaugh Group of the Pennsylvanian System. The Conemaugh Group is typically in the range of 650 to 700 feet thick in the area of New Florence, Pennsylvania, and is comprised of interbedded sandstone, siltstone, shale, and claystone. The Casselman Formation, which is the uppermost formation in the Conemaugh Group, is approximately 350 feet thick and extends from the top of the Pittsburgh Limestone member (at the top of the formation) to the top of the Ames Limestone (at the bottom of the formation). In the area of the Ash Disposal Site, the hilltops are underlain by the Birmingham Shale, which lies near the bottom of the Casselman Formation. The Glenshaw Formation underlies the Casselman Formation and is approximately 300 to 350 feet thick. It is comprised of interbedded sandstone, siltstone, shale, and claystone. Claystone beds occurring in the Glenshaw Formation are important units because they commonly act as aquitards and aquicludes between groundwater-bearing units in sandstone and siltstone beds.

Four thin marine limestone beds are present in the Glenshaw Formation including Ames, Woods Run, Pine Creek, and Brush Creek. The Ames Limestone is the stratigraphically highest limestone bed in the Glenshaw Formation, while the Brush Creek Limestone is the stratigraphically lowest marine limestone bed in the Glenshaw Group. The importance of the marine limestone beds is that they are key marker beds that allow for determining stratigraphic position within the Glenshaw Formation. Economically unimportant coal beds, typically only a few inches thick, are also present within the Glenshaw Formation.

The only significant groundwater-bearing unit within the Casselman Formation in the area of the Ash Disposal Site is likely the Birmingham Shale, which underlies the hilltops to the east, south, and west of the Ash Disposal Site. In the Glenshaw Formation, significant groundwater-bearing units commonly include the Saltsburg Sandstone, Buffalo Sandstone, and Mahoning Sandstone. The Mahoning Sandstone is the basal member of the Glenshaw Formation. Minimal amounts of groundwater can also exist within the limestone, shale, siltstone, and thin coal beds.

The Allegheny Group underlies the Conemaugh Group. It is approximately 350 feet thick and is comprised largely of interbedded sandstone, siltstone, and claystone with some minor limestone beds. The Allegheny Group contains several economically important coal seams, including the Upper Freeport Coal (uppermost unit of the Allegheny Group), the Lower Freeport Coal, and the Lower Kittanning Coal. Portions of these seams have been mined in the area of the Ash Disposal Site. The Upper Kittanning and Middle Kittanning Coal seams are also present but are not considered to be important economic resources in the area of the Ash Disposal Site. Prominent near-surface hydrostratigraphic units in the Allegheny Group include the Butler Sandstone (located between the Upper and Lower Freeport coal seams) and the Freeport Sandstone (located between the Lower Freeport and Upper Kittanning coal seams).

The uppermost aquifer unit underlying the Ash Disposal Site exists in an unconfined condition near the soil/bedrock interface or in bedrock where the soil has been removed by past earthmoving activities at the site. Groundwater flow is topographically controlled and flows from north to south in the area of the Ash Disposal Site. Groundwater flowing from upgradient of the Ash Disposal Site will pass beneath the CCR unit and through the areas in which the downgradient monitoring wells are located.

3.0 Groundwater Monitoring Well Systems

The groundwater monitoring well systems for the Ash Filter Ponds and the Ash Disposal Site meet the requirements of §257.91 with respect to number and locations of wells and with respect to monitoring the same hydrostratigraphic interval. Provided below are tables showing details for the groundwater monitoring well systems for each of these CCR units.

3.1 Ash Filter Ponds

The groundwater monitoring system for the Ash Filter Ponds is comprised of five wells, including Wells MW-1B and MW-2 (upgradient), and Wells MW-3, MW-4, and MW-23 (downgradient). All five wells communicate with the alluvium, which is the uppermost aquifer. The locations of the groundwater monitoring wells are shown on Figure 1, along with depiction of the generalized groundwater flow direction in the area of the ponds. Installation details and boring logs for the wells are contained in Appendix A of this document, with pertinent information summarized in Table 1.

Table 1: Ash Filter Ponds Groundwater Monitoring Well System

Monitoring Well No.	Hydraulic Position	Casing Diameter (inches/material)	Ground Surface Elevation (feet msl)	Top of PVC Casing Elevation (feet msl)	Well Depth (feet bgs)	Top/Bottom Elevations of Screened Interval (feet msl)
MW-1B	Upgradient	2-inch PVC	1,086.89	1,089.49	39.5	1,077.39 / 1,047.39
MW-2	Upgradient	2-inch PVC	1,088.90	1091.57	46.0	1,075.90/1,045.90
MW-3	Downgradient	2-inch PVC	1,079.05	1,079.39	30.0	1,069.05 / 1,049.05
MW-4	Downgradient	2-inch PVC	1,077.18	1,080.03	30.0	1,067.16 / 1,047.16
MW-23	Downgradient	4-inch PVC	1,084.51	1,085.93	30.0	1,074.51 / 1,054.51

3.2 Ash Disposal Site

The groundwater monitoring system for the Ash Disposal Site is comprised of four wells, including Well MW-31 (upgradient) and Wells MW-9, MW-10, and MW-11 (downgradient). Monitoring Wells MW-9 and MW-11 communicate with the shallow unconfined groundwater in bedrock and Monitoring Wells MW-10 and MW-31 communicate with shallow groundwater across the soil/bedrock interface. Hence, all four wells monitor the uppermost aquifer in the area of the Ash Disposal Site. The locations of the groundwater monitoring wells are shown on Figure 2, along with depiction of the generalized groundwater flow direction in the area of the landfill. Boring logs and installation details for the wells are contained in Appendix B of this document, with pertinent information summarized in Table 2.

Table 2: Ash Disposal Site Groundwater Monitoring Well System

Monitoring Well No.	Hydraulic Position	Casing Diameter (inches/ material)	Ground Surface Elevation (feet msl)	Top of PVC Casing Elevation (feet msl)	Well Depth (feet bgs)	Top/Bottom Elevations of Screened Interval (feet msl)
MW-31	Upgradient	4-inch PVC	1,475.96	1,477.94	57.8	1,443.46 / 1,418.46
MW-9	Downgradient	4-inch PVC	1,140.73	1,142.87	110	1,080.73 / 1,030.73
MW-10	Downgradient	4-inch PVC	1,128.24	1,129.76	50.2	1,123.04 / 1,078.04
MW-11	Downgradient	4-inch PVC	1,126.21	1,128.18	110	1,111.21 / 1,016.21

4.0 Purging and Sampling Equipment

To support the collection of representative groundwater samples from each of the monitoring wells, the low-flow method has been adopted and utilized for sampling at both of the Conemaugh CCR units, and will remain in place for all subsequent Detection Monitoring activities, and Assessment Monitoring activities (if necessary). The low-flow method is documented and accepted by the U.S. Environmental Protection Agency, and allows for purging/sampling of groundwater such that laminar flow (non-turbulent) conditions are maintained with corresponding minimal or no drawdown in the well. This, in turn, promotes continuous or near-continuous groundwater recharge of the well from the surrounding formation, and ensures that the subsequently collected samples are representative of fresh formation waters. Low-flow sampling can be performed using either dedicated or portable sampling equipment.

For the Ash Filter Ponds, a combination of dedicated pumps and portable equipment is employed to conduct the CCR sampling efforts. For Wells MW-1B, MW-3, and MW-23, dedicated air-operated bladder pumps (manufactured by Geotech Environmental Equipment, Inc.) have been installed. Due to slight deformation in the near-surface casing of Wells MW-2 and MW-4 (which does not affect the integrity of the wells), a portable peristaltic pump is used for sample collection. For the Ash Disposal Site, all four wells have been equipped with dedicated air-operated bladder pumps. Each of the dedicated pump intakes is set so that sediment from the bottom of the wells or stagnant water from the tops of the water columns is not drawn in during the groundwater purging/sampling. Table 3 provides a summary of the monitoring wells depths, the depths to the dedicated pump intakes, and the heights of the water column above the pump intakes (this information is based on actual field measurements).

Table 3: Well Depths and Sampling Pump Settings

Monitoring Well	Location	Measured Total Depth (feet below top of casing)	Depth to Pump Intake (feet below top of casing)	Nominal Height of Water Column above Pump Intake (feet)
MW-1B	Ash Filter Ponds	41.95	38	19.2
MW-2	Ash Filter Ponds	44.63	N/A	N/A
MW-3	Ash Filter Ponds	27.50	24	9.2
MW-4	Ash Filter Ponds	32.65	N/A	N/A
MW-23	Ash Filter Ponds	32.03	29	10.4
MW-9	Ash Disposal Site	116.17	108	67.9
MW-10	Ash Disposal Site	50.10	47	19.2
MW-11	Ash Disposal Site	110.6	106	79.7
MW-31	Ash Disposal Site	59.85	55	12.2

Figures

LEGEND:

MW-3 (1067.09) — CCR GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION MEASURED ON APRIL 25, 2017

GROUNDWATER FLOW DIRECTION

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

SCALE

0 100 200 FEET

APTIM

500 Penn Center Boulevard,
Suite 1000
Pittsburgh, Pennsylvania 15235

GenOn

FIGURE 1
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH FILTER PONDS
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	8/4/17	--	E. Schlegel	--	--	1009144003-B5

File: O:\PROJECT\1009144003_Conemaugh\1009144003-B5.dwg
Plot Date/Time: Sep 13, 2017 – 6:24am
Plotted By: greg.jones
Xref: Image

LEGEND:

MW-9 (1099.47) — CCR GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION MEASURED ON APRIL 12 AND 13, 2017

GROUNDWATER FLOW DIRECTION

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

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

GenOn

FIGURE 2
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH/REFUSE DISPOSAL SITE
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	8/4/17	--	E. Schlegel	--	--	1009144003-B6

File: O:\PROJECT\1009144003_Conemaugh\1009144003-B6.dwg
Plot Date/Time: Sep 13, 2017 - 6:28am
Plotted By: greg.jones
Xref: Image

Appendix A

Boring Logs and Construction Details—Ash Filter Ponds Groundwater Monitoring Wells

gai CONSULTANTS, INC.

PROJECT RELIANT ENERGY CONEMAUGH GENERATING STATION MW-1 REPLACEMENT PROJECT NO. 92-220-71 TASK 18

ELEVATION SAME AS MW-1 GWL 0 HRS _____ HRS BORING NO. MW-1B

DATE 9-03-03 CLASSIFIED BY S. C. WIGTON PAGE NO. 1 OF 2

DEPTH FEET	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%)	DESCRIPTION: PROFILE	DESCRIPTION: SOIL DENSITY—CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: COLOR	DESCRIPTION: MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
						GRY/BRN	GRAVEL/LIMESTONE/CINDERS/TOPSOIL		START 9-3-03
				1.4		BRN	SAND, SILT, AND CLAY (FILL)		
5.0									WET @ 5.0 FT
							VERY LITTLE RETURN OF CUTTINGS		
10.0									
							LARGE BOULDER (>1 FT. Ø) TEARDROP SHAPED		
15.0							WEDGED INTO HOLLOW STEM AUGERS MAKING		
							DRILLING IMPOSSIBLE, PULL AUGERS OUT OF HOLE		
							AND USING A SLEDGE DRIVE ROCK OUT OF BIT		
							The boulder is alluvial material		
							– BOULDERS 14 FT to 26 FT.		– CUTTINGS ARE [illegible]
20.0									OF SATURATED [illegible]
									[illegible]
							VERY LITTLE RETURN OF CUTTINGS		
25.0									
30.0									

REMARKS** DRILLTECH D40K L.G. HETAGER DRILLING COMPANY 0-32 FOR 6¼ I.D. HOLLOW STEM AUGERS. 32-40 FT 6" TRICONE ROLLER BIT with ADX.

PROJECT NO. 92-220-71 TASK 18

BORING NO. MW-1B

*POCKET PENETROMETER READINGS

**METHOD OF ADVANCING AND CLEANING BORING

gai CONSULTANTS, INC.

PROJECT Reliant Energy Conemaugh Generating Station MW-1 Replacement PROJECT NO. 92-220-71 Task 2

ELEVATION _____ GWL 0 HRS _____ BORING NO. MW-1B

HRS

DATE 9-3-03 CLASSIFIED BY S.C. Wigton PAGE NO. 2 OF 2

DEPTH FEET	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%)	DESCRIPTION: PROFILE	DESCRIPTION: SOIL DENSITY—CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: COLOR	DESCRIPTION: MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
						BRN	CLAY SOME SILT AND SAND		
				28.0 TIPPLE					
						GRY	SILTSTONE		
35.0									
40.0									
							BOTTOM OF BORING 40.0 FEET		
45.0							WELL CONSTRUCTION		
					40-10 Ft	Sch 40	PVC 10 SLOT 4"Ø SCREEN		AS THE AUGERS WERE
					10-+2.5	Sch 40	PVC 4"Ø PIPE		WITHDRAWN AND THE [illegible]
					ANNULUS	40-8	SILICA SAND (430 BEST SILICA)		PACK WAS PLACED THE
						8-5	BENTONITE PELLETS (1-Bucket)		RUNNING SILT [illegible]
						5-1	BENTONITE CHIPS		SQUEEZED INTO THE ANNULUS
						1-0	CONCRETE		MAKING PLACEMENT OF
							2 Ft x 2 Ft x 0.5 Ft FORM AROUND 6"Ø		THE FILTER PACK [illegible]
							6' LONG STEEL PROTECTIVE COVER		
							LOCK FROM MW-1 WILL BE USED AGAIN		

REMARKS** SEE SHEET 1 OF 2

PROJECT NO. 92-220-71 Task 2

BORING NO. MW-1B

*POCKET PENETROMETER READINGS

**METHOD OF ADVANCING AND CLEANING BORING

Monitoring Well Design SOIL AND ROCK CLASSIFICATION SHEET

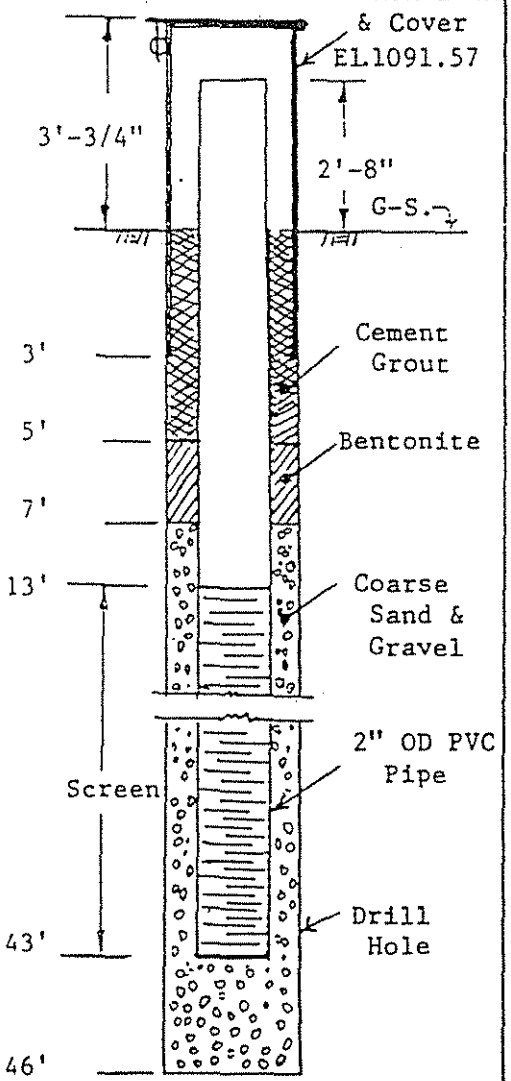
PROJECT: Ash Filter Ponds W.O. 04-4479-158 SITE AREA Conemaugh Station

CONTRACTOR: Penn Drilling Co. ELEVATION 1088.9 (GS)

DRILLER: Tom Stewart GWL 0 HRS

CLASSIFIED BY: Yogesh Shah DATE: 6/11/86 24 HRS

Depth Ft.	Sample No.	SPT Blows/ 6 In. (6 12 18)	Ft. Rec.	Profile	DESCRIPTION Density (or Consistency), Color Rock Or Soil Type - Accessories	U.S.C.S.	R.Q.D.	Soil Or Rock: Range Size / Core Run	Grain Shape / Rec. Core	REMARKS Chemical Comp, Geologic Data, Ground Water, Construction Problems, etc.
					Monitoring Well Data: MW-2					1. Developed for 1½ hours on 6/11/86. 2. Pump test for 1 hour on 6/12/86.



Monitoring Well Design SOIL AND ROCK CLASSIFICATION SHEET

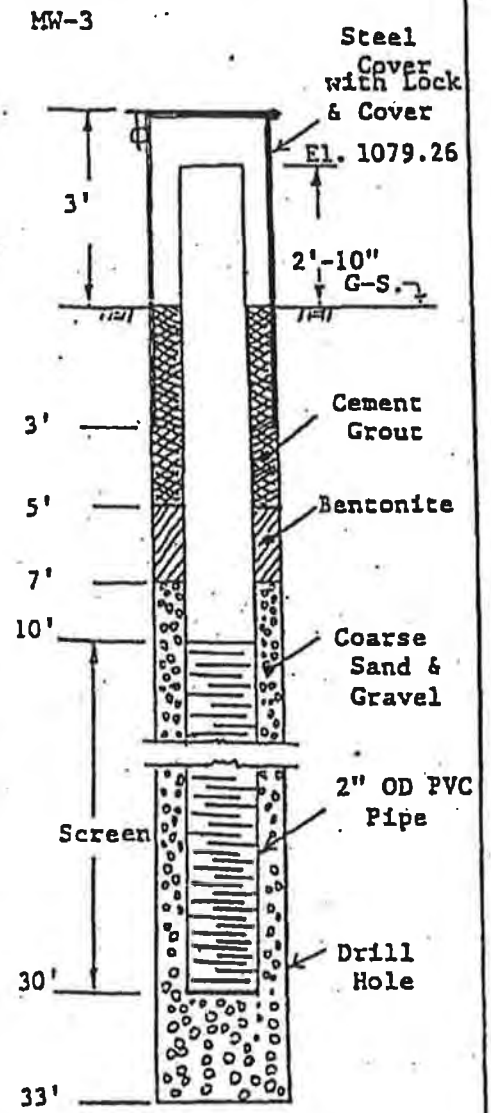
PROJECT: Ash Filter Ponds W.O. 04-4479-158 SITE AREA Conemaugh Station

CONTRACTOR: Penn. Drilling Co. ELEVATION 1076.4 (GS)

DRILLER: Tom Stewart GWL 0 HRS

CLASSIFIED BY: Yogesh Shah DATE: 6/12/86 24 HRS

Depth Ft.	Sample No.	SPT Blows/ 6 in. (6 12 18)	Ft. Rec.	Profile	DESCRIPTION Density (or Consistency), Color Rock Or Soil Type - Accessories	U.S.C.S.	R.Q.D.	Soil Or Rock: Range Size / Core Run	Grain Shape / Rec. Core	REMARKS Chemical Comp, Geologic Data, Ground Water, Construction Problems, etc.
					Monitoring Well Data: MW-3					1. Developed for 2 hours on 6/12/86. 2. Pump test for ½ hour on 6/12/86.



Monitoring Well Design

SOIL AND ROCK CLASSIFICATION SHEET

PROJECT: Ash Filter Ponds W.O. 04-4479-158 SITE AREA Conemaugh Station

CONTRACTOR: Penn. Drilling Co.

DRILLER: Tom Stewart

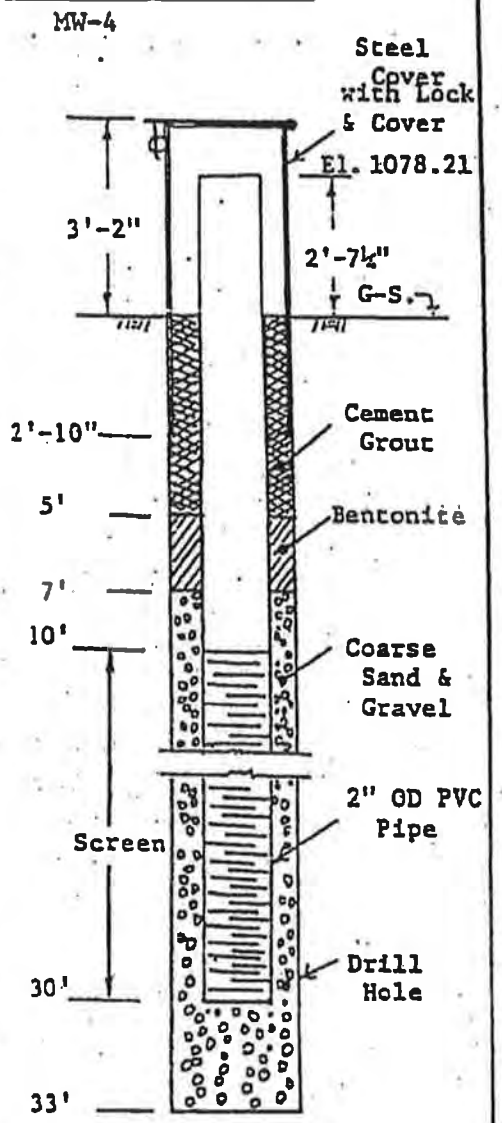
CLASSIFIED BY: Yogesh Shah DATE: 6/11/86

ELEVATION 1075.6 (GS)

GWL 0 HRS

24 HRS

Depth Ft.	Sample No.	SPT Blows/ 6 In. (6 12 18)	Ft. Rec.	Profile	DESCRIPTION Density (or Consistency), Color Rock Or Soil Type - Accessories	U.S.C.S.	R.Q.D.	Soil Or Rock: Range Size / Core Run	Soil Or Rock: Grain Shape / Rec. Core	REMARKS Chemical Comp, Geologic Data, Ground Water, Construction Problems, etc.
					Monitoring Well Data: MW-4					1. Devleoped for 1½ hours on 6/11/86. 2. Pump test for ½ hour on 6/12/86.



N 384879.38
E 1634491.13
Top of PVC 1085.93

gai CONSULTANTS, INC.

PROJECT GPU CONEMAUGH IMPOUNDMENTS WQMP — PROJECT NO. 92-220-71-18
Ground ELEVATION 1084.51 GWL 0 HRS ____ HRS 10/98 1068.35 — BORING NO. MW-23
DATE 10-1-98 FIELD ENGINEER S. C. WIGTON — PAGE NO. 1 OF 2

DEPTH FEET	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%)	DESCRIPTION: PROFILE	SOIL DENSITY—CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
						BRN	SAND AND GRAVEL SOME BOULDERS (FILL)		BOULDERS 3" - 1' Ø
2.0									BORING LOCATED IN BACKHOE
									TEST HOLE DUG TO ~6 FT
4.0									THEREFORE WELL AUGER A
							(4.5-5.1 Concrete Fill)		NON-SAMPLED HOLE TO 12'
6.0									
8.0									
10.0									
	33 32	OS-1			V. STF	GRY/BRN	SANDY CLAY SOME SS FRAGS	CL	SS FRAGS 1/8 - 3/4" Ø
12.0	24 27	0.6/2.0					TRACES OF ORGANIC MATERIAL (ROOTS ETC.)		Probable original Ground level
14.0									
	17 38	OS-2			DENSE	BRN	CLAYEY SAND AND SS FRAGS	SC	SAMPLE MOIST TO WET
16.0	39 39	1.0/2.0							
18.0									
	16 27	OS-3							SAMPLE WET
20.0	34 42	1.2/2.0							
22.0									
	22 36 43	OS-4			DENSE	BRN	CLAYEY SAND AND GRAVEL	SC/CL	SAMPLE SATURATED
24.0	9/15	1.5/2.0							
									AUGER REFUSAL 25.0 ROLLER BIT
26.0							(BOULDER 25-26 FT)		PUT IN HOLE.
									ADVANCE AUGER TO 28 FT
28.0				28.1 TIME					
						GRY	SHALE (TOP OF ROCK 28.1)		
30.0							BOTTOM OF BORING 30 FT		

REMARKS** L.G. HETAGER DRILLING CO Driller Jim HOPKINS DRILLTECH D40K RIG. 0-25' 8¼ ID 14-INCH OD HSA 25-30' 7⅞" ROLLER BIT.

PROJECT NO. 92-220-71-18
BORING NO. MW-23

*POCKET PENETROMETER READINGS

**METHOD OF ADVANCING AND CLEANING BORING

gai CONSULTANTS, INC.

PROJECT GPU CONEMAUGH IMPOUNDMENTS WQMP — PROJECT NO. 92-220-71-18

ELEVATION _____ GWL 0 HRS _____ HRS — BORING NO. MW-23

DATE 10-2-98 FIELD ENGINEER S. C. WIGTON — PAGE NO. 2 OF 2

DEPTH FEET	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%)	DESCRIPTION: PROFILE	SOIL DENSITY—CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
							WELL CONSTRUCTION		
					- SET 20 FT 20 SLOT SCH 40 PVC SCREEN 30-10				
					- SOLID PVC RISER 10 → +2 FT				all PVC pipe 4" ø
					- 430 BEST SILICA SAND 30 FT - 9.0 FT				
					- BENTONITE PELLETS 9-7 FT				
					- Bentonite chips 7-2 FT				
					- CONCRETE 2- SURFACE				
					- SET 10 FT long Steel Protective COVER IN CONCRETE Drillers Pipe				30 SAND between PVC and Steel
					- Poured 2'x2' - 4 inch thick Pad around well				
							WELL DEVELOPMENT		
							- SURGE AND PUMP FOR 2 HOURS		
							WATER VERY MUDDY		
							- PUMP GETS STUCK IN WELL FOR		
							6 HOURS HAVE TO GET UPSY-DAISY		
							PUMP PULLER TO REMOVE		
							- GET PUMP OUT THEN CONFIRM THE		
							FINISHED DEPTH WITH PROBE AND		
							TREMMIE PIPE		
							- THERE IS SOME 430 BEST SILICA		
							INSIDE THE CASING BUT IT CAME FROM		
							THE SPACE BETWEEN THE STEEL PROTECTIVE		
							AND PVC DURING DEVELOPMENT		
							- WELL APPEARS TO BE O.K.		

REMARKS** _____

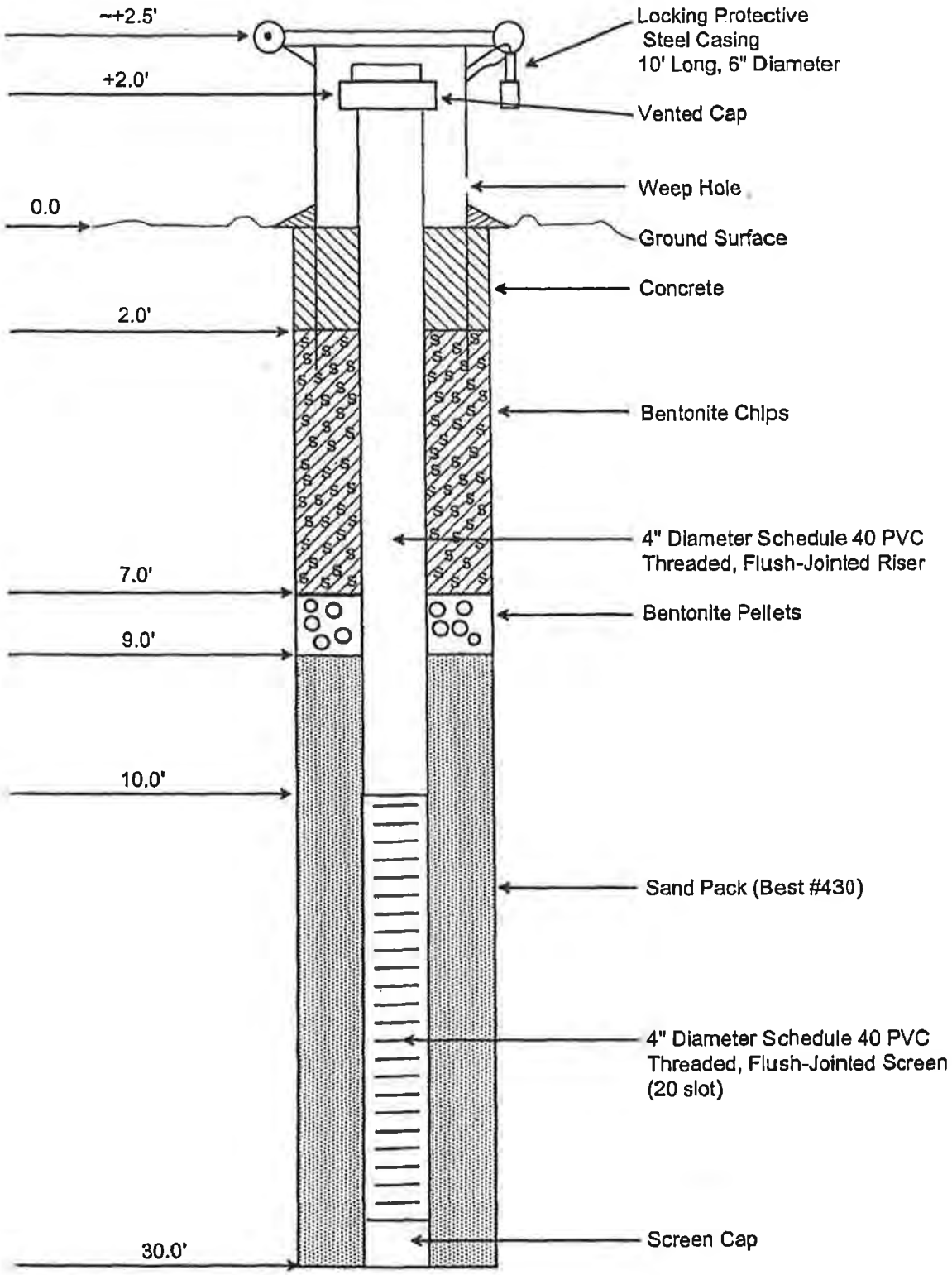
PROJECT NO. 92-220-71-18

BORING NO. MW-23

*POCKET PENETROMETER READINGS

**METHOD OF ADVANCING AND CLEANING BORING

Project 1999-220-71-18
D:wells/MW23



8" Diameter Borehole
(Not to Scale)

MW 23
CONEMAUGH RESIDUAL WASTE IMPOUNDMENTS
MONITORING WELL CONSTRUCTION DIAGRAM

Appendix B

Boring Logs and Construction Details—
Ash Disposal Site Groundwater Monitoring Wells

FORM 6R

Sheet 1 of 2

I.D. Number: 300876

Borehole Number: MW-9
Surface Elevation (Ft/MSL): 1140.73 (ft)
Borehole Diameter: 10 inches, From 0 To 20
7 7/8 inches, From 20 To 110
Total Depth: 110.0 (ft)
Depth to Static Ground Water Level (SWL): 41.92 (ft)
Date SWL Measured: 07/06/95 (mm/dd/yy)

Drilling Method: Air Rotary Rig (Truck Mounted)
Date Drilled: 8/3/92 (mm/dd/yy)
Drilled By: L. G. Hetager
Drillers License Number: 1728
Logged By: John B. Chapman
County: Indiana
Township or Municipality: West Wheatfield

Depth (Ft)	Lithologic Description	Plot	Ground Water* Observations	Samples No.	Samples Rec**/Att	Comments	Well/Piezometer Construction	Depth (Ft)
0	Silty Sand, medium orange						A, B, C, D	0
10	– medium brown							10
	orange brown							
20	Sandy Siltstone					Top of Rock at 20'		20
	Sandstone, Light brown							
30	– medium gray		32.0 ▽					30
40			41.92 ▼ (7/6/95)					40
	Shale, Dark gray					Some clay streaks		
50	Sandy shale, medium gray						E, F	50
	Sandstone, medium gray						G	
60								60

* ▽ Encountered Ground Water ▼ Composite Static Water Level ** Recovered/Attempted

Use additional sheets with this format as necessary

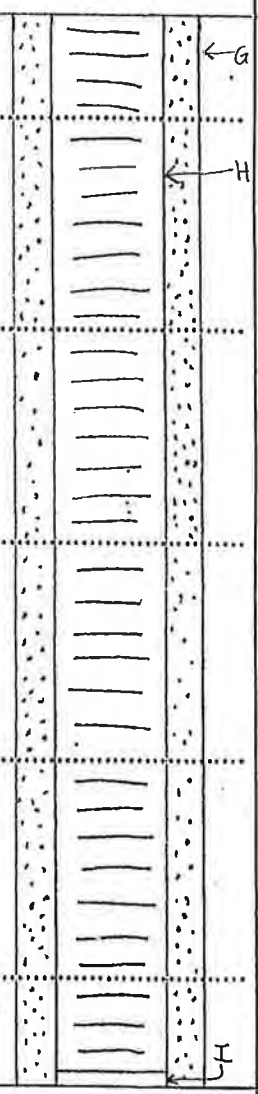
FORM 6R

I.D. Number: 300876

Borehole Number: MW-9
Surface Elevation (Ft/MSL): 1140.73 (ft)
Borehole Diameter: 10 inches, From 0 To 20
7 7/8 inches, From 20 To 110
Total Depth: 110.0 (ft)
Depth to Static Ground Water Level (SWL): _____ (ft)
Date SWL Measured: _____ (mm/dd/yy)

Drilling Method: Air Rotary Rig (Truck Mounted)
Date Drilled: 8/3/92 (mm/dd/yy)
Drilled By: L. G. Hetager
Drillers License Number: 1728
Logged By: J. B. Chapman
County: Indiana
Township or Municipality: West Wheatfield

Depth (Ft)	Lithologic Description	Plot	Ground Water* Observations	Samples No.	Samples Rec** Att	Comments	Well/Piezometer Construction	Depth (Ft)
60	Sandy shale, medium gray							60
70								70
80	Shale, Dark Gray Sandstone, Light Gray							80
90	Shale, Black - Dark Gray - Dark Gray					— Trace Coal Streaks		90
100								100
110						End of Boring at 110 ft.		110
120								



* ▽ Encountered Ground Water ▼ Composite Static Water Level ** Recovered/Attempted

Use additional sheets with this format as necessary

FORM 6R

Sheet 1 of 1

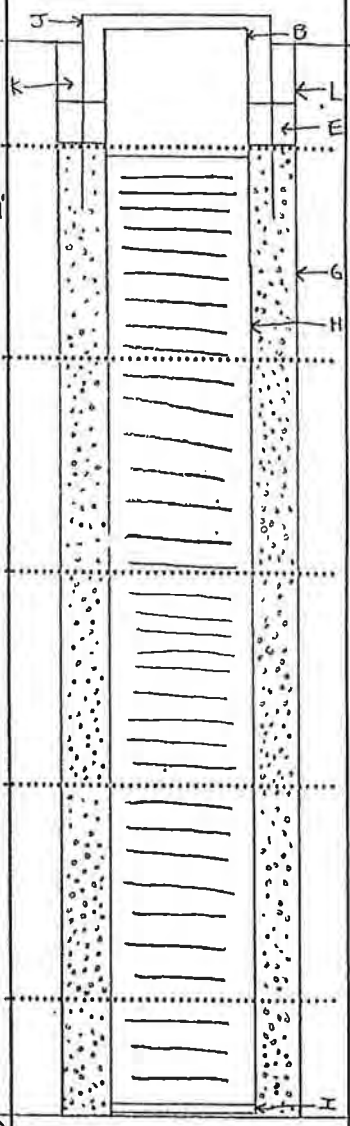
I.D. Number 30087.6

Borehole Number: MW-10
Surface Elevation (Ft/MSL): 1128.24 (ft)
Borehole Diameter: 10 inches, From 0 To 8.4
8 inches, From 8.4 To 50.3
Total Depth: 50.3 (ft)
Depth to Static Ground Water Level (SWL): 28.28 (ft)
Date SWL Measured: 07/12/95 (mm/dd/yy)

Drilling Method: Air Hammer (Truck Mounted)
Date Drilled: 01/23-24/89 (mm/dd/yy)
Drilled By: Pennsylvania Drilling Company
Drillers License Number: 0406
Logged By: J. E. Bonetti
County: Indiana
Township or Municipality: West Wheatfield

Depth (Ft)	Lithologic Description	Plot	Ground Water* Observations	Samples No.	Samples Rec** Att	Comments
0	Clay and Sandstone Fragments, Brown					Medium Stiff and Hard
	Clay, Light gray and Red					medium stiff to stiff
	– Blue to Dark Gray					stiff to very stiff. Top of Rock at 8.4'
10	Sandstone, Green and Brown					medium soft to medium Hard – Few shale seams
	– Gray and Brown					medium Hard
20	Silty Claystone, Dark gray and gray					medium soft to medium Hard
30			31.0 ▽; 28.28 ▼ (7/12/95)			
40						
	Siltstone, gray					medium Hard – Few carbonaceous shale seams
	Sandstone, gray					medium Hard
50						End of Boring at 50.3 Ft.
60						

Well/Piezometer Construction



* ▽ Encountered Ground Water ▼ Composite Static Water Level ** Recovered/Attempted

Use additional sheets with this format as necessary

FORM 6R

Sheet 1 of 2

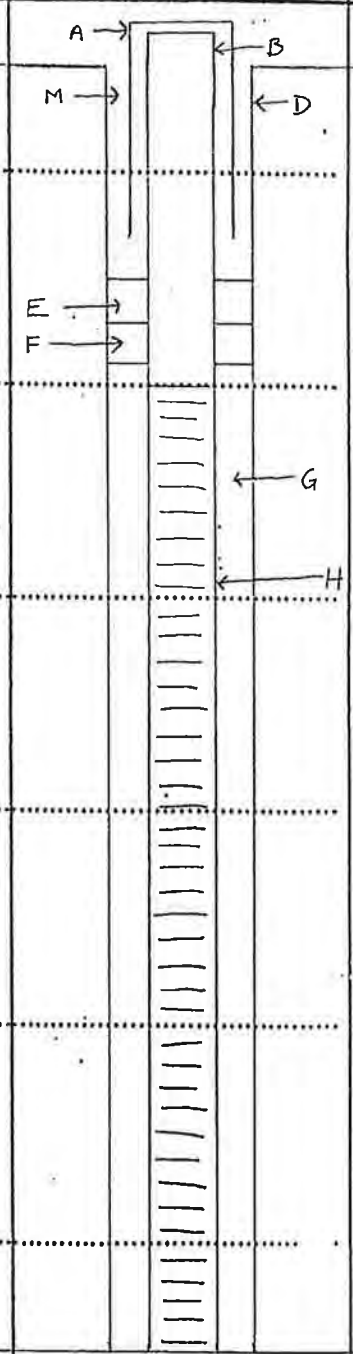
I.D. Number 300876

Borehole Number: MW-11
Surface Elevation (Ft/MSL): 1126.21 (ft)
Borehole Diameter: 8 inches, From 0 To 110
_____ inches, From _____ To _____
Total Depth: 110.0 (ft)
Depth to Static Ground Water Level (SWL): 26.25 (ft)
Date SWL Measured: 07/06/95 (mm/dd/yy)

Drilling Method: Air Rotary
Date Drilled: 11/4-5/93 (mm/dd/yy)
Drilled By: L.G. Hetager
Drillers License Number: 1728
Logged By: N.S. Slater
County: Indiana
Township or Municipality: West Wheatfield

Depth (Ft)	Lithologic Description	Plot	Ground Water* Observations	Samples No.	Samples Rec** Att	Comments
0	Topsoil Clay, some sandstone fragments					
	Flyash, Black					SOFT
10	Sandstone, Brown					Top of Rock at 9.0' medium soft to medium Hard - Some shale seams
	gray					medium Hard
20	Silty Claystone, gray					medium soft to medium Hard
			26.25 (7/6/95)			
30			33.0			
40						
	Siltstone, gray ~~Sandstone, gray~~					Some thin carbonaceous shale ~~medium Hard~~ medium Hard
50	Silty Shale, gray					medium soft
	Siltstone, gray					medium Hard
60						

Well/Piezometer Construction



* ▽ Encountered Ground Water ▼ Composite Static Water Level ** Recovered/Attempted

Use additional sheets with this format as necessary

FORM 6R

I.D. Number: 300876

Borehole Number: MW-11
Surface Elevation (Ft/MSL): 1126.21 (ft)
Borehole Diameter: 8 inches, From 0 To 110
_____ inches, From _____ To _____
Total Depth: 110 (ft)
Depth to Static Ground Water Level (SWL): 26.25 (ft)
Date SWL Measured: 07/06/95 (mm/dd/yy)

Drilling Method: Air Rotary
Date Drilled: 11/4-5/93 (mm/dd/yy)
Drilled By: L.G. Hetager
Drillers License Number: 1728
Logged By: N.S. Slater
County: Indiana
Township or Municipality: West Wheatfield

Depth (Ft)	Lithologic Description	Plot	Ground Water* Observations	Samples No.	Samples Rec** Att	Comments	Well/Piezometer Construction	Depth (Ft)
60	Siltstone, gray					Medium Hard Some Shale		60
70	Silty Sandstone, gray						H, G	70
80								80
	Shale, green					Soft		
90	- gray							90
	Calcareous Shale, gray					Medium Soft		
100								100
	Carbonaceous Shale, Black							
	Calcareous Shale, Black							
110						End of Boring at 110 Ft.		110
120								120

* ▽ Encountered Ground Water ▼ Composite Static Water Level ** Recovered/Attempted

Use additional sheets with this format as necessary

Drilling Log

Monitoring Well **MW-31**

Project: NRG Conemaugh Generating Station CCR | Owner: NRG
Location: New Florence, PA | Proj. No.: 1009144001
Surface Elev.: 1475.96 ft. | Total Hole Depth: 57.5 ft. | North: | East:
Top of Casing: 1477.94 ft. | Water Level Initial: ▽ 46.2 ft. | Static: ▼ 39.2 ft. | Diameter: 8 in.
Screen: Dia: 4 in. | Length: 25 ft. | Type/Size: Schedule 40 PVC/0.010 in.
Casing: Dia: 4 in. | Length: 35 ft. | Type: Schedule 40 PVC
Fill Material: Hole Plug | Rig/Core: Versa Drill
Drill Co.: Duncan Brothers Drilling, Inc. | Method: Air Rotary
Driller: Dave Powell | Log By: Dustin Moore | Date: 10/15/15 | Permit #: NA
Checked By: | License No.:

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count / Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						SM	Dark brown SILTY SAND (topsoil) WITH GRAVEL; gravel as large sandstone cobbles and boulders (colluvium); moist.
2						CLS	Yellowish brown SANDY CLAY WITH GRAVEL; some silt; gravel as large sandstone cobbles and boulders; moist; becoming darker brown at 6.5 feet bgs.
4							
6							
8							
10						CL ML	Dark brown SILTY CLAY WITH SAND; some gravel; moist.
12							
14							
16							
18							
20							
22						MLS	Yellowish brown SANDY SILT; some gravel; moist; hard gravelly layer around 32.5 feet bgs.
24							
26							
28							
30							

Continued Next Page

Drilling Log

Monitoring Well **MW-31**

Project *NRG Conemaugh Generating Station CCR* Owner *NRG*

Location *New Florence, PA* Proj. No. *1009144001*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
30							*Continued*
32							
34						MLS	
36							
38							Dark brown/gray SANDY SILT; softer than above; wet.
40						MLS	
42							
44							Gray weathered CLAYSTONE bedrock.
46							
48							Dark gray to black CLAYSTONE bedrock; harder; competent.
50							
52							
54							
56							
58							
60							
62							
64							
66							
68							
70							

ATTACHMENT 4	Documentation that AFPs Remain in Detection Monitoring per § 257.71(d)(1)(i)(B)(2)
Attachment 4A	Statistical Method for Groundwater Data Evaluation Report, October 2017
Attachment 4B	Statement of Recent Statistical Methods Conducted
Attachment 4C	Groundwater Monitoring and Corrective Action Annual Report, Calendar Year 2017
Attachment 4D	Groundwater Monitoring and Corrective Action Annual Report, Calendar Year 2018
Attachment 4E	Groundwater Monitoring and Corrective Action Annual Report, Calendar Year 2019
Attachment 4F	Preliminary Groundwater Monitoring and Statistical Analyses for Calendar Year 2020
Attachment 4G	Cobalt Characterization and Associated Groundwater Evaluation – Summary of Findings, December 2020

Note: Attachment 4D contains an Alternate Source Demonstration, which was completed in April 2018 for use in the Groundwater Monitoring and Corrective Action Annual Report for the 2018 Calendar Year and referenced in the Report for the 2019 Calendar Year (Attachment 4E).

ATTACHMENT 4A

Statistical Method for Groundwater Data Evaluation Report, October 2017

CCR COMPLIANCE
STATISTICAL METHOD FOR GROUNDWATER DATA EVALUATION
ASH FILTER PONDS AND ASH/REFUSE DISPOSAL SITE

Prepared for:

GenOn Northeast Management Company
Conemaugh Generating Station
New Florence, Pennsylvania

Prepared by:

Aptim Environmental & Infrastructure, Inc.
Pittsburgh, Pennsylvania

October 2017

Table of Contents

List of Figures

1.0 Introduction

Title 40 Code of Federal Regulations §257.91 requires the owner or operator of Coal Combustion Residuals (CCR) landfills and surface impoundments, also known as CCR units, to implement a groundwater monitoring system. 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. The referenced groundwater monitoring system for each defined CCR unit must consist of a sufficient number of wells (minimum one upgradient and three downgradient) installed at appropriate locations to accurately determine background groundwater quality and also to accurately represent the quality of groundwater passing the boundary of the CCR unit.

Further, §257.93(a) of the Rule requires that a groundwater sampling and analysis program be established to include consistent procedures to ensure that the monitoring results accurately represent the quality of groundwater at the upgradient and downgradient wells. In addition, §257.93(f) also requires selection of a statistical method for use in determining if a statistically significant increase over background concentrations in groundwater has occurred at one or more of the downgradient monitoring well locations. Candidate statistical methods are outlined in §257.93(f)(1-5) and corresponding performance standards (dependent upon the method selected) are specified in §257.93(g)(1-6). Lastly, §257.93(f)(6) requires the owner or operator of the CCR unit to obtain a certification from a professional engineer stating that the selected statistical method is appropriate for evaluating the groundwater monitoring data for the CCR management area. The certification must include a narrative description of the statistical method selected.

The Conemaugh Generating Station, operated by GenOn Northeast Management Company, is a coal-fired power plant located in New Florence, 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 Conemaugh Ash/Refuse Disposal Site and four Ash Filter Ponds (Ponds “A”, “B”, “C”, and “D”) used for the management of bottom ash. Each of these CCR units has a dedicated groundwater monitoring well network that meets the requirements of §257.91 with regard to number and appropriate locations of wells (certification provided under separate cover). Additionally and in accordance with the provisions of §257.91(d) of the Rule, the monitoring network for the Ash Filter Ponds has been established to provide coverage in the context of a multiunit system, encompassing all four ponds (Ponds “A,” “B,” “C,” and “D”) collectively.

This Certification has been prepared to comply with the requirements of §257.93(f)(6), addressing the statistical method selection for both of the CCR units at the station. This Certification will be placed in the Conemaugh facility's operating record per §257.105(h)(4), noticed to the State Director per §257.106(h)(3), and posted to the publicly accessible internet site per §257.107(h)(3).

2.0 Statistical Method Selection and Background Data Evaluation

As previously noted, each of the station's CCR units has a dedicated groundwater monitoring system, represented by at least one upgradient/background well and a minimum of three downgradient wells. Specific to the Ash Filter Ponds and as shown on Figure 1, the groundwater monitoring system includes upgradient wells MW-1B and MW-2, and downgradient wells MW-3, MW-4, and MW-23. Specific to the Ash/Refuse Disposal Site and as shown on Figure 2, the groundwater monitoring system is represented by upgradient well MW-31 and downgradient wells MW-9, MW-10 and MW-11. The Ash/Refuse Disposal Site is a valley fill located north of the Station proper, and consists of three stages, including Stage I (closed), Stage II (currently active), and Stage III (permitted expansion currently under construction).

Choosing an appropriate statistical method is paramount in developing a sound and defensible groundwater monitoring program. As such, the statistical method should be commensurate with knowledge of the basic site-specific characteristics such as number and configuration of wells, the water quality constituents being measured, and general hydrology. The method should also be selected with reference to the statistical characteristics of the monitored parameters such as proportion of non-detects, type of concentration distribution (e.g., normal, lognormal) and presence or absence of spatial variability.

For both CCR units at the Conemaugh Station, an interwell prediction limit approach has been selected. In addition to being one of the candidate methods cited under §257.93(f)(1-5), the interwell prediction limit method is among those recommended in U.S. EPA's (EPA) Unified Guidance document ("Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities," March 2009). This guidance document was developed in order to assist the EPA and the regulated community in testing and evaluating groundwater monitoring data under 40 CFR §258, §264, and §265 (relating to solid waste and hazardous waste management facilities).

The prediction limit approach is flexible and conforms to varying data distributions, frequencies of non-detects, and whether or not the data exhibit a significant trend. Parametric tests are used for those datasets which follow a known and identifiable distribution, with the most common examples in groundwater monitoring being the normal and the lognormal. If a specific distribution cannot be determined, non-parametric test methods can be used. Non-parametric tests do not require a known statistical distribution and can be helpful when the data contain a substantial proportion of non-detects.

Prediction limits are generally easy to construct and have a straightforward interpretation. Only background values are used to construct a concentration-based prediction limit, which is then compared to one or more future observations from a compliance point population (e.g.,

downgradient compliance wells). For purposes of detection monitoring (§257.94 of the Rule) and potential assessment monitoring (§257.95 of the Rule) and as is typical, a one-sided upper prediction limit will be constructed from the background data. A noted exception is pH which will also have a lower-prediction limit, essentially creating a range of values deemed representative of background. Specific to the Conemaugh CCR units and further detailed below, separate prediction limits will be constructed for the Ash Filter Ponds and the Ash/Refuse Disposal Site, covering each of the relevant Appendix III and IV constituents.

2.1 Establishment of Background Groundwater Values

Based on the groundwater data collected from each upgradient well (corresponding to the minimum eight required rounds of sampling per §257.94[b]), prediction limits of background for each CCR unit will be established for the constituents listed in Appendices III and IV, as follows:

Appendix III	Appendix IV
Total Boron	Total Antimony
Total Calcium	Total Arsenic
Chloride	Total Barium
Fluoride	Total Beryllium
Total Dissolved Solids	Total Cadmium
Sulfate	Total Chromium
pH	Total Cobalt
---	Fluoride
---	Total Lead
---	Total Lithium
---	Total Mercury
---	Total Molybdenum
---	Total Selenium
---	Total Thallium
---	Radium 226 + 228

2.1.1 Outlier Testing

Prior to use in establishment of the prediction limits, the background datasets (on a constituent by constituent basis) will be evaluated for potential outliers. However, in this regard, EPA's Unified Guidance recommends that statistical outliers should not be removed or altered unless independent evidence of an error exists. Accordingly, if evidence of an error is found to exist, these points will be removed from the dataset prior to calculation of the prediction limits.

2.1.2 Spatial Variability Analysis

Spatial variability in groundwater monitoring is generally understood to be present when the mean levels of a given constituent vary from one well to the next. For situations in which more than one upgradient well exists (such is the case for the Conemaugh Ash Filter Ponds), the data from these wells will be reviewed for evidence of statistically significant spatial variability based on an Analysis of Variance (ANOVA) test. If significant spatial variation is identified, consideration may be given to modification of the approach, including potential transition to an intrawell method for future comparisons at the compliance wells (assuming that it can be established convincingly that they have not been impacted by the CCR unit).

2.1.3 Temporal Variability Analysis

Temporal variability in groundwater monitoring exists when the distribution of measurements varies with the times at which sampling or analytical measurement occurs. There are several reasons that temporal variability can occur, with the most common being seasonal fluctuations. In the event that seasonality is detected, the data can be "de-seasonalized." However, corrections for seasonality are to be applied cautiously, as they represent extrapolation into the future. There should be a defensible physical explanation along with sufficient empirical evidence for seasonality before corrections are made. Any adjustments made for temporal variability would be done as described within the Unified Guidance. With respect to temporal variability, it is emphasized that clear identification of any potential trends/fluctuation would be limited until several additional years of data are collected beyond the first eight rounds of background sampling.

2.1.4 Determination of Data Distribution

Determining the distribution of data (normal vs. non-normal) is important since it forms the basic premise for parametric tests. For a normal distribution, this means that the density of the data or the natural log of the data follows the traditional bell-shaped curve, with the greatest number of values being centered around the mean and fewer values being a significant distance from the mean.

Normality will first be evaluated using the Shapiro-Wilk Test with a specified Alpha (α) of 95 percent (interwell prediction limit default). The Shapiro-Wilk Test is based on the assumption that if a dataset (or the natural logs of the dataset) is normally distributed, then the ordered values should be highly correlated with the corresponding quantiles of the normal distribution. The Shapiro-Wilk test statistic, W, will be large when the probability plot of the data indicates a straight line, but will be small if there are significant bends or curves in the plotted data. The test statistic will be compared to published critical values, and the assumption of normality rejected when the calculated test statistic falls below the critical values.

The denominator, d, of the W test statistic calculation is computed as follows (Gilbert, 1987):

$$d = \sum_{i=1}^{n} (X_i - \bar{X})^2 = \sum_{i=1}^{n} {X_i}^2 - \frac{1}{n}\left[\sum_{i=1}^{n} X_i\right]^2$$

Where:

X_i = the ith smallest ordered value in the sample,
$\bar{X}$ = the mean of the n observations, and
n = the number of observations.

The observations are then ordered from smallest to largest and k is computed where:

$$k = \frac{n}{2} \quad \text{(if } n \text{ is even), and}$$
$$k = \frac{n-1}{2} \quad \text{(if } n \text{ is odd)}$$

The W test statistic is then computed as follows:

$$W = \frac{1}{d}\left[\sum_{i=1}^{k} a_i\left(X_{[n-i+1]} - X_i\right)\right]^2$$

Where:

$a_1, a_2, \ldots, a_k$ are provided in Table A6 (Gilbert, 1987).

The data will be tested at the α=0.05 significance level, with the null hypothesis being rejected if W is less than the quantile given in Table A7 (Gilbert, 1987).

However, if the original dataset fails the test, there are a series of transformations that may be applied to determine if any helps fit the data to the bell-shaped curve. The Ladder of Powers (Helsel and Hirsch, 1992) includes the following transformations in order of execution: x, $x^{1/2}$, x^2, $x^{1/3}$, x^3, ln(x), x^4, x^5, x^6. If one or more of these transformations passes the normality test, all data will be transformed prior to the construction of any prediction limits; the data transformation that best normalizes the distribution will be used.

Specialized software (obtained from Sanitas^{TM}) will be utilized to aid in performing the above transformations, in addition to other statistical evaluations, including ultimate calculation of the background prediction limits. This software relies on a decision-logic framework that progresses through a series of statistical step-flow charts and testing algorithms, arriving at the best suited application and making any necessary adjustments or transformations to the datasets.

2.1.5 Managing Non-Detects

As is commonplace in groundwater monitoring programs and in part due to natural variability, measurable levels of constituents may be detected during certain sampling events and then be absent (non-detect) during other events. In preparation for determining the distribution of the background datasets (described above in Section 2.1.4), the following recommended procedures will be adopted to manage non-detects:

100 Percent Non-Detects. If 100 percent of the analyses for a constituent resulted in non-detects at or below the reporting limit, it will be assumed that the constituent is not present and no further statistical evaluation will be performed. The practical quantitation limit or method detection limit will then be assumed to be the upper prediction limit.

90 to 100 Percent Non-Detects. If 90 to 100 percent of the analyses for a constituent results in non-detects at or below the reporting limit, a non-parametric evaluation will be used wherein the highest detected concentration will serve as the upper prediction limit.

50 to 90 Percent Non-Detects. If 50 to 90 percent of the analyses for a constituent result in non-detects at or below the reporting limit, these values will be replaced with one half the reporting limit and a nonparametric confidence interval will be constructed wherein the highest detected concentration is utilized as the upper prediction limit.

15 to 50 Percent Non-Detects. If 15 to 50 percent of the analyses for a constituent result in non-detects at or below the reporting limit, the detected values will be evaluated using either a parametric or non-parametric method commensurate with published guidance.

0 to 15 Percent Non-Detects. If 0 to 15 percent of the analyses for a constituent results in non-detects at or below the reporting limit, these values will be replaced with one half the reporting limit and the data tested for normality.

If the data are normally or lognormally distributed, the sample mean and sample standard deviation will be adjusted using Aitchison's method, and a parametric evaluation (Section 2.1.6.1) will be performed to determine the upper prediction limit. If the data are not normally or lognormally distributed, a non-parametric method (Section 2.1.6.2) will be utilized wherein the highest detected concentration for each constituent will serve as the upper prediction limit.

2.1.6 Parametric and Non-Parametric Evaluations

2.1.6.1 Parametric Evaluation

The parametric evaluation of normally and lognormally distributed data with 50 percent or fewer non-detects will be performed according to the methods described in the Unified Guidance. The 95 percent prediction limit will be calculated assuming that one sample would be taken from one

well during two future sampling periods (one sampling period and one resampling event if necessary to confirm any observed exceedance). The equation for the 95 percent prediction limit is given by:

$$95\%\ Prediction\ Limit\ = \bar{x} + t_{1-0.05/m,n-1} s \sqrt{1 + \frac{1}{n}}$$

Where:

$\bar{x}$ = the sample mean of the detected or adjusted results
S = sample standard deviation of the detected or adjusted results
$t_{1-0.05/m,n-1}$ = the students t-coefficient for degrees of freedom (n-1) and confidence level (1-0.05/m)
n = the number of samples
m = the number of future samples

For this analysis, $\bar{x}_s$ and S_s are calculated as:

$$\bar{x}_s = \frac{1}{n}\sum_{i=1}^{n} x_i$$

and,

$$S_s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(\bar{x}_s - x_i)^{1/2}}\ .$$

As described above, prediction limits can be constructed to accurately account for the number of tests to be conducted (a resampling plan), so as to limit the site-wide false positive rate and ensure an adequate level of statistical power. The Unified Guidance suggests that the annual site-wide false positive rate be no greater than 10 percent (i.e. 5 percent per semiannual event; 2.5 percent per quarterly event).

The basic equation for estimating the site-wide false positive rate (not including resampling) is the following:

$$\alpha_{cum} = 1 - (1 - \alpha_{test})^{n_T}$$

Where:

α_{cum} = site-wide false positive rate
α_{test} = test-wide false positive rate
n_T = number of wells x number of constituents in a calendar year

By rearranging to solve for α_{test}, the 10 percent design site-wide false positive rate (0.1) can be substituted for α_{cum} and the needed per-test false positive error rate calculated as:

$$\alpha_{test} = 1 - (1 - 0.9)^{1/n_T}$$

Aitchison's Adjustment

Aitchison's method adjusts the sample mean and sample standard deviation to account for non-detects below the reporting limit in data that are normally or lognormally distributed and have between 15 and 50 percent non-detects. Aitchison's method assumes that non-detect samples do not contain the constituent of concern, are free of contamination, and could be considered as having a zero concentration in the analysis.

Using the data above the detection level, the sample mean and sample variance are calculated as follows:

$$\bar{X}_d = \sum_{i=1}^{m} X_i$$

and,

$$s_d^2 = \frac{1}{m-1}\left\{\sum_{i=1}^{m} X_i^2 - \frac{1}{m}\left(\sum_{i=1}^{m} X_i\right)^2\right\}$$

The adjusted sample mean and sample variance are then calculated as follows:

$$\bar{X} = \left(\frac{m}{n}\right)\bar{x}_d$$

and,

$$s^2 = \frac{(m-1)}{(n-1)} s_d^2 + \frac{m(m-1)}{n(n-1)} \bar{X}_d^2$$

Where:

m = the number of detects,
n = the total number of samples.

2.1.6.2 Non-Parametric Evaluation

A non-parametric evaluation is one that is not based upon specific parameters of the variate, such as the sample mean and sample standard deviation. A non-parametric evaluation will be used when data do not follow a distribution that can be predicted according to statistical parameters, or in those instances where a large proportion of the samples are reported as non-detects (i.e., greater than 90 percent). The non-parametric evaluation will take the highest detected concentration as the upper prediction limit for the constituent.

3.0 Detection and Assessment Monitoring

3.1 Detection Monitoring

Per §257.90(b)(1)(iii-iv) of the Rule and no later than October 17, 2017, groundwater detection monitoring for existing CCR units is to have included performance of eight rounds (at a minimum) of background sampling, and the corresponding start of evaluation for statistically significant increases over background with regard to the Appendix III constituents. Accordingly, the data generated from the eight rounds of background sampling will be subjected to the statistical protocols outlined in Section 2.0, and upper prediction limits established for each Appendix III constituent (pH will also have a lower prediction limit). To support the evaluation of statistically significant increases, samples from the groundwater wells associated with each of the Conemaugh CCR units will be collected on a semiannual frequency (per §257.94[b]) and analyzed for the Appendix III constituents. The data from the downgradient wells at each unit will then be compared to the upper prediction limits on a constituent by constituent basis.

If during the course of semiannual detection monitoring an Appendix III constituent (in any of the downgradient wells) is measured above its respective upper prediction limit (or below the lower prediction limit in the case of pH), this finding will constitute a preliminarily identified statistically significant increase. Pursuant to this finding and within 90 days, a repeat sampling event will be conducted and further efforts undertaken to determine if possible laboratory error or some other confounding condition has been noted, or if an alternate source (other than the CCR unit) could be responsible for the increase. If these efforts do not provide the ability/evidence to either nullify the increase or delineate an alternate source, then the affected CCR units will transition from detection monitoring to assessment monitoring.

3.2 Assessment Monitoring

As described above, if a statistically significant increase is confirmed (and cannot be dismissed or alternate source identified) then the affected CCR unit must move from detection monitoring to assessment monitoring (§257.95 of the Rule). Notice of this transition must be placed in the facility operating record per §257.105(h)(5)94(e)(3), and appropriate notification made to the State Director per §257.106(h)(4) along with posting to the publicly accessible internet site per §257.107(h)(4).

Within 90 days of entry into assessment monitoring, all wells associated with the affected CCR unit will be sampled for the list of Appendix IV constituents. Subsequently, and within 90 days of obtaining the results from the initial round of sampling and on at least a semiannual basis thereafter, all wells will be analyzed for the constituents in Appendix III and for those constituents in Appendix IV that were detected.

In similar fashion to that described above in Section 3.1, the data from the eight rounds of background sampling will be subjected to the statistical protocols outlined in Section 2.0 and upper prediction limits established for each Appendix IV constituent. In addition, Groundwater Protection Standards will be established for all detected Appendix IV constituents. Per §257.95(h)(1-3), these standards will either correspond to the Maximum Contaminant Level (MCL) values that are provided within 40 CFR 141.62 and 141.66, or the background upper prediction limit for those constituents that do not have an MCL. In cases where the background upper prediction limit is higher than the MCL, the upper prediction limit will serve as the Groundwater Protection Standard.

For purposes of comparison, if the concentrations of all Appendix III constituents and the detected Appendix IV constituents are shown to be at or below the background prediction limits for two consecutive sampling events, the CCR unit will return to detection monitoring. The return to detection monitoring must be documented in the facility's operating record per §257.105(h)(7), noticed to the State Director per §257.106(h)(5), and posted on the publicly accessible internet site per §257.107(h)(5). If concentrations of any of these same constituents are above the background prediction limits but below the Groundwater Protection Standard, assessment monitoring will continue.

However, should one or more Appendix IV constituents exhibit a statistically significant increase above the Groundwater Protection Standard, documentation of the specific Appendix IV constituent(s) must be placed in the facility's operating record per §257.105(h)(8), along with notification to the State Director per §257.106(h)(6) and posting to the publicly accessible internet site per §257.107(h)(6). In addition, an investigation must be undertaken to evaluate the nature and extent of a possible release from the CCR unit and account for any other conditions that may factor into potential remedy implementation in accordance with the elements in §257.95(g)(1)(i-iv). Pending the outcome of the investigation, it may be possible to nullify the findings or identify an alternate source (similar to the process provided for under detection monitoring), and return the CCR unit directly to assessment monitoring. In the event that the CCR unit is ultimately deemed responsible for statistical increases in the groundwater constituent concentrations, the provisions of §257.96, §257.97, and §257.98 of the Rule would be followed to guide potential remedy assessment, selection and implementation. Moreover, should the responsible CCR unit be identified as an unlined surface impoundment, then the requirements under §257.95(g)(5), §257.101(a)(1), and §257.102 would be triggered for retrofit or closure.

4.0 Professional Engineer's Certification

In accordance with §257.93(f)(6) of the Rule, I hereby certify based on a review of the information contained herein, and my knowledge and understanding of the principles and accepted practices contained in EPA's Unified Guidance, that the statistical method selected for evaluation of groundwater data associated with the Conemaugh CCR Units is adequate and appropriate. This method's application will provide the necessary means for determining compliance and potential identification of statistically significant increases in groundwater concentrations as related to the Detection Monitoring (§257.94) and Assessment Monitoring (§257.95) elements of the Rule.

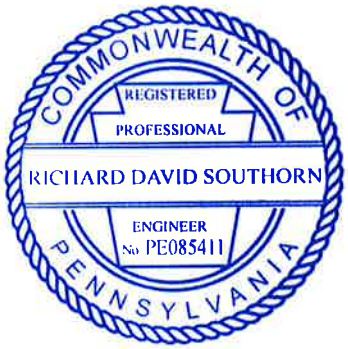
Certified by: _____

Date: 10/9/17

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

Professional Engineer Registration No. PE 085411

CB&I Environmental & Infrastructure, Inc.



5.0 References

Gilbert, R. O., "Statistical Methods for Environmental Pollution Monitoring," 1987.

Helsel, D. R. and R. M. Hirsch, "Discussion of Applicability of the t-test for Detecting Trends in Water Quality Variables," Water Resources Bulletin 24, pp. 201-204, 1992.

United States Environmental Protection Agency, "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities—Unified Guidance (EPA 530/R-09-007)," March 2009.

Figures

LEGEND:

MW-3 CCR GROUNDWATER MONITORING WELL

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

SCALE

0 100 200 FEET

APTIM

500 Penn Center Boulevard,
Suite 1000
Pittsburgh, Pennsylvania 15235

GenOn

FIGURE 1
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH FILTER PONDS
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	3/16/16	--	E. Schlegel	--	--	1009144003-B3

File: O:\PROJECT\1009144003_Conemaugh\1009144003-B3.dwg
Plot Date/Time: Sep 14, 2017 – 7:15am
Plotted By: greg.jones
Xref: Image

LEGEND:

MW-9 CCR GROUNDWATER MONITORING WELL

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

APTIM

500 Penn Center Boulevard,
Suite 1000
Pittsburgh, Pennsylvania 15235

GenOn

FIGURE 2
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH/REFUSE DISPOSAL SITE
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	3/16/16	--	E. Schlegel	--	--	1009144003-B4

File: O:\PROJECT\1009144003_Conemaugh\1009144003-B4.dwg
Plot Date/Time: Sep 14, 2017 - 7:17am
Plotted By: greg.jones
Xref: Image

ATTACHMENT 4B

Statement of Recent Statistical Methods Conducted

Statement of Recent Statistical Methods Conducted

APTIM Environmental and Infrastructure, LLC (APTIM) was contracted by the Station to complete initial and annual groundwater sampling, as well as the associated statistical analysis to determine background concentrations. APTIM's approach (Interwell Prediction Limit), which aligns with one of the suggested candidate methodologies per § 257.93(f)(3), is discussed in its *Groundwater Statistical Method Certification Report* (October 2017, Attachment 3D). APTIM utilizes the Sanitas™ software application to generate the upper prediction limits that are used in the ongoing groundwater data comparisons. The original Sanitas output, generated in January 2018, is provided for reference on the following page. This output documents the upper prediction limits adopted for each of the CCR Rule Appendix III constituents based on the initial eight rounds of monitoring (December 2015 through July 2017) for upgradient wells MW-1B and MW-2. It is these values against which the groundwater data obtained from downgradient wells has been compared during each round of Detection Monitoring, beginning with the October 2017 sampling event.

Prediction Limit

Conemaugh Generating Station Client: GenOn Data: Conemaugh Ash Filter CCR ChemStat Printed 1/15/2018, 10:29 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Boron (mg/L)	n/a	0.5756	n/a	n/a	3 future	n/a	17	0	ln(x)	0.000...	Param Inter 1 of 2
Calcium (mg/L)	n/a	376.3	n/a	n/a	3 future	n/a	17	0	ln(x)	0.000...	Param Inter 1 of 2
Chloride (mg/L)	n/a	1560	n/a	n/a	3 future	n/a	17	0	n/a	0.00563	NP Inter (normality) ...
Fluoride (mg/L)	n/a	0.2	n/a	n/a	3 future	n/a	17	64.71	n/a	0.00563	NP Inter (NDs) 1 of 2
pH (S.U.)	n/a	7.42	4.586	n/a	3 future	n/a	16	0	x^2	0.000...	Param Inter 1 of 2
Sulfate (mg/L)	n/a	788.4	n/a	n/a	3 future	n/a	17	0	ln(x)	0.000...	Param Inter 1 of 2
Total dissolved solids (mg/L)	n/a	6975	n/a	n/a	3 future	n/a	17	0	ln(x)	0.000...	Param Inter 1 of 2

ATTACHMENT 4C

Groundwater Monitoring and Corrective Action Annual Report
Calendar Year 2017

CCR COMPLIANCE
GROUNDWATER MONITORING AND CORRECTIVE ACTION
ANNUAL REPORT
ASH FILTER PONDS AND ASH/REFUSE DISPOSAL SITE

Prepared for:

GenOn Northeast Management Company
Conemaugh Generating Station
New Florence, Pennsylvania

Prepared by:

Aptim Environmental & Infrastructure, Inc.
Pittsburgh, Pennsylvania

January 2018

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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 must be completed no later than January 31, 2018, and provide 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 Conemaugh Generating Station (Station), operated by GenOn Northeast Management Company, is a coal-fired power plant located in New Florence, 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 Conemaugh Ash/Refuse Disposal Site and four Ash Filter Ponds (Ponds "A," "B," "C," and "D") used for the management of bottom ash. 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. Additionally, in accordance with the provisions of §257.91(d) of the Rule, the groundwater monitoring system for the Ash Filter Ponds has been designated to provide coverage in the context of a multiunit system encompassing all four ponds collectively.

In summary, this Annual Report has been prepared to comply with the requirements of §257.90(e), addressing each of the Conemaugh Station's CCR Units with respect to the groundwater monitoring and corrective actions undertaken during Calendar Year 2017. 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 Ash Filter Ponds

2.1 Groundwater Monitoring Network

The CCR groundwater monitoring system for the Ash Filter Ponds is comprised of five wells, including Wells MW-1B and MW-2 (upgradient), and Wells MW-3, MW-4, and MW-23 (downgradient). All five wells communicate with the alluvium, which is the uppermost aquifer. The locations of the groundwater monitoring wells are shown on Figure 1, along with depiction of the generalized groundwater flow direction in the area of the ponds. Each of these wells was already existing, and no new wells were added nor were any existing wells abandoned/replaced during the 2017 reporting period.

2.2 2017 Data Collection

Per the requirements of §257.94(b), Detection Monitoring was ongoing throughout 2017, including activities to ensure the collection of a minimum of eight independent samples from each of the background/upgradient and downgradient wells associated with the Ash Filter Ponds. These samples were analyzed for the necessary Appendix III and Appendix IV constituents, with the results summarized in the attached Tables 1 and 2, respectively. In addition, a ninth round of samples was collected (October 1-4, 2017) and analyzed for Appendix III constituents only. The results from these samples (also shown in Table 1) will serve as the first point of comparison to determine if concentrations in any of the downgradient wells are at levels representing a statistically significant increase (SSI) over the background concentrations established in the upgradient well(s).

2.3 2017 Monitoring Program Transitions

During 2017, there were no transitions between monitoring programs. Only activities in support of the Detection Monitoring program were conducted.

2.4 2017 Corrective Actions

During 2017, there were no problems identified or corrective actions undertaken.

2.5 2018 Projected Activities

No later than January 15, 2018, the results from the ninth round of Detection Monitoring sampling will be reviewed against the Appendix III background concentrations and preliminary identification of any SSIs completed. If SSIs are identified, subsequent activities could include performance of an Alternate Source Demonstration [per §257.94(e)(2)] to potentially negate the SSIs (and remain in Detection Monitoring), and/or entry into the Assessment Monitoring program [per §257.94(e)(1)] should the SSIs be deemed valid. Completion of the Alternate Source

Demonstration or entry into the Assessment Monitoring program must be accomplished within 90 days, or no later than April 15, 2018.

3.0 Ash Disposal Site

3.1 Groundwater Monitoring Network

The CCR groundwater monitoring system for the Ash Disposal Site is comprised of four wells, including Well MW-31 (upgradient) and Wells MW-9, MW-10, and MW-11 (downgradient). Monitoring Wells MW-9 and MW-11 communicate with the shallow unconfined groundwater in bedrock and Monitoring Wells MW-10 and MW-31 communicate with shallow groundwater across the soil/bedrock interface. Hence, all four wells monitor the uppermost aquifer in the area of the Ash Disposal Site. The locations of the groundwater monitoring wells are shown on Figure 2, along with depiction of the generalized groundwater flow direction in the area of the disposal site. Each of these wells was already existing, and no new wells were added nor were any existing wells abandoned/replaced during the 2017 reporting period.

3.2 2017 Data Collection

Per the requirements of §257.94(b), Detection Monitoring was ongoing throughout 2017, including activities to ensure the collection of a minimum of eight independent samples from each of the background/upgradient and downgradient wells associated with the Ash Disposal Site. These samples were analyzed for the necessary Appendix III and Appendix IV constituents, with the results summarized in the attached Tables 3 and 4, respectively. In addition, a ninth round of samples was collected (October 2-3, 2017) and analyzed for Appendix III constituents only. The results from these samples (also shown in Table 3) will serve as the first point of comparison to determine if concentrations in any of the downgradient wells are at levels representing an SSI over the background concentrations established in the upgradient well(s).

3.3 2017 Monitoring Program Transitions

During 2017, there were no transitions between monitoring programs. Only activities in support of the Detection Monitoring program were conducted.

3.4 2017 Corrective Actions

During 2017, there were no problems identified or corrective actions undertaken.

3.5 2018 Projected Activities

No later than January 15, 2018, the results from the ninth round of Detection Monitoring sampling will be reviewed against the Appendix III background concentrations and preliminary identification of any SSIs completed. If SSIs are identified, subsequent activities could include performance of an Alternate Source Demonstration [per §257.94(e)(2)] to potentially negate the SSIs (and remain in Detection Monitoring), and/or entry into the Assessment Monitoring program [per §257.94(e)(1)] should the SSIs be deemed valid. Completion of the Alternate Source

Demonstration or entry into the Assessment Monitoring program must be accomplished within 90 days, or no later than April 15, 2018.

Tables

Table 1
Conemaugh Generating Station
Ash Filter Ponds--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.)
MW-1B (Upgradient)	17-Dec-15	1070.99	0.29	333	1540	< 0.1	3620	544	5.49
	27-Jan-16	1071.19	0.31	288	1280	< 0.1	3180	583	5.87
	20-Apr-16	1071.69	0.28	170	652	< 0.5	2410	729	6.09
	19-Jul-16	1071.69	0.36	208	1310	0.1	2760	575	5.79
	11-Oct-16	1072.99	0.46	192	1010	0.2	2640	438	6.56
	17-Jan-17	1072.54	0.43	198	1030	< 0.1	2650	427	5.87
	24-Apr-17	1072.69	0.37	166	988	< 0.1	2470	548	5.27
	20-Jul-17	1072.04	0.39	345	1560	< 0.1	3740	388	5.00
	1-Oct-17	1070.84	0.36	430	2040	< 0.1	4930	427	5.68
MW-2 (Upgradient)	11-Oct-16	1072.72	0.30	191	251	< 0.1	1200	348	6.28
	16-Nov-16	1072.42	0.31	176	94	0.1	868	416	6.95
	21-Dec-16	1073.02	0.41	176	101	0.2	1050	519	7.03
	25-Jan-17	1073.72	0.21	137	68	0.2	726	316	6.93
	21-Mar-17	1073.82	0.33	158	75	0.1	828	387	6.40
	25-Apr-17	1072.92	0.29	136	69	< 0.1	792	373	6.28
	13-Jun-17	1073.02	0.30	150	60	< 0.1	768	369	6.15
	27-Jul-17	1072.57	0.28	133	67	< 0.1	684	310	6.45
	4-Oct-17	1071.17	0.32	138	58	< 0.1	768	330	6.80
MW-3 (Downgradient)	16-Dec-15	1065.24	< 0.05	123	363	< 0.1	882	227	5.74
	26-Jan-16	1065.89	< 0.05	132	392	< 0.1	970	250	5.94
	25-Apr-16	1066.14	< 0.05	203	505	< 0.1	1460	288	6.52
	25-Jul-16	1064.99	< 0.05	115	343	< 0.1	972	225	5.72
	24-Oct-16	1066.19	< 0.05	123	304	< 0.1	902	211	6.01
	17-Jan-17	1066.94	< 0.05	113	370	< 0.1	976	245	5.95
	25-Apr-17	1067.09	< 0.05	181	552	< 0.1	1740	314	5.57
	25-Jul-17	1065.99	< 0.05	151	389	< 0.1	1270	256	5.47
	1-Oct-17	1064.89	< 0.05	135	387	< 0.1	1140	255	6.30
MW-4 (Downgradient)	21-Dec-15	1069.53	0.15	301	643	< 0.1	2470	874	5.77
	4-Feb-16	1069.73	0.13	316	654	< 0.1	2580	870	5.83
	26-Apr-16	1070.08	0.13	426	932	< 0.1	3390	965	6.19
	25-Jul-16	1068.98	0.12	346	874	< 0.1	3120	1090	5.82
	26-Oct-16	1070.08	0.17	310	670	< 0.1	2530	865	6.27
	30-Jan-17	1070.88	0.15	301	736	< 0.1	2740	895	6.12
	26-Apr-17	1070.93	0.14	392	863	< 0.1	3310	996	6.68
	27-Jul-17	1070.23	0.19	403	977	< 0.1	3350	1170	5.63
	4-Oct-17	1068.83	0.14	335	814	< 0.2	3200	1050	6.02
MW-23 (Downgradient)	20-Dec-15	1068.03	< 0.05	182	388	< 0.1	1580	653	5.59
	2-Feb-16	1069.08	< 0.05	176	344	< 0.1	1520	576	5.98
	25-Apr-16	1069.38	< 0.05	175	329	< 0.1	1540	557	5.16
	21-Jul-16	1067.93	0.34	173	371	< 0.1	1600	591	5.63
	24-Oct-16	1068.83	< 0.05	173	327	< 0.1	1540	509	6.14
	18-Jan-17	1070.13	0.11	165	368	< 0.1	1550	543	5.79
	24-Apr-17	1069.68	< 0.05	164	383	< 0.1	1520	558	5.21
	24-Jul-17	1069.18	< 0.05	183	378	< 0.1	1530	532	5.15
	1-Oct-17	1067.98	< 0.05	172	313	< 0.1	1520	575	6.25

= Data to be compared against calculated Background values from the upgradient wells.

Table 2
Conemaugh Generating Station
Ash Filter Ponds--Groundwater Baseline 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)
MW-1B (Upgradient)	17-Dec-15	< 0.001	< 0.001	0.04	< 0.001	0.005	< 0.01	0.012	< 0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	4.24
	27-Jan-16	< 0.001	< 0.001	0.03	< 0.001	0.005	< 0.01	< 0.005	< 0.1	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	0.29
	20-Apr-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.72
	19-Jul-16	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	0.006	0.1	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	1.31
	11-Oct-16	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	< 0.005	0.2	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	0.78
	17-Jan-17	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	0.005	< 0.1	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	0.24
	24-Apr-17	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	0.005	< 0.1	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.77
	20-Jul-17	< 0.001	< 0.001	0.03	< 0.001	0.005	< 0.01	0.013	< 0.1	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	1.03
MW-2 (Upgradient)	11-Oct-16	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.69
	16-Nov-16	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.44
	21-Dec-16	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.2	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.43
	25-Jan-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	0.2	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.88
	21-Mar-17	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.09
	25-Apr-17	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.35
	13-Jun-17	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	0.001	< 0.0002	0.80
	27-Jul-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.14
MW-3 (Downgradient)	16-Dec-15	< 0.001	< 0.001	0.04	< 0.001	< 0.002	< 0.01	0.009	< 0.1	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.44
	26-Jan-16	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.011	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.86
	25-Apr-16	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.014	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.60
	25-Jul-16	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.009	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.46
	24-Oct-16	< 0.001	< 0.001	0.04	< 0.001	< 0.002	< 0.01	0.012	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.34
	17-Jan-17	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.008	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.28
	25-Apr-17	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.013	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.45
	25-Jul-17	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.010	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.33
MW-4 (Downgradient)	21-Dec-15	< 0.001	< 0.001	0.01	< 0.001	0.002	< 0.01	0.039	< 0.1	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.20
	4-Feb-16	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.038	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.47
	26-Apr-16	< 0.001	< 0.001	0.02	< 0.001	0.003	< 0.01	0.039	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.15
	25-Jul-16	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.035	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.43
	26-Oct-16	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.037	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.72
	30-Jan-17	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.034	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.09
	26-Apr-17	< 0.001	< 0.001	0.01	< 0.001	0.004	< 0.01	0.041	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.73
	27-Jul-17	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.039	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.24
MW-23 (Downgradient)	20-Dec-15	< 0.001	< 0.001	0.01	< 0.001	0.002	< 0.01	0.114	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	6.87
	2-Feb-16	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	0.106	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.03
	25-Apr-16	< 0.001	0.001	0.01	< 0.001	0.002	< 0.01	0.123	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.56
	21-Jul-16	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.114	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.65
	24-Oct-16	< 0.001	0.001	0.02	< 0.001	< 0.002	< 0.01	0.099	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.12
	18-Jan-17	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	0.100	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.66
	24-Apr-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	0.097	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.40
	24-Jul-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	0.095	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.21

Table 3
Conemaugh Generating Station
Ash Disposal Site--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.)
MW-31 (Upgradient)	20-Dec-15	1435.54	< 0.05	6.2	1	< 0.1	50	4	6.15
	1-Feb-16	1438.04	< 0.05	7.1	1	< 0.1	34	4	6.42
	20-Apr-16	1439.54	< 0.05	7.8	< 1	< 0.1	44	4	6.45
	20-Jul-16	1435.89	< 0.05	6.3	1	< 0.1	58	4	6.24
	25-Oct-16	1436.24	< 0.05	6.7	1	< 0.1	70	4	5.82
	19-Jan-17	1438.74	< 0.05	6.4	1	< 0.1	64	3	6.19
	12-Apr-17	1439.74	< 0.05	6.2	1	< 0.1	52	4	5.75
	25-Jul-17	1437.24	< 0.05	7.4	1	< 0.1	72	4	5.62
	3-Oct-17	1434.49	< 0.05	6.6	1	< 0.1	32	4	6.36
MW-9 (Downgradient)	17-Dec-15	1100.47	< 0.05	102	83	0.1	426	72	7.08
	28-Jan-16	1100.57	0.09	102	97	0.1	424	63	7.20
	21-Apr-16	1099.77	< 0.05	96	81	0.1	398	65	7.38
	20-Jul-16	1098.97	0.05	99	93	< 0.1	466	62	7.57
	16-Nov-16	1099.82	< 0.05	104	94	< 0.1	466	55	7.05
	23-Jan-17	1100.77	< 0.05	96	92	< 0.1	406	65	7.27
	12-Apr-17	1099.47	< 0.05	96	96	< 0.1	446	77	6.74
	24-Jul-17	1099.82	< 0.05	104	98	< 0.1	456	79	6.60
	2-Oct-17	1099.67	< 0.05	94	92	< 0.1	430	75	7.41
MW-10 (Downgradient)	16-Dec-15	1103.26	< 0.05	106	90	0.1	444	97	7.71
	1-Feb-16	1103.36	< 0.05	102	100	0.1	416	107	7.56
	19-Apr-16	1103.06	< 0.05	102	95	0.1	454	99	7.45
	25-Jul-16	1102.16	< 0.05	100	91	0.1	476	114	7.25
	25-Oct-16	1102.16	< 0.05	117	84	0.1	522	113	7.50
	25-Jan-17	1103.86	< 0.05	94	105	< 0.1	482	110	7.21
	13-Apr-17	1102.86	< 0.05	97	99	< 0.1	460	97	6.77
	26-Jul-17	1102.66	0.05	108	94	< 0.1	508	127	6.75
	3-Oct-17	1102.61	< 0.05	111	91	0.1	490	130	7.38
MW-11 (Downgradient)	21-Dec-15	1102.68	0.08	180	55	0.1	814	223	6.77
	27-Jan-16	1103.38	0.09	169	48	< 0.1	776	191	7.02
	21-Apr-16	1102.63	0.07	161	46	< 0.1	754	170	7.31
	21-Jul-16	1101.68	0.14	156	52	< 0.1	754	208	7.37
	20-Oct-16	1101.93	0.09	166	48	0.1	754	199	6.97
	23-Jan-17	1103.63	< 0.05	164	51	0.1	770	207	6.98
	13-Apr-17	1103.28	0.07	170	49	< 0.1	774	183	6.65
	26-Jul-17	1102.33	0.10	150	60	< 0.1	700	182	6.35
	2-Oct-17	1102.48	0.07	151	61	0.1	732	210	7.20

= Data to be compared against calculated Background values from the upgradient wells.

Table 4
Conemaugh Generating Station
Ash Disposal Site--Groundwater Baseline 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)
MW-31 (Upgradient)	20-Dec-15	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	14.1
	1-Feb-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.08
	20-Apr-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.75
	20-Jul-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.77
	25-Oct-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.42
	19-Jan-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.03
	12-Apr-17	< 0.001	< 0.001	< 0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.51
	25-Jul-17	< 0.001	< 0.001	< 0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	-0.05
MW-9 (Downgradient)	17-Dec-15	< 0.001	< 0.001	0.17	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	3.66
	28-Jan-16	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.18
	21-Apr-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	3.90
	20-Jul-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	-0.05
	16-Nov-16	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.78
	23-Jan-17	< 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	0.70
	12-Apr-17	< 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	0.03
	24-Jul-17	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.74
MW-10 (Downgradient)	16-Dec-15	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	-0.04
	1-Feb-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.25
	19-Apr-16	< 0.001	< 0.001	0.10	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.68
	25-Jul-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.55
	25-Oct-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.62
	25-Jan-17	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.29
	13-Apr-17	< 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	0.34
	26-Jul-17	< 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	1.05
MW-11 (Downgradient)	21-Dec-15	< 0.001	< 0.001	0.07	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	2.21
	27-Jan-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.33
	21-Apr-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	3.18
	21-Jul-16	< 0.001	< 0.001	0.08	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.70
	20-Oct-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.93
	23-Jan-17	< 0.001	< 0.001	0.07	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.48
	13-Apr-17	< 0.001	< 0.001	0.07	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.46
	26-Jul-17	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.80

Figures

LEGEND:

MW-3 (1064.89) — CCR GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION MEASURED BETWEEN OCTOBER 1 AND 4, 2017

GROUNDWATER FLOW DIRECTION

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

SCALE

0 100 200 FEET

APTIM

500 Penn Center Boulevard,
Suite 1000
Pittsburgh, Pennsylvania 15235

GenOn

FIGURE 1
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH FILTER PONDS
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	1/31/18	--	E. Schlegel	--	--	1009144003-B7

File: O:\PROJECT\1009144003_Conemaugh\1009144003-B7.dwg
Plot Date/Time: Jan 31, 2018 – 9:02am
Plotted By: Evan.Schlegel
Xref: Image

LEGEND:

MW-9 (1099.67) — CCR GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION MEASURED BETWEEN OCTOBER 2 AND 3, 2017.

GROUNDWATER FLOW DIRECTION

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

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

GenOn

FIGURE 2
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH/REFUSE DISPOSAL SITE
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	1/31/18	--	E. Schlegel	--	--	1009144003-B7

File: O:\PROJECT\1009144003_Conemaugh\1009144003-B6.dwg
Plot Date/Time: Jan 31, 2018 – 8:52am
Plotted By: Evan.Schlegel
Xref: Image

ATTACHMENT 4D

Groundwater Monitoring and Corrective Action Annual Report
Calendar Year 2018

CCR COMPLIANCE
GROUNDWATER MONITORING AND CORRECTIVE ACTION
ANNUAL REPORT
ASH FILTER PONDS AND ASH/REFUSE DISPOSAL SITE

Prepared for:

GenOn Northeast Management Company
Conemaugh Generating Station
New Florence, Pennsylvania

Prepared by:

Aptim Environmental & Infrastructure, Inc.
Pittsburgh, Pennsylvania

January 2019

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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 Conemaugh Generating Station (Station), operated by GenOn Northeast Management Company (GenOn), is an electric generating station located in New Florence, Pennsylvania. The Station operates two coal-fired boilers each with a steam turbine-driven electric generator that provides electricity to the regional electric grid. 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 Conemaugh Ash/Refuse Disposal Site and four Ash Filter Ponds (Ponds "A," "B," "C," and "D") used for the management of bottom ash. 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. Additionally, in accordance with the provisions of §257.91(d) of the Rule, the groundwater monitoring system for the Ash Filter Ponds has been designated to provide coverage in the context of a multiunit system encompassing all four ponds collectively.

In summary, this second Annual Report has been prepared to comply with the requirements of §257.90(e), addressing each of the Conemaugh Station's CCR Units with respect to the groundwater monitoring and corrective actions undertaken during Calendar Year 2018. 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 Ash Filter Ponds

2.1 Groundwater Monitoring Network

The CCR groundwater monitoring system for the Ash Filter Ponds is comprised of five wells, including Wells MW-1B and MW-2 (upgradient), and Wells MW-3, MW-4, and MW-23 (downgradient). All five wells communicate with the alluvium, which is the uppermost aquifer. The locations of the groundwater monitoring wells are shown on Figure 1, along with depiction of the generalized groundwater flow direction in the area of the ponds. Each of these wells was already existing, and no new wells were added nor were any existing wells abandoned/replaced during the 2018 reporting period.

2.2 Summary of Previously-Reported Monitoring Activities

In accordance with the requirements under §257.94(b) for existing CCR surface impoundments, a minimum of eight independent samples from each background and downgradient well were collected and analyzed for the constituents listed in Appendices III and IV of the Rule prior to October 17, 2017. The results from these samples, which were collected during the period from December 2015 through July 2017, are presented in Table 1 (Appendix III constituents) and Table 2 (Appendix IV constituents). In addition, a ninth round of samples was collected (October 1-4, 2017) and analyzed for Appendix III constituents only. The results from these samples (also shown in Table 1) served as the first point of comparison to determine if concentrations in any of the downgradient wells are at levels representing a statistically significant increase (SSI) over the background concentrations established in the upgradient well(s).

2.3 2018 Data Collection

During January 2018, the results from the October 2017 Detection Monitoring event were reviewed, and subsequent determination made that one downgradient well (MW-4) showed an Appendix III constituent (sulfate) at levels representing an SSI above corresponding background concentrations (see Table 1). Accordingly, and per the provisions of §257.94(e)(2), efforts were undertaken to conduct an Alternate Source Demonstration in an attempt to identify a potential source other than the Ash Filter Ponds which was responsible for the observed SSI. This Alternate Source Demonstration, further discussed below in Section 2.3 and included in Appendix A, was ultimately successful and determined that incidental gypsum deposition in the area of Well MW-4 was causing the elevated sulfate readings in the localized groundwater. As a result, the Ash Filter Ponds were deemed to remain in the CCR Detection Monitoring Program, and were additionally sampled in May 2018 and October 2018 with continuing observations of SSIs only for sulfate in Well MW-4 (see Table 1).

2.4 Alternate Source Demonstration

As noted above, an Alternate Source Demonstration was conducted in early-2018 which resolved the observed SSI for sulfate in downgradient Well MW-4, relative to the levels measured during the October 2017 Detection Monitoring event. This Demonstration, which was completed in April 2018 and certified by APTIM's qualified professional engineer, provided the necessary documentation to confirm that the Ash Filter Ponds are not creating unacceptable impacts to groundwater. Considering the May 2018 and October 2018 Detection Monitoring events again showed elevated sulfate only as the lone SSI in MW-4, the findings from the April 2018 Demonstration remain relevant and applicable.

2.5 2018 Monitoring Program Transitions

During 2018, there were no transitions between monitoring programs. As a result of the successful Alternate Source Demonstration, only activities in support of the Detection Monitoring program were conducted.

2.6 2018 Corrective Actions

During 2018, there were no problems identified or corrective actions undertaken.

2.7 2019 Projected Activities

It is anticipated that Detection Monitoring activities will continue for the Ash Filter Ponds during 2019, with continued review of Appendix III constituent concentrations and comparison with the calculated background values.

3.0 Ash Disposal Site

3.1 Groundwater Monitoring Network

The CCR groundwater monitoring system for the Ash Disposal Site is comprised of four wells, including Well MW-31 (upgradient) and Wells MW-9, MW-10, and MW-11 (downgradient). Monitoring Wells MW-9 and MW-11 communicate with the shallow unconfined groundwater in bedrock and Monitoring Wells MW-10 and MW-31 communicate with shallow groundwater across the soil/bedrock interface. Hence, all four wells monitor the uppermost aquifer in the area of the Ash Disposal Site. The locations of the groundwater monitoring wells are shown on Figure 2, along with depiction of the generalized groundwater flow direction in the area of the disposal site. Each of these wells was already existing, and no new wells were added nor were any existing wells abandoned/replaced during the 2018 reporting period.

3.2 Summary of Previously-Reported Monitoring Activities

In accordance with the requirements under §257.94(b) for existing CCR landfills, a minimum of eight independent samples from each background and downgradient well were collected and analyzed for the constituents listed in Appendices III and IV of the Rule prior to October 17, 2017. The results from these samples, which were collected during the period from December 2015 through July 2017, are presented in Table 3 (Appendix III constituents) and Table 4 (Appendix IV constituents). In addition, a ninth round of samples was collected (October 2-3, 2017) and analyzed for Appendix III constituents only. The results from these samples (also shown in Table 3) served as the first point of comparison to determine if concentrations in any of the downgradient wells are at levels representing an SSI over the background concentrations established in the upgradient well(s).

3.3 2018 Data Collection

During January 2018, the results from the October 2017 Detection Monitoring event were reviewed, and subsequent determination made that all three downgradient wells showed several Appendix III constituents at levels representing an SSI above corresponding background concentrations (see Table 3). Accordingly, the Ash Disposal Site was transitioned into the CCR Assessment Monitoring, and an initial round of samples covering all Appendix IV constituents was collected in March 2018 (see Table 4) per §257.95(b). From these results, the detected Appendix IV constituents were carried forward and analyzed during continued Assessment Monitoring events conducted in May 2018 and October 2018. As shown in Table 4, none of the Appendix IV constituents from the May and October 2018 events were measured at concentrations representing a statistically significant level (SSL) above the corresponding site-specific groundwater protection standards. Detected concentrations of at least one Appendix IV constituent

(total barium); however, do remain above calculated background, and thus providing the basis for continued Assessment Monitoring into 2019.

It is additionally noted that the May 2018 Assessment Monitoring event yielded an erroneous result for Radium-226/228 in downgradient Well MW-9. The initially reported value (103.6 pCi/L) was generated via an incorrect laboratory analytical method. Following this determination, a new sample (for Radium analysis only) was collected from MW-9 in July 2018 and reanalyzed using the correct analytical method. The revised result from the July 2018 sampling is highlighted in Table 4.

3.4 2018 Monitoring Program Transitions

In 2018, the Ash Disposal Site transitioned into the Assessment Monitoring Program based on review of the October 2017 Detection Monitoring results, and subsequent confirmation that several Appendix III constituents in downgradient wells were at levels representing SSIs above background. The transition to the Assessment Monitoring Program was implemented during late-March 2018, including placement of an appropriate notification into the facility's operating record per §257.105(h).

3.5 2018 Corrective Actions

On August 8, 2018, a surficial (non-groundwater) release of CCR materials from the Ash Disposal Site (associated with the Stage II active area) was discovered during the performance of a routine weekly inspection (as required by the Rule). Upon discovery, Conemaugh Station informed the Pennsylvania Department of Environmental Protection (PADEP), who conducted an inspection of the area on August 9, 2018. Following an initial investigation, the release most likely occurred during an extremely intense precipitation event on July 30, 2018.

Pursuant to the requirements of §257.96(a) and (f), GenOn initiated an assessment of corrective measures on August 8, 2018 (the date of discovery), including corresponding notification to PADEP [§257.106(h)(7)], placement of such into the Station's operating records [§257.105(h)(9)], and posting to the publicly accessible website [§257.107(h)(7)]. To minimize potential impacts to human health and/or the environment, Conemaugh Station conducted interim/corrective measures to stabilize/improve the areas which were affected by the release and to reclaim (via vacuum truck) the surficially-deposited CCR materials from along the reaches of the East Valley mitigation stream.

Soil and surface water sampling was conducted to confirm and document the adequacy of the overall cleanup efforts and corrective measures implementation. As required, an Assessment of Corrective Measures Report was prepared to further discuss the CCR release incident, the measures implemented and final resolution. Per the Rule, the Assessment of Corrective Measures Report must be included as part of the Annual Groundwater Monitoring and Corrective Action

Report, and as such, this report is presented in Appendix B. A standalone copy of the Assessment of Corrective Measures Report was placed in the Conemaugh Station's operating record per §257.105(h)(10), noticed to PADEP per §257.106(h)(8), and posted to the publicly accessible website per §257.107(h)(8).

3.6 2019 Projected Activities

It is anticipated that Assessment Monitoring activities will continue for the Ash Disposal Site during 2019, with continued review of Appendix III/Appendix IV constituent concentrations and comparison against calculated background and established groundwater protection standards.

Tables

Table 1 Conemaugh Generating Station Ash Filter Ponds--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						
			0.58	376	1560	0.20	6975	788	4.59-7.42
MW-1B (Upgradient)	17-Dec-15	1070.99	0.29	333	1540	< 0.1	3620	544	5.49
	27-Jan-16	1071.19	0.31	288	1280	< 0.1	3180	583	5.87
	20-Apr-16	1071.69	0.28	170	652	< 0.5	2410	729	6.09
	19-Jul-16	1071.69	0.36	208	1310	0.1	2760	575	5.79
	11-Oct-16	1072.99	0.46	192	1010	0.2	2640	438	6.56
	17-Jan-17	1072.54	0.43	198	1030	< 0.1	2650	427	5.87
	24-Apr-17	1072.69	0.37	166	988	< 0.1	2470	548	5.27
	20-Jul-17	1072.04	0.39	345	1560	< 0.1	3740	388	5.00
	1-Oct-17	1070.84	0.36	430	2040	< 0.1	4930	427	5.68
	22-May-18	1074.94	0.39	120	640	< 0.1	1680	364	5.91
	18-Oct-18	1074.69	0.89	53	288	3.1	1340	543	7.56
MW-2 (Upgradient)	11-Oct-16	1072.72	0.30	191	251	< 0.1	1200	348	6.28
	16-Nov-16	1072.42	0.31	176	94	0.1	868	416	6.95
	21-Dec-16	1073.02	0.41	176	101	0.2	1050	519	7.03
	25-Jan-17	1073.72	0.21	137	68	0.2	726	316	6.93
	21-Mar-17	1073.82	0.33	158	75	0.1	828	387	6.40
	25-Apr-17	1072.92	0.29	136	69	< 0.1	792	373	6.28
	13-Jun-17	1073.02	0.30	150	60	< 0.1	768	369	6.15
	27-Jul-17	1072.57	0.28	133	67	< 0.1	684	310	6.45
	4-Oct-17	1071.17	0.32	138	58	< 0.1	768	330	6.80
	29-May-18	1075.57	0.10	98	22	0.4	606	185	7.10
	23-Oct-18	1075.37	0.18	105	21	0.4	550	192	6.97
MW-3 (Downgradient)	16-Dec-15	1065.24	< 0.05	123	363	< 0.1	882	227	5.74
	26-Jan-16	1065.89	< 0.05	132	392	< 0.1	970	250	5.94
	25-Apr-16	1066.14	< 0.05	203	505	< 0.1	1460	288	6.52
	25-Jul-16	1064.99	< 0.05	115	343	< 0.1	972	225	5.72
	24-Oct-16	1066.19	< 0.05	123	304	< 0.1	902	211	6.01
	17-Jan-17	1066.94	< 0.05	113	370	< 0.1	976	245	5.95
	25-Apr-17	1067.09	< 0.05	181	552	< 0.1	1740	314	5.57
	25-Jul-17	1065.99	< 0.05	151	389	< 0.1	1270	256	5.47
	1-Oct-17	1064.89	< 0.05	135	387	< 0.1	1140	255	6.30
	23-May-18	1067.79	< 0.05	175	455	< 0.1	1330	276	6.07
	23-Oct-18	1068.29	< 0.05	152	440	< 0.1	1150	293	5.75
MW-4 (Downgradient)	21-Dec-15	1069.53	0.15	301	643	< 0.1	2470	874	5.77
	4-Feb-16	1069.73	0.13	316	654	< 0.1	2580	870	5.83
	26-Apr-16	1070.08	0.13	426	932	< 0.1	3390	965	6.19
	25-Jul-16	1068.98	0.12	346	874	< 0.1	3120	1090	5.82
	26-Oct-16	1070.08	0.17	310	670	< 0.1	2530	865	6.27
	30-Jan-17	1070.88	0.15	301	736	< 0.1	2740	895	6.12
	26-Apr-17	1070.93	0.14	392	863	< 0.1	3310	996	6.68
	27-Jul-17	1070.23	0.19	403	977	< 0.1	3350	1170	5.63
	4-Oct-17	1068.83	0.14	335	814	< 0.2	3200	1050	6.02
	29-May-18	1070.53	0.13	345	842	< 0.1	3280	1010	5.96
	24-Oct-18	1071.93	0.14	290	589	< 0.1	2550	927	5.99
MW-23 (Downgradient)	20-Dec-15	1068.03	< 0.05	182	388	< 0.1	1580	653	5.59
	2-Feb-16	1069.08	< 0.05	176	344	< 0.1	1520	576	5.98
	25-Apr-16	1069.38	< 0.05	175	329	< 0.1	1540	557	5.16
	21-Jul-16	1067.93	0.34	173	371	< 0.1	1600	591	5.63
	24-Oct-16	1068.83	< 0.05	173	327	< 0.1	1540	509	6.14
	18-Jan-17	1070.13	0.11	165	368	< 0.1	1550	543	5.79
	24-Apr-17	1069.68	< 0.05	164	383	< 0.1	1520	558	5.21
	24-Jul-17	1069.18	< 0.05	183	378	< 0.1	1530	532	5.15
	1-Oct-17	1067.98	< 0.05	172	313	< 0.1	1520	575	6.25
	22-May-18	1071.18	< 0.05	181	347	< 0.1	1460	507	5.63
	22-Oct-18	1071.13	< 0.05	165	355	< 0.1	1450	538	5.70

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 July 2017) of groundwater sampling data for Wells MW-1B and MW-2.

Table 2
Conemaugh Generating Station
Ash Filter Ponds--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	0.001	0.04	0.001	0.005	0.01	0.013	0.2	0.001	0.03	0.0002	0.02	0.001	0.0002	4.24
		Groundwater Protection Standard														
		MCL	MCL	MCL	MCL	MCL	MCL	RSL	MCL	RSL	RSL	MCL	RSL	MCL	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
MW-1B (Upgradient)	17-Dec-15	< 0.001	< 0.001	0.04	< 0.001	0.005	< 0.01	0.012	< 0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	4.24
	27-Jan-16	< 0.001	< 0.001	0.03	< 0.001	0.005	< 0.01	< 0.005	< 0.1	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	0.29
	20-Apr-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.72
	19-Jul-16	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	0.006	0.1	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	1.31
	11-Oct-16	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	< 0.005	0.2	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	0.78
	17-Jan-17	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	0.005	< 0.1	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	0.24
	24-Apr-17	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	0.005	< 0.1	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.77
	20-Jul-17	< 0.001	< 0.001	0.03	< 0.001	0.005	< 0.01	0.013	< 0.1	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	1.03
MW-2 (Upgradient)	11-Oct-16	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.69
	16-Nov-16	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.44
	21-Dec-16	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.2	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.43
	25-Jan-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	0.2	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.88
	21-Mar-17	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.09
	25-Apr-17	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.35
	13-Jun-17	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	0.001	< 0.0002	0.80
	27-Jul-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.14
MW-3 (Downgradient)	16-Dec-15	< 0.001	< 0.001	0.04	< 0.001	< 0.002	< 0.01	0.009	< 0.1	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.44
	26-Jan-16	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.011	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.86
	25-Apr-16	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.014	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.60
	25-Jul-16	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.009	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.46
	24-Oct-16	< 0.001	< 0.001	0.04	< 0.001	< 0.002	< 0.01	0.012	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.34
	17-Jan-17	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.008	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.28
	25-Apr-17	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.013	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.45
	25-Jul-17	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.010	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.33
MW-4 (Downgradient)	21-Dec-15	< 0.001	< 0.001	0.01	< 0.001	0.002	< 0.01	0.039	< 0.1	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.20
	4-Feb-16	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.038	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.47
	26-Apr-16	< 0.001	< 0.001	0.02	< 0.001	0.003	< 0.01	0.039	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.15
	25-Jul-16	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.035	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.43
	26-Oct-16	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.037	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.72
	30-Jan-17	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.034	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.09
	26-Apr-17	< 0.001	< 0.001	0.01	< 0.001	0.004	< 0.01	0.041	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.73
	27-Jul-17	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.039	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.24
MW-23 (Downgradient)	20-Dec-15	< 0.001	< 0.001	0.01	< 0.001	0.002	< 0.01	0.114	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	6.87
	2-Feb-16	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	0.106	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.03
	25-Apr-16	< 0.001	0.001	0.01	< 0.001	0.002	< 0.01	0.123	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.56
	21-Jul-16	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.114	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.65
	24-Oct-16	< 0.001	0.001	0.02	< 0.001	< 0.002	< 0.01	0.099	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.12
	18-Jan-17	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	0.100	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.66
	24-Apr-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	0.097	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.40
	24-Jul-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	0.095	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.21

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 July 2017) of groundwater sampling data for Wells MW-1B and MW-2.
3. 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
Conemaugh Generating Station
Ash Disposal Site--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						
			0.05	8.86	1	0.1	96.2	4	4.07-6.81
MW-31 (Upgradient)	20-Dec-15	1435.54	< 0.05	6.2	1	< 0.1	50	4	6.15
	1-Feb-16	1438.04	< 0.05	7.1	1	< 0.1	34	4	6.42
	20-Apr-16	1439.54	< 0.05	7.8	< 1	< 0.1	44	4	6.45
	20-Jul-16	1435.89	< 0.05	6.3	1	< 0.1	58	4	6.24
	25-Oct-16	1436.24	< 0.05	6.7	1	< 0.1	70	4	5.82
	19-Jan-17	1438.74	< 0.05	6.4	1	< 0.1	64	3	6.19
	12-Apr-17	1439.74	< 0.05	6.2	1	< 0.1	52	4	5.75
	25-Jul-17	1437.24	< 0.05	7.4	1	< 0.1	72	4	5.62
	3-Oct-17	1434.49	< 0.05	6.6	1	< 0.1	32	4	6.36
	24-May-18	1441.64	< 0.05	6.2	1	< 0.1	58	4	6.29
	22-Oct-18	1439.94	< 0.05	84.9	1	< 0.1	40	4	6.17
MW-9 (Downgradient)	17-Dec-15	1100.47	< 0.05	102	83	0.1	426	72	7.08
	28-Jan-16	1100.57	0.09	102	97	0.1	424	63	7.20
	21-Apr-16	1099.77	< 0.05	96	81	0.1	398	65	7.38
	20-Jul-16	1098.97	0.05	99	93	< 0.1	466	62	7.57
	16-Nov-16	1099.82	< 0.05	104	94	< 0.1	466	55	7.05
	23-Jan-17	1100.77	< 0.05	96	92	< 0.1	406	65	7.27
	12-Apr-17	1099.47	< 0.05	96	96	< 0.1	446	77	6.74
	24-Jul-17	1099.82	< 0.05	104	98	< 0.1	456	79	6.60
	2-Oct-17	1099.67	< 0.05	94	92	< 0.1	430	75	7.41
	23-May-18	1100.17	< 0.05	104	112	< 0.1	456	84	7.29
	17-Oct-18	1100.32	< 0.05	102	109	< 0.1	472	67	7.09
MW-10 (Downgradient)	16-Dec-15	1103.26	< 0.05	106	90	0.1	444	97	7.71
	1-Feb-16	1103.36	< 0.05	102	100	0.1	416	107	7.56
	19-Apr-16	1103.06	< 0.05	102	95	0.1	454	99	7.45
	25-Jul-16	1102.16	< 0.05	100	91	0.1	476	114	7.25
	25-Oct-16	1102.16	< 0.05	117	84	0.1	522	113	7.50
	25-Jan-17	1103.86	< 0.05	94	105	< 0.1	482	110	7.21
	13-Apr-17	1102.86	< 0.05	97	99	< 0.1	460	97	6.77
	26-Jul-17	1102.66	0.05	108	94	< 0.1	508	127	6.75
	3-Oct-17	1102.61	< 0.05	111	91	0.1	490	130	7.38
	29-May-18	1104.76	< 0.05	99	99	0.1	492	106	7.14
	17-Oct-18	1103.66	< 0.05	98	89	0.1	456	106	7.10
MW-11 (Downgradient)	21-Dec-15	1102.68	0.08	180	55	0.1	814	223	6.77
	27-Jan-16	1103.38	0.09	169	48	< 0.1	776	191	7.02
	21-Apr-16	1102.63	0.07	161	46	< 0.1	754	170	7.31
	21-Jul-16	1101.68	0.14	156	52	< 0.1	754	208	7.37
	20-Oct-16	1101.93	0.09	166	48	0.1	754	199	6.97
	23-Jan-17	1103.63	< 0.05	164	51	0.1	770	207	6.98
	13-Apr-17	1103.28	0.07	170	49	< 0.1	774	183	6.65
	26-Jul-17	1102.33	0.10	150	60	< 0.1	700	182	6.35
	2-Oct-17	1102.48	0.07	151	61	0.1	732	210	7.20
	24-May-18	1103.08	< 0.05	139	54	0.1	736	192	7.02
	18-Oct-18	1102.93	0.07	169	60	0.1	750	194	6.94

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 July 2017) of groundwater sampling data for Well MW-31.

Table 4
Conemaugh Generating Station
Ash Disposal Site--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	0.001	0.02	0.001	0.002	0.01	0.005	0.1	0.001	0.01	0.0002	0.02	0.001	0.0002	1.89
		Groundwater Protection Standard														
		MCL	MCL	MCL	MCL	MCL	MCL	RSL	MCL	RSL	RSL	MCL	RSL	MCL	MCL	MCL
		0.006	0.01	2	0.004	0.005	0.1	0.006	4.0	0.15	0.04	0.002	0.10	0.05	0.002	5
MW-31 (Upgradient)	20-Dec-15	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	14.1
	1-Feb-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.08
	20-Apr-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.75
	20-Jul-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.77
	25-Oct-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.42
	19-Jan-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.03
	12-Apr-17	< 0.001	< 0.001	< 0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.51
	25-Jul-17	< 0.001	< 0.001	< 0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	-0.05
	28-Mar-18	< 0.001	< 0.001	< 0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.63
	24-May-18	Not Analyzed	Not Analyzed	< 0.01	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.40
	22-Oct-18	Not Analyzed	Not Analyzed	0.01	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.71
MW-9 (Downgradient)	17-Dec-15	< 0.001	< 0.001	0.17	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	3.66
	28-Jan-16	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.18
	21-Apr-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	3.90
	20-Jul-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	-0.05
	16-Nov-16	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.78
	23-Jan-17	< 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	0.70
	12-Apr-17	< 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	0.03
	24-Jul-17	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.74
	28-Mar-18	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.37
	23-May-18	Not Analyzed	Not Analyzed	0.04	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.32
	17-Oct-18	Not Analyzed	Not Analyzed	0.05	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.67
MW-10 (Downgradient)	16-Dec-15	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	-0.04
	1-Feb-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.25
	19-Apr-16	< 0.001	< 0.001	0.10	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.68
	25-Jul-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.55
	25-Oct-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.62
	25-Jan-17	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.29
	13-Apr-17	< 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	0.34
	26-Jul-17	< 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	1.05
	29-Mar-18	< 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	0.29
	29-May-18	Not Analyzed	Not Analyzed	0.03	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.33
	17-Oct-18	Not Analyzed	Not Analyzed	0.04	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.48
MW-11 (Downgradient)	21-Dec-15	< 0.001	< 0.001	0.07	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	2.21
	27-Jan-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.33
	21-Apr-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	3.18
	21-Jul-16	< 0.001	< 0.001	0.08	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.70
	20-Oct-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.93
	23-Jan-17	< 0.001	< 0.001	0.07	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.48
	13-Apr-17	< 0.001	< 0.001	0.07	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.46
	26-Jul-17	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.80
	29-Mar-18	< 0.001	< 0.001	0.08	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.78
	24-May-18	Not Analyzed	Not Analyzed	0.07	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.83
	18-Oct-18	Not Analyzed	Not Analyzed	0.07	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	1.20

= Value determined as a statistical outlier and excluded from background calculations.

= Result from July 17, 2018 re-sampling; prior result from May 23, 2018 sampling (103.6 pCi/L) was associated with use of incorrect analytical Method (gamma spec Method 901.1).

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 July 2017) of groundwater sampling data for Well MW-31.
3. 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

LEGEND:

MW-3 (1068.29) — CCR GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION MEASURED BETWEEN OCTOBER 18 AND 24, 2018.

GROUNDWATER FLOW DIRECTION

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

SCALE

0 100 200 FEET

APTIM

500 Penn Center Boulevard,
Suite 1000
Pittsburgh, Pennsylvania 15235

GenOn

FIGURE 1
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH FILTER PONDS
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	12/11/18	--	E. Schlegel	--	--	1009144003-B8

File: O:\PROJECT\1009144003_Conemaugh\1009144003-B8.dwg
Plot Date/Time: Dec 12, 2018 – 6:25am
Plotted By: Greg.Jones
Xref:
Image

LEGEND:

MW-9 (1100.32) — CCR GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION MEASURED BETWEEN OCTOBER 17 AND 22, 2018.

GROUNDWATER FLOW DIRECTION

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

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

GenOn

FIGURE 2
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH/REFUSE DISPOSAL SITE
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	12/11/18	--	E. Schlegel	--	--	1009144003-B9

File: O:\PROJECT\1009144003_Conemaugh\1009144003-B9.dwg
Plot Date/Time: Dec 12, 2018 - 6:32am
Plotted By: Greg.Jones
Xref:
Image

Appendix A

Ash Filter Ponds--Alternate Source Demonstration

CCR COMPLIANCE
ALTERNATE SOURCE DEMONSTRATION
APPENDIX III GROUNDWATER EVALUATION
OF A STATISTICALLY SIGNIFICANT INCREASE AT THE CONEMAUGH ASH FILTER PONDS

Prepared for:

GenOn Northeast Management Company
Conemaugh Generating Station
New Florence, Pennsylvania

Prepared by:

Aptim Environmental & Infrastructure, Inc.
St. Charles, Illinois

April 2018

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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 which 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 Monitoring Program are outlined in §257.94.

The Conemaugh Generating Station (Conemaugh), operated by GenOn Northeast Management Company, is a coal-fired steam turbine-driven electric generation station located in New Florence, 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 Conemaugh operations include four Ash Filter Ponds (Ponds "A," "B," "C," and "D") and the Ash/Refuse Disposal Site (not the subject of this current document). The Ash Filter Ponds have a dedicated groundwater monitoring system that was originally installed to comply with Commonwealth of Pennsylvania Residual Waste Regulations, and was subsequently evaluated and modified for use under the CCR program. Additionally, in accordance with the provisions of §257.91(d) of the Rule, the groundwater monitoring system for the Ash Filter Ponds has been designated to provide coverage in the context of a multiunit system encompassing all four ponds collectively.

In accordance with §257.94(b), groundwater sampling in support of the CCR Detection Monitoring Program was conducted during the 4th quarter of 2017 at the Conemaugh Ash Filter Ponds. Samples were collected on October 1-4, 2017, and subsequently analyzed for CCR Appendix III constituents only. The analytical data from this sampling event has served as the first point of comparison to determine if concentrations in any of the downgradient wells are at levels representing a statistically significant increase (SSI) over background concentrations established in the upgradient wells. Results from the October 2017 sampling event showed only one Appendix III constituent (sulfate) at levels above background in one of the downgradient monitoring wells (MW-4).

Following additional review of the data and preliminary consideration of the results as an SSI, a determination was made on January 15, 2018 to conduct an Alternate Source Demonstration per §257.94(e)(2), which includes provisions such that:

> "The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality."

Accordingly, this Alternate Source Demonstration (ASD) has been prepared to satisfy the requirements of §257.94(e)(2), and which further stipulates that the ASD must be completed within 90 days of detecting a SSI(s) above background and be certified by a qualified professional engineer. If a successful ASD is completed, then sampling under the CCR Detection 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)] that must 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 Monitoring Program per §257.95.

2.0 Background

These ash ponds are located within the station proper, are situated immediately adjacent to one another, and are designated from north to south as Bottom Ash Filter Recycle Pond "A" and Bottom Ash Filter Ponds "B," "C," and "D" (see Figure 1). Each pond is approximately 405 feet long by 90 feet wide as measured at the crest and has an average depth of approximately 11 feet as measured from the crest to the top of the protective bottom ash layer. In addition, each of the ponds is constructed with a liner system compliant with the requirements of §257.71, reflecting the certified/documented presence of a two-feet thick clay liner meeting the hydraulic conductivity criteria per §257.71(a)(1)(i).

The groundwater monitoring system for the Ash Filter Ponds is comprised of five wells, including two upgradient wells (MW-1B and MW-2), and three downgradient wells (MW-3, MW-4, and MW-23). All five wells communicate with the alluvium, which is the uppermost aquifer in this portion of the property. The locations of the monitoring wells are also shown on Figure 1, along with a depiction of the generalized groundwater flow direction in the area of the ponds.

Per the requirements of §257.94, background sampling over the course of eight quarterly events was performed (4th QTR 2015 through 3rd QTR 2017) at all five groundwater monitoring wells. Data from upgradient wells MW-1B and MW-2 was then utilized to calculate background levels for each of the Appendix III constituents. The procedures used to calculate the background concentrations are presented in the document entitled "Statistical Method for Groundwater Data Evaluation – Ash Filter Ponds and Ash/Refuse Disposal Site – Conemaugh Generating Station, October 2017." In summary, specialized software that utilizes a statistical predictive algorithm was used to calculate the background concentrations. The quarterly background data for the upgradient wells and the resultant calculated background concentrations derived from the specialized software are presented in Appendix A.

An SSI is realized at a downgradient well if either the concentration at that well is greater than the background concentration, or the pH at that well is outside of the background pH range. As shown in Table 1, the results from the October 2017 Detection Monitoring event showed sulfate concentrations in well MW-4 (1,050 mg/L) to be above the calculated background value (788 mg/L). Based on this observation, a decision was made on January 15, 2018 to evaluate the possible existence of an alternate source for the observed sulfate concentration in well MW-4.

3.0 Geochemical Comparison

Utilizing the data from the October 2017 groundwater sampling event, a geochemical comparison was performed to assist in determining if the SSI for sulfate at well MW-4 originated from the Ash Filter Ponds or from an alternate source. In this regard, a Piper diagram was created to help compare analytical data from the monitoring wells to the liquid in the Ash Filter Ponds. A Piper diagram employs a methodology that is used to compare a known/suspected source to sampling locations, based on the classification and visualization of hydrochemical data. This methodology builds on the recognition that almost 90 percent of dissolved solids in groundwater are attributed to eight ions: Ca^{2+}, Cl^{-}, CO_3^{2-}, HCO_3^{-}, K^{+}, Mg^{2+}, Na^{+}, and SO_4^{2-}.

A Piper diagram normalizes the eight ions into cations and anions. The normalized data are then plotted in three areas, including a center diamond which shows the composition of the sample with respect to both cations and anions, and two triangles that represent either cations or anions in the data. A Piper diagram also combines the concentrations of the anions CO_3^{2-} and HCO_3^{-} and cations Na^{+} and K^{+}, which allows all the major ions to be plotted on one diagram. The illustration below shows the hydrochemical classification system used to construct a Piper diagram. Samples that have been impacted by a source would shift away from upgradient background composition and toward the source composition.

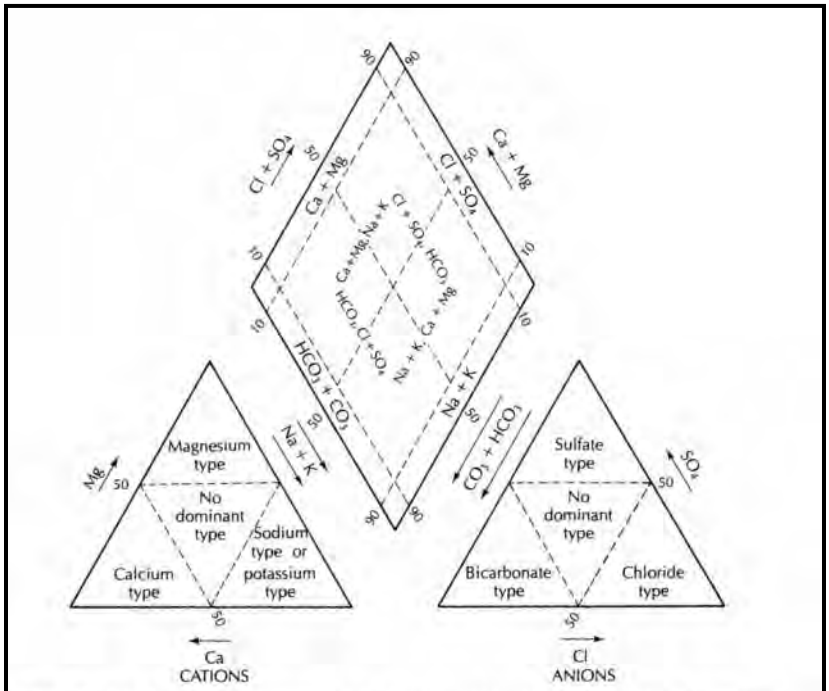

FIGURE 10.9 Hydrogeochemical classification system for natural waters using the trilinear diagram.

Fetter, C.W., Applied Hydrogeology, 1994.

The Piper diagram created for the current evaluation is presented in Figure 2 and makes use of supplemental data collected during the April 2017 CCR background sampling event (see Table 2) from the following locations:

- Upgradient wells MW-1B and MW-2
- Downgradient wells MW-3, MW-4, and MW-23
- Ash Filter Ponds "A" and "B"

It should be noted that the April 2017 analytical data strongly correlate with the October 2017 analytical results, including a possible SSI for sulfate (996 mg/L) at well MW-4, had background values been established at that time.

The Piper diagram further indicates that the geochemical composition of well MW-4 has not been altered by the source composition (Ponds "A" or "B"), as an altered composition would have plotted closer to the source composition. Moreover, the composition of the groundwater within well MW-4 is the least similar of all of the downgradient monitoring wells to the source composition. These observations suggest that the elevated sulfate levels well MW-4 are from a source other than the Ash Filter Ponds.

A final point to note is the presence/absence 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 appreciable levels of boron. From review of Tables 1 and 2, significant levels of boron are present in the liquid contained within the Ash Filter Pond "A" and "B." Conversely, boron levels are generally non-detect in downgradient wells MW-3 and MW-23, and nearly non-detect in well MW-4 at concentrations seen to be a full order of magnitude less than the concentrations measured in the ponds. If well MW-4 was impacted by the regulated unit, one would expect to see elevated boron levels. These results offer additional evidence to support the differing compositions of well MW-4 versus the ponds, and further bolster the existence of an alternate source for the SSI for sulfate.

4.0 Alternate Source Identification and Conclusions

Based on discussions with Station personnel and understanding of operations in the area of the Ash Filter Ponds, focus was given to possible impacts associated with the gypsum handling operations which originate in the nearby Gypsum Storage Dome. Gypsum is generated as a product of the wet flue gas desulfurization (wet FGD) emissions control system that is designed to remove sulfur dioxide and other pollutants from the coal-fired boiler's flue gas stream. Gypsum is essentially comprised of calcium and sulfate, two of the CCR Appendix III indicator parameters. As shown on Figure 1, the Dome lies east of the Ash Filter Ponds and serves as the starting point for loading and truck-based transportation of gypsum to the Station's Ash/Refuse Disposal Site. The route from the Dome to the Ash/Refuse Disposal Site begins on a paved roadway that runs just south of the Ash Filter Ponds, with downgradient wells MW-3 and MW-4 being located immediately adjacent to this roadway. This roadway is regularly wetted via water trucks as a dust control measure, and any runoff from this section of the roadway will sheetflow in the direction of MW-3 and MW-4. Figure 3 shows a truck loaded with gypsum traveling along the haul road past the monitoring wells and en route to the Ash/Refuse Disposal Site. The photograph used in this figure was captured during APTIM's visit to Conemaugh on March 23, 2018.

Historical sulfate data for the three downgradient monitoring wells, including graphical representations (provided in Appendix B), indicate elevated and rising sulfate levels in all three wells until approximately 2014, when sulfate levels at wells MW-3 and MW-23 began to decline. At the same time, sulfate levels at well MW-4 continued to rise. Inquiries to Conemaugh personnel revealed that a concrete Gypsum Area Sump was newly installed and put on-line in and around this similar 2014 timeframe. As shown on Figure 4, the Gypsum Area Sump included a surface water runoff collection channel and culvert system located just east of well MW-3 and just south of well MW-23. Once functional, the Gypsum Area Sump and associated piping/grading began capturing the surface water runoff (containing gypsum) from the paved roadway near wells MW-3 and MW-23, and sulfate levels in these two wells subsequently decreased.

Well MW-4, however, is not topographically connected to the Gypsum Area Sump and was therefore unaffected by its implementation (refer to Figure 4). Well MW-3 is higher in surface elevation than well MW-4, and therefore, surface water runoff west of well MW-3 flows toward well MW-4 and not into the collection features tied to the Gypsum Area Sump. During APTIM's March 23, 2018 site visit, gypsum residue was present in the immediate area around MW-4 on the ground surface and completely covering the concrete wellpad. These observations were not found at either of the other downgradient monitoring wells. The analytical results from the October 2017 and April 2017 sampling events do bear out the "fingerprint" of gypsum in the form of elevated calcium and sulfate levels in well MW-4. Comparatively lesser concentrations of these

constituents are seen in wells MW-3 and MW-23, most likely due to the noted improvements in surface water drainage in these areas associated with the Gypsum Area Sump installation.

Several notable pieces of evidence have emerged during the course of this demonstration study, each of which points to an alternate source for the SSI for sulfate reported at well MW-4 during the October 2017 Detection Monitoring event. This evidence includes recognized differences in the geochemical composition of the groundwater at well MW-4 versus the liquid contents of the Ash Filter Ponds (refer to Figure 2). Further, the absence of elevated boron levels in all downgradient wells, including well MW-4, indicates a groundwater regime that is not impacted by ash or ash-derived leachate. The competent clay liner system within the ponds also bolsters the confirmation of different characteristics for groundwater outside the ponds when compared to the contents of the ponds themselves. And most notably, the examination of the gypsum handling operations and first-hand observations of gypsum accumulation in the immediate area of well MW-4 due to surface water runoff from the adjacent haul road. Subsequent surface water infiltration through these gypsum residuals and into the underlying groundwater table near well MW-4 is the most plausible explanation for the localized sulfate impacts. Commensurate with this conclusion, the SSI from the October 2017 Detection Monitoring event is deemed not to be in association with the Conemaugh Ash Filter Ponds. Accordingly, and per §257.94(e)(2), Detection Monitoring for the regulated unit will continue on the minimum semiannual frequency as outlined in §257.94(b).

5.0 Professional Engineer's Certification

In accordance with §257.94(e)(2) 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 Conemaugh Ash Filter Ponds are not the source of the SSI observed during the October 2017 Detection Monitoring event.

Certified by: _____

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

Professional Engineer Registration No. PE 085411

Aptim Environmental & Infrastructure, Inc.

Date: April 13, 2018

Tables

Table 1
Conemaugh Generating Station--Ash Filter Ponds
CCR Appendix III Constituents

Monitoring Well	Date Sampled	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						
		0.58	**376**	**1560**	**0.2**	**6975**	**788**	**4.59-7.42**
MW-3 (Downgradient)	1-Oct-17	< 0.05	135	387	< 0.1	1140	255	6.30
MW-4 (Downgradient)	4-Oct-17	0.14	335	814	< 0.2	3200	1050	6.02
MW-23 (Downgradient)	1-Oct-17	< 0.05	172	313	< 0.1	1520	575	6.25

= Statistically Significant Increase (SSI) over Background.

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 of groundwater sampling data from upgradient monitoring wells (see Appendix A).

Table 2
Ash Pond and Monitoring Well Analytical Results (April 2017)
Conemaugh Generating Station

Parameter	Units	MW-1B (Upgradient)	MW-2 (Upgradient)	MW-3 (Downgradient)	MW-4 (Downgradient)	MW-23 (Downgradient)	Pond A	Settling Pond (Pond B)
		4/24/2017	4/25/2017	4/25/2017	4/26/2017	4/24/2017	4/26/2017	4/26/2017
Field Readings:								
Groundwater Elevation	ft MSL	1072.69	1072.92	1067.09	1070.93	1069.68	N/A	N/A
Specific Conductance	µmhos/cm	3890	1106	2470	4750	2280	N/A	N/A
Oxidation-Reduction Potential	mV	331	302	295	325	190	176	197
Dissolved Oxygen	mg/L	2.79	4.03	2.01	3.00	2.74	N/A	N/A
Temperature	^{o}C	16.0	15.5	14.0	14.5	15.5	21.2	27.1
Turbidity	NTU	0.03	3.34	0.35	1.06	5.21	N/A	N/A
pH	S.U.	5.27	6.28	5.57	6.68	5.21	8.37	7.22
CCR Appendix III:								
Total Boron	mg/L	0.37	0.29	ND @ 0.05	0.14	ND @ 0.05	2.70	2.75
Total Calcium	mg/L	166	136	181	392	164	444	443
Total Chloride	mg/L	988	69	552	863	383	91	85
Total Fluoride	mg/L	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	0.2	0.3
Total Dissolved Solids	mg/L	2470	792	1740	3310	1520	2020	2020
Sulfate	mg/L	548	373	314	996	558	1060	1020
pH	S.U.	5.27	6.28	5.57	6.68	5.21	8.37	7.22
Anions:								
Alkalinity to pH 4.5	mg/L $CaC0_3$	13	112	62	44	30	34	32
Bromide	mg/L	0.5	0.2	1.0	0.3	0.5	1.4	1.4
Chloride	mg/L	995	68	545	892	377	91	85
Fluoride	mg/L	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	0.2	0.3
Sulfate	mg/L	546	368	312	1000	546	1060	1020
Cations:								
Aluminum	mg/L	ND @ 0.1	0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	0.5	0.9
Barium	mg/L	0.02	0.02	0.03	0.01	0.01	0.06	0.13
Boron	mg/L	0.39	0.29	ND @ 0.05	0.13	ND @ 0.05	2.70	2.75
Calcium	mg/L	170	142	182	379	172	444	443
Iron	mg/L	ND @ 0.05	0.09	0.23	0.05	18.7	1.74	0.71
Lithium	mg/L	0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01	0.75	0.73
Magnesium	mg/L	29.0	36.4	75.8	98.9	70.2	58.8	56.2
Manganese	mg/L	2.94	0.09	7.30	9.00	11.8	0.35	0.31
Potassium	mg/L	12.5	4.4	2.4	4.3	2.5	20.2	19.8
Sodium	mg/L	683	38.5	180	652	206	74.6	72.7
Strontium	mg/L	0.62	0.39	0.31	0.78	0.14	2.01	2.14
Silica	mg/L	19.3	9.64	15.7	14.5	15.8	4.7	6.1

N/A = Not Analyzed.
ND = Not detected at or above the indicated reporting limit.

Figures

LEGEND:

MW-3 (1064.89) CCR GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION MEASURED BETWEEN OCTOBER 1 AND 4, 2017

GROUNDWATER FLOW DIRECTION

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

SCALE

0 100 200 FEET

REV. NO.	DATE	DESCRIPTION

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FIGURE 1
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH FILTER PONDS

DRAWN BY: BWM	APPROVED BY: DAM	PROJ. NO.: 1009194003	DATE: APRIL 2018

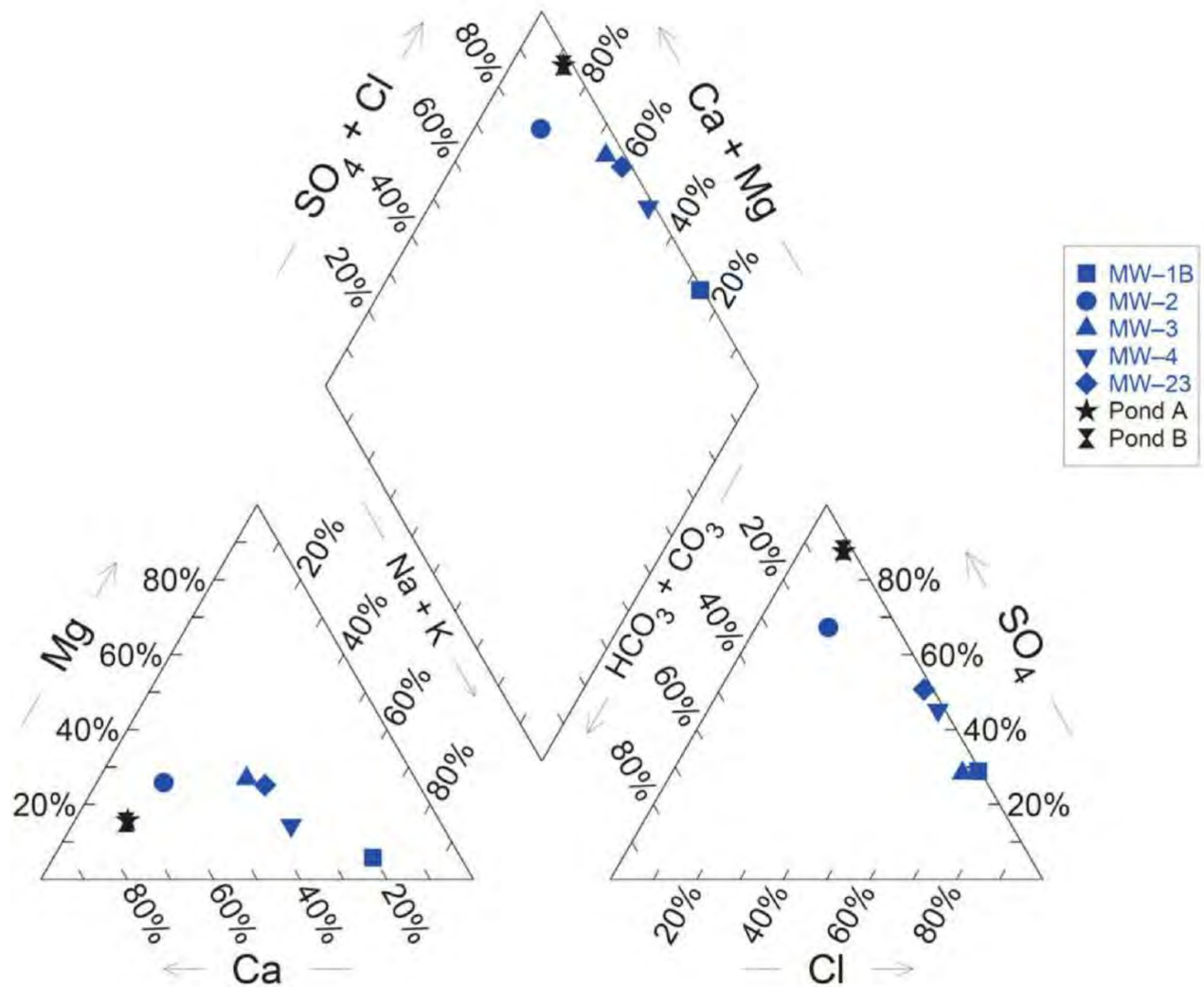

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FIGURE 2
PIPER DIAGRAM

DRAWN BY:	BWM	APPROVED BY:	DAM	PROJ. NO.:	1009194003	DATE:	APRIL 2018

REFERENCE: PHOTOGRAPH TAKEN MARCH 23, 2018.

REV. NO.	DATE	DESCRIPTION

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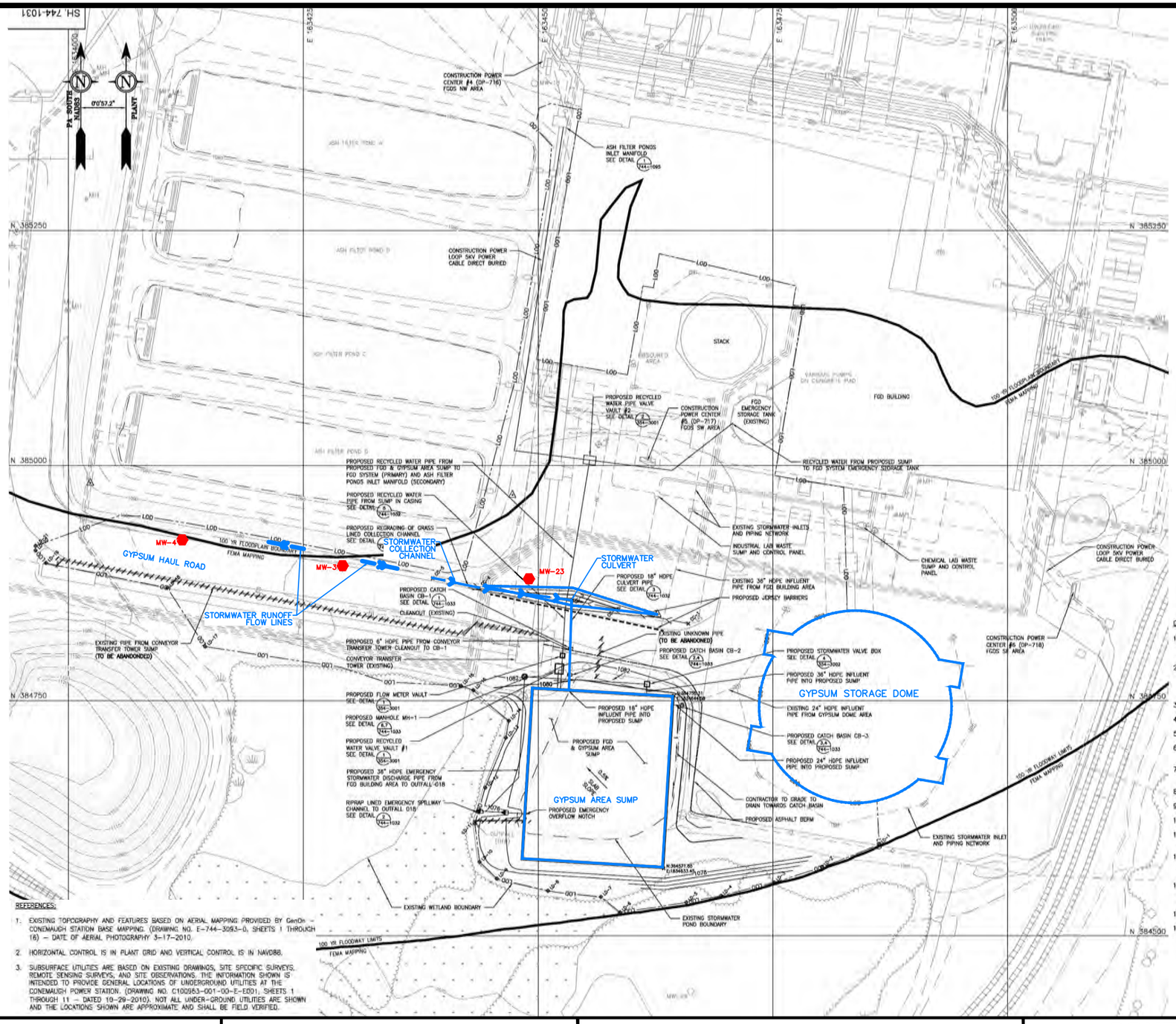
FIGURE 3
PHOTO OF GYPSUM HAUL TRUCK
NEXT TO MONITORING WELLS

DRAWN BY: BWM	APPROVED BY: DAM	PROJ. NO.: 1009194003	DATE: APRIL 2018



REFERENCES:

1. EXISTING TOPOGRAPHY AND FEATURES BASED ON AERIAL MAPPING PROVIDED BY GenOn – CONEMAUGH STATION BASE MAPPING. (DRAWING NO. E-744-3053-0, SHEETS 1 THROUGH 18) – DATE OF AERIAL PHOTOGRAPHY 3-17-2010.
2. HORIZONTAL CONTROL IS IN PLANT GRID AND VERTICAL CONTROL IS IN NAVD88.
3. SUBSURFACE UTILITIES ARE BASED ON EXISTING DRAWINGS, SITE SPECIFIC SURVEYS, REMOTE SENSING SURVEYS, AND SITE OBSERVATIONS. THE INFORMATION SHOWN IS INTENDED TO PROVIDE GENERAL LOCATIONS OF UNDERGROUND UTILITIES AT THE CONEMAUGH POWER STATION. (DRAWING NO. C102983-001-00-E-E001, SHEETS 1 THROUGH 11 – DATED 10-29-2010). NOT ALL UNDER-GROUND UTILITIES ARE SHOWN AND THE LOCATIONS SHOWN ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.

GENERAL LEGEND

EXISTING FEATURES	PROPOSED FEATURES	
		MONITORING WELL LOCATION
MH	MH	MANHOLE
1200	1200	CONTOUR
		BURIED PIPE/CULVERT
		PIPE (TO BE ABANDONED)
SW		STORMWATER PIPE
		EXISTING POND WATER LEVEL
		CHAIN LINK FENCE/GATE
		TREE LINE
		WETLAND
		RAILROAD LINE
		TREE
		SHRUB
		SURVEY CONTROL POINT
		GUIDE RAIL / BARRIER
		PERIMETER LIGHTING
		FIRE HYDRANT
		STORMWATER PIPE
		STORMWATER INLET
		PROPOSED ASPHALT BERM
	LOD	LIMIT OF DISTURBANCE
		POINT LOCATION
		JERSEY BARRIER

Collection Channel			
Name	Northing	Easting	Elevation
CC-1	384831.87	1634059.62	1083.91
CC-2	384846.93	1634085.72	1080.01
CC-3	384857.00	1634536.11	1077.40
CC-4	384880.52	1634436.62	1081.33
CC-5	384880.09	1634387.70	1081.58

Limit of Disturbance (LOD)		
Name	Northing	Easting
LD-1	384597.01	1634863.23
LD-2	384573.02	1634802.42
LD-3	384556.97	1634751.56
LD-4	384542.73	1634694.42
LD-5	384535.57	1634657.59
LD-6	384524.97	1634586.64
LD-7	384541.60	1634566.66
LD-8	384648.02	1634510.25
LD-9	384580.85	1634455.92
LD-10	384578.52	1634437.51
LD-11	384619.44	1634432.45
LD-12	384657.61	1634443.55
LD-13	384710.67	1634465.46
LD-14	384728.81	1634468.62
LD-15	384781.17	1634430.92
LD-16	384785.93	1634417.74
LD-17	384807.59	1634145.56
LD-18	384888.95	1634100.24
LD-19	384899.53	1633978.13
LD-20	384909.81	1633965.07
LD-21	384914.64	1633965.11

*NOTE: NOT ALL LIMIT OF DISTURBANCE BOUNDARY POINTS ARE SHOWN.

GENERAL NOTES:

1. EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES ARE TO BE INSTALLED ACCORDING TO THE 01/18/2013 APPROVED E&S CONTROL PLAN PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
2. THE APPROXIMATE LOCATION OF THE 100 YEAR FLOODWAY LIMITS AND FLOODPLAIN BOUNDARIES ARE BASED ON FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) MAPPING, FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY-PANEL NUMBER 421724 0014B, EFFECTIVE DATE APRIL 2,1990.
3. FOR VALVE VAULTS AND PIPING SUPPORT DETAILS, SEE DRAWINGS 354-3001 AND 354-3002.
4. FOR ENLARGED PLAN OF SUMP, SEE DRAWING 436-1054.
5. FOR SUMP STRUCTURAL DETAILS AND SECTIONS, SEE DRAWING 436-1055.
6. PROPOSED INFLUENT PIPING SHALL BE HDPE PIPE WITH THE SAME INSIDE DIAMETER AS THE EXISTING STORMWATER PIPE WHICH IT WILL RECEIVE FLOW FROM.
7. PIPES TO BE ABANDONED SHALL BE CUT OFF AND GROUTED SHUT OR REMOVED. CONTRACTOR TO NOTIFY NRG/GenOn PRIOR TO WORK.
8. FOR CONSTRUCTION CONTROL POINTS, SEE DRAWINGS 744-1031, 744-1096, AND 436-1054.
9. FOR DISCHARGE PIPE PROFILES, SEE DRAWING 744-1096.
10. FOR TYPICAL PIPE TRENCH DETAILS, SEE DRAWING 744-1032.
11. STANDARD BOLLARDS TO BE INSTALLED AROUND PROPOSED RECYCLED WATER PIPE VALVE VAULTS. SEE DETAIL 7 ON DRAWING 744-1032 AND DRAWINGS 354-3001 AND 354-3002.
12. SHEET PILING/SHORING SHALL BE DESIGNED AND INSTALLED BY THE CONTRACTOR AS NEEDED TO PREVENT DAMAGE TO THE EXISTING ASPHALT ROAD AND CONVEYOR TRANSFER TOWER. SEE DRAWING 436-1058 FOR SITE SPECIFIC DESIGN CONSIDERATIONS.
13. ROCK ANCHORS SHALL BE INSTALLED PRIOR TO CONSTRUCTION OF THE SUMP BASE SLAB AS SPECIFIED ON DRAWINGS 436-1054, 436-1055, AND 436-1058. A MUD MAT MAY BE INSTALLED TO FACILITATE THE ROCK ANCHOR INSTALLATION.
14. FOR GENERAL NOTES, SEE DRAWING 744-1094.
15. EXISTING STORMWATER POND GRADES, EXISTING GROUND CONTOURS, EXISTING FEATURES, AND UTILITY LOCATIONS MUST BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO STARTING EARTHWORK AND LAYOUT WORK.

FIGURE ADAPTED FROM GAI CONSULTANTS "FGD & GYPSUM AREA SUMP GENERAL PLAN", DATED 12-14-12.

REV. NO.	DATE	DESCRIPTION

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FIGURE 4
FGD & GYPSUM AREA SUMP GENERAL PLAN

DRAWN BY:	BWM	APPROVED BY:	DAM	PROJ. NO.:	1009194003	DATE:	APRIL 2018

C:\3DCivil\NRG\Conemaugh\Figures\Fig-04-FGD-GypsumAreaSump.dwg, 11x17, 4/9/2018 2:01:45 PM

Appendix A

Quarterly Background Data for the Upgradient Wells and the Resultant Calculated Background Concentrations

Conemaugh Generating Station--Ash Filter Ponds
Data for Calculation of Background Values
CCR Appendix III Constituents

Monitoring Well	Date Sampled	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.)
MW-1B (Upgradient)	17-Dec-15	0.29	333	1540	< 0.1	3620	544	5.49
	27-Jan-16	0.31	288	1280	< 0.1	3180	583	5.87
	20-Apr-16	0.28	170	652	< 0.5	2410	729	6.09
	19-Jul-16	0.36	208	1310	0.1	2760	575	5.79
	11-Oct-16	0.46	192	1010	0.2	2640	438	6.56
	17-Jan-17	0.43	198	1030	< 0.1	2650	427	5.87
	24-Apr-17	0.37	166	988	< 0.1	2470	548	5.27
	20-Jul-17	0.39	345	1560	< 0.1	3740	388	5.00
MW-2 (Upgradient)	11-Oct-16	0.30	191	251	< 0.1	1200	348	6.28
	16-Nov-16	0.31	176	94	0.1	868	416	6.95
	21-Dec-16	0.41	176	101	0.2	1050	519	7.03
	25-Jan-17	0.21	137	68	0.2	726	316	6.93
	21-Mar-17	0.33	158	75	0.1	828	387	6.40
	25-Apr-17	0.29	136	69	< 0.1	792	373	6.28
	13-Jun-17	0.30	150	60	< 0.1	768	369	6.15
	27-Jul-17	0.28	133	67	< 0.1	684	310	6.45

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 of groundwater sampling data; see attached output from Sanitas software application.

Prediction Limit

Conemaugh Generating Station Client: NRG Data: Conemaugh Ash Filter CCR ChemStat Printed 1/15/2018, 10:29 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Boron (mg/L)	n/a	0.5756	n/a	n/a	3 future	n/a	17	0	ln(x)	0.000...	Param Inter 1 of 2
Calcium (mg/L)	n/a	376.3	n/a	n/a	3 future	n/a	17	0	ln(x)	0.000...	Param Inter 1 of 2
Chloride (mg/L)	n/a	1560	n/a	n/a	3 future	n/a	17	0	n/a	0.00563	NP Inter (normality) ...
Fluoride (mg/L)	n/a	0.2	n/a	n/a	3 future	n/a	17	64.71	n/a	0.00563	NP Inter (NDs) 1 of 2
pH (S.U.)	n/a	7.42	4.586	n/a	3 future	n/a	16	0	x^2	0.000...	Param Inter 1 of 2
Sulfate (mg/L)	n/a	788.4	n/a	n/a	3 future	n/a	17	0	ln(x)	0.000...	Param Inter 1 of 2
Total dissolved solids (mg/L)	n/a	6975	n/a	n/a	3 future	n/a	17	0	ln(x)	0.000...	Param Inter 1 of 2

Appendix B

Historical Sulfate Data (Three Downgradient Monitoring Wells)

GEOCHEMICAL TESTING
Environmental and Energy Analysis

Welcome David Shott

My Account Sign Out

- Analyte
- Trend
- Trend Analysis
- Workorders
- WorkOrder Tests
- Workorders By Site ID
- Workorders by Date

Home Workorders By Site ID Trend Analysis Trend Analysis

Analyte Trace

Please select a Date Range and Site:

Note: Date Format MM/DD/YYYY

From: 01/01/2004 To: 12/31/2017

NRG - CONEMAUGH STATION - GW - G1033.10 Search

Select Monitoring Point(s) Select Analyte(s)

MW-3 Sulfate

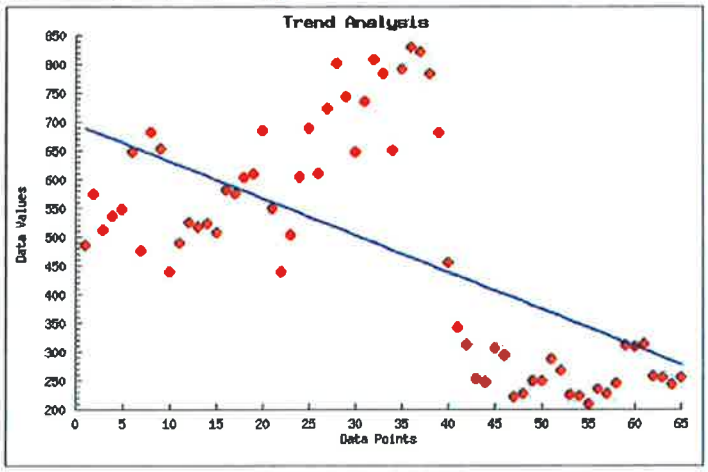
Export CSV

Sample No.	PDF	Attach	Sample ID	Date Sampled	Analyte	Result	QL	Qual	CL	Units	DF	Date/Time Analyzed	Test Method
G1710052			MW-3	10/01/2017	Sulfate	255	2			mg/L	1	10/03/2017 03:19	EPA 300.0
G1710051			MW-3	10/01/2017	Sulfate	243	10		738	mg/L	1	10/02/2017 22:35	EPA 300.0
G1707E08			MW-3	07/25/2017	Sulfate	256	2			mg/L	1	07/26/2017 08:47	EPA 300.0
G1707E07			MW-3	07/25/2017	Sulfate	258	10		738	mg/L	1	07/26/2017 07:18	EPA 300.0
G1704C52			MW-3	04/25/2017	Sulfate	314	2			mg/L	1	04/26/2017 06:28	EPA 300.0
G1704C51			MW-3	04/25/2017	Sulfate	309	10		738	mg/L	1	04/26/2017 05:47	EPA 300.0
G1704C50			MW-3	04/25/2017	Sulfate	312	2			mg/L	1	04/26/2017 01:51	EPA 300.0
G1701801			MW-3	01/17/2017	Sulfate	245	2			mg/L	1	01/17/2017 19:31	EPA 300.0
G1701800			MW-3	01/17/2017	Sulfate	228	10		738	mg/L	1	01/17/2017 18:36	EPA 300.0
G1610C34			MW-3	10/24/2016	Sulfate	237	10		738	mg/L	1	10/24/2016 21:23	EPA 300.0
G1610C33			MW-3	10/24/2016	Sulfate	211	2			mg/L	1	10/25/2016 00:04	EPA 300.0
G1607D13			MW-3	07/25/2016	Sulfate	225	2			mg/L	1	07/26/2016 23:38	EPA 300.0
G1607D12			MW-3	07/25/2016	Sulfate	227	10		738	mg/L	1	07/26/2016 22:34	EPA 300.0
G1604C65			MW-3	04/25/2016	Sulfate	267	10		738	mg/L	1	04/26/2016 00:06	EPA 300.0
G1604C64			MW-3	04/25/2016	Sulfate	288	2			mg/L	1	04/26/2016 01:22	EPA 300.0
G1601B13			MW-3	01/26/2016	Sulfate	250	2			mg/L	1	01/26/2016 19:36	EPA 300.0
G1601B12			MW-3	01/26/2016	Sulfate	249	10		738	mg/L	1	01/26/2016 19:26	EPA 300.0
G1512897			MW-3	12/16/2015	Sulfate	227	2			mg/L	1	12/16/2015 23:44	EPA 300.0
G1510B75			MW-3	10/22/2015	Sulfate	222	10		738	mg/L	1	10/23/2015 11:10	EPA 300.0
G1507A53			MW-3	07/21/2015	Sulfate	293	10		738	mg/L	1	07/21/2015 19:19	EPA 300.0
G1504C97			MW-3	04/27/2015	Sulfate	306	10		738	mg/L	1	04/27/2015 16:04	EPA 300.0
G1502038			MW-3	02/02/2015	Sulfate	248	10		738	mg/L	1	02/02/2015 17:49	EPA 300.0
G1410610			MW-3	10/13/2014	Sulfate	254	10		738	mg/L	1	10/13/2014 19:42	EPA 300.0
G1407578			MW-3	07/10/2014	Sulfate	312	10		738	mg/L	1	07/10/2014 17:57	EPA 300.0
G1404A78			MW-3	04/16/2014	Sulfate	344	10		738	mg/L	1	04/16/2014 18:54	EPA 300.0
G1402036			MW-3	02/03/2014	Sulfate	456	10		738	mg/L	1	02/04/2014 04:22	EPA 300.0
G1310157			MW-3	10/02/2013	Sulfate	681	10		738	mg/L	1	10/03/2013 09:23	EPA 300.0
G1307835			MW-3	07/17/2013	Sulfate	784	10	**	738	mg/L	1	07/19/2013 11:38	EPA 300.0
G1304933			MW-3	04/18/2013	Sulfate	821	10	**	738	mg/L	2	04/19/2013 09:00	EPA 300.0
G1301B90			MW-3	01/28/2013	Sulfate	830	10	**	738	mg/L	1	01/29/2013 09:45	EPA 300.0
G1211317			MW-3	11/07/2012	Sulfate	792	10	**	738	mg/L	1	11/08/2012 14:35	EPA 300.0
G1207908			MW-3	07/23/2012	Sulfate	649	10		738	mg/L	1	07/24/2012 09:07	EPA 300.0
G1204599			MW-3	04/12/2012	Sulfate	784	10	**	738	mg/L	1	04/13/2012 03:21	EPA 300.0
G1201362			MW-3	01/09/2012	Sulfate	807	10	**	738	mg/L	1	01/11/2012 09:16	EPA 300.0
G1110659			MW-3	10/17/2011	Sulfate	736	10		738	mg/L	5	10/26/2011 20:33	EPA 300.0
G1107365			MW-3	07/11/2011	Sulfate	648	10		738	mg/L	1	07/13/2011 03:03	EPA 300.0
G1104803			MW-3	04/21/2011	Sulfate	744	10	**	738	mg/L	1	04/22/2011 01:35	EPA 300.0
G1101588			MW-3	01/18/2011	Sulfate	803	10	**	738	mg/L	1	01/19/2011 11:00	EPA 300.0
G1010090			MW-3	10/04/2010	Sulfate	725	10		738	mg/L	1	10/06/2010 10:35	EPA 300.0
G1007286			MW-3	07/12/2010	Sulfate	611	10		738	mg/L	1	07/13/2010 23:44	EPA 300.0
G1004535			MW-3	04/20/2010	Sulfate	688	10		738	mg/L	1	04/21/2010 06:20	EPA 300.0
G1001485			MW-3	01/20/2010	Sulfate	605	10		738	mg/L	1	01/21/2010 10:05	EPA 300.0
G0910579			MW-3	10/21/2009	Sulfate	505	10		738	mg/L	1	10/21/2009 21:14	EPA 300.0
G0907378			MW-3	07/15/2009	Sulfate	441	10		738	mg/L	1	07/15/2009 22:45	EPA 300.0
G0904485			MW-3	04/20/2009	Sulfate	549	10		738	mg/L	1	04/22/2009 10:48	EPA 300.0
G0901497			MW-3	01/27/2009	Sulfate	684	10		738	mg/L	1	02/04/2009 00:00	EPA 300.0
G0810471			MW-3	10/20/2008	Sulfate	611	10		738	mg/L	1	10/21/2008 12:20	EPA 300.0
G0807419			MW-3	07/16/2008	Sulfate	604	10		738	mg/L	1	07/16/2008 23:15	EPA 300.0
G0804541			MW-3	04/21/2008	Sulfate	576	10		738	mg/L	1	04/22/2008 10:00	EPA 300.0
G0801435			MW-3	01/17/2008	Sulfate	583	10		738	mg/L	1	01/18/2008 19:18	EPA 300.0
G0710360			MW-3	10/15/2007	Sulfate	508	10		738	mg/L	1	10/16/2007 18:37	EPA 300.0
G0707064			MW-3	07/03/2007	Sulfate	523	10		738	mg/L	1	07/03/2007 00:00	EPA 300.0
G0704373			MW-3	04/16/2007	Sulfate	517	10		738	mg/L	1	04/17/2007 04:10	EPA 300.0
G0701360			MW-3	01/16/2007	Sulfate	526	10		738	mg/L	1	01/17/2007 10:37	EPA 300.0
G0610489			MW-3	10/24/2006	Sulfate	490	10		738	mg/L	1	10/24/2006 18:53	EPA 300.0
G0607332			MW-3	07/19/2006	Sulfate	441	10		738	mg/L	1	07/20/2006 13:02	EPA 300.0
G0604336			MW-3	04/18/2006	Sulfate	654	10		738	mg/L	1	04/19/2006 11:02	EPA 300.0
G0601272			MW-3	01/17/2006	Sulfate	682	10		738	mg/L	1	01/17/2006 19:48	EPA 300.0
G0510273			MW-3	10/13/2005	Sulfate	476	10		738	mg/L	1	10/13/2005 23:13	EPA 300.0
G0507278			MW-3	07/18/2005	Sulfate	649	10		0	mg/L	1	07/19/2005 16:26	EPA 300.0
G0504252			MW-3	04/14/2005	Sulfate	548	10		738	mg/L	1	04/14/2005 21:22	EPA 300.0
G0501322			MW-3	01/18/2005	Sulfate	536	10		738	mg/L	1	02/08/2005 07:22	EPA 300.0

Sample No.	PDF	Attach	Sample ID	Date Sampled	Analyte	Result	QL	Qual	CL	Units	DF	Date/Time Analyzed	Test Method
G0410194			MW-3	10/13/2004	Sulfate	512	10		738	mg/L	1	10/14/2004 15:36	EPA 300.0
G0407245			MW-3	07/15/2004	Sulfate	573	10		0	mg/L	1	07/15/2004 19:33	EPA 300.0
G0404284			MW-3	04/20/2004	Sulfate	485	10		0	mg/L	1	05/25/2004 00:00	EPA 300.0

Statistical Probability / Trend Analysis

Probability	95 %	99 %	99.5 %
Z: -3.7082	1.645	2.327	2.575
Trend	Yes	Yes	Yes



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Analyte Trace

Please select a Date Range and Site:

Note: Date Format MM/DD/YYYY

From: 01/01/2004 To: 12/31/2017

NRG - CONEMAUGH STATION - GW - G1033.10

Search

Select Monitoring Point(s) Select Analyte(s)

MW-4 Sulfate

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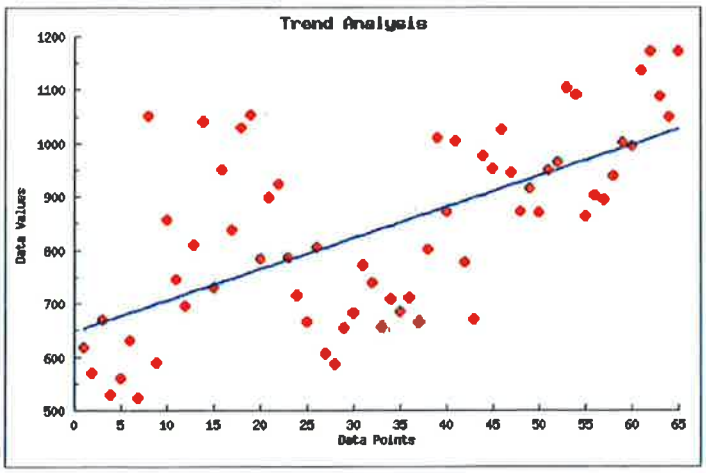
Sample No.	PDF	Attach	Sample ID	Date Sampled	Analyte	Result	QL	Qual	CL	Units	DF	Date/Time Analyzed	Test Method
G1710253			MW-4	10/04/2017	Sulfate	1170	10	**	738	mg/L	1	10/04/2017 17:41	EPA 300.0
G1710252			MW-4	10/04/2017	Sulfate	1050	2			mg/L	1	10/05/2017 08:52	EPA 300.0
G1707F83			MW-4	07/27/2017	Sulfate	1090	10	**	738	mg/L	1	07/27/2017 20:28	EPA 300.0
G1707F82			MW-4	07/27/2017	Sulfate	1170	2			mg/L	1	07/27/2017 19:04	EPA 300.0
G1704D71			MW-4	04/26/2017	Sulfate	1140	10	**	738	mg/L	1	04/27/2017 09:08	EPA 300.0
G1704D69			MW-4	04/26/2017	Sulfate	996	2			mg/L	1	04/28/2017 08:10	EPA 300.0
G1704D68			MW-4	04/26/2017	Sulfate	1000	2			mg/L	1	04/28/2017 07:52	EPA 300.0
G1701E56			MW-4	01/30/2017	Sulfate	940	10	**	738	mg/L	1	01/31/2017 19:42	EPA 300.0
G1701E55			MW-4	01/30/2017	Sulfate	895	2			mg/L	1	01/31/2017 19:20	EPA 300.0
G1610D95			MW-4	10/26/2016	Sulfate	903	10	**	738	mg/L	1	10/26/2016 20:16	EPA 300.0
G1610D94			MW-4	10/26/2016	Sulfate	865	2			mg/L	1	10/27/2016 06:30	EPA 300.0
G1607D13			MW-4	07/25/2016	Sulfate	1090	2			mg/L	1	07/27/2016 00:10	EPA 300.0
G1607D12			MW-4	07/26/2016	Sulfate	1100	10	**	738	mg/L	1	07/26/2016 23:22	EPA 300.0
G1604D34			MW-4	04/26/2016	Sulfate	965	2			mg/L	1	04/27/2016 07:47	EPA 300.0
G1604D33			MW-4	04/26/2016	Sulfate	951	10	**	738	mg/L	1	04/27/2016 07:36	EPA 300.0
G1602350			MW-4	02/04/2016	Sulfate	870	2			mg/L	1	02/05/2016 10:12	EPA 300.0
G1602348			MW-4	02/04/2016	Sulfate	915	10	**	738	mg/L	1	02/05/2016 10:01	EPA 300.0
G1512B14			MW-4	12/21/2015	Sulfate	874	2			mg/L	1	12/21/2015 17:27	EPA 300.0
G1510A90			MW-4	10/21/2015	Sulfate	946	10	**	738	mg/L	1	10/22/2015 19:42	EPA 300.0
G1507C23			MW-4	07/23/2015	Sulfate	1030	10	**	738	mg/L	1	07/23/2015 23:24	EPA 300.0
G1504E71			MW-4	04/29/2015	Sulfate	953	10	**	738	mg/L	1	04/29/2015 18:59	EPA 300.0
G1501985			MW-4	01/22/2015	Sulfate	977	10	**	738	mg/L	1	01/23/2015 09:41	EPA 300.0
G1410E15			MW-4	10/27/2014	Sulfate	670	10		738	mg/L	1	10/27/2014 20:39	EPA 300.0
G1409967			MW-4	09/18/2014	Sulfate	777	10	**	738	mg/L	1	09/18/2014 17:48	EPA 300.0
G1404D04			MW-4	04/21/2014	Sulfate	1000	10	**	738	mg/L	1	04/22/2014 15:28	EPA 300.0
G1401764			MW-4	01/16/2014	Sulfate	874	10	**	738	mg/L	1	01/16/2014 23:17	EPA 300.0
G1310157			MW-4	10/02/2013	Sulfate	1010	10	**	738	mg/L	1	10/04/2013 08:19	EPA 300.0
G1307578			MW-4	07/11/2013	Sulfate	802	10	**	738	mg/L	1	07/15/2013 09:48	EPA 300.0
G1304670			MW-4	04/15/2013	Sulfate	666	10		738	mg/L	1	04/15/2013 20:14	EPA 300.0
G1301669			MW-4	01/15/2013	Sulfate	710	10		738	mg/L	1	01/15/2013 21:02	EPA 300.0
G1210910			MW-4	10/18/2012	Sulfate	686	10		738	mg/L	1	10/19/2012 13:40	EPA 300.0
G1207653			MW-4	07/17/2012	Sulfate	708	10		738	mg/L	1	07/18/2012 01:47	EPA 300.0
G1204788			MW-4	04/18/2012	Sulfate	658	10		738	mg/L	1	04/19/2012 02:46	EPA 300.0
G1201758			MW-4	01/18/2012	Sulfate	738	10	**	738	mg/L	1	01/19/2012 13:57	EPA 300.0
G1110659			MW-4	10/17/2011	Sulfate	771	10	**	738	mg/L	1	10/18/2011 09:52	EPA 300.0
G1107484			MW-4	07/13/2011	Sulfate	684	10		738	mg/L	1	07/14/2011 16:31	EPA 300.0
G1104684			MW-4	04/19/2011	Sulfate	656	10		738	mg/L	10	04/25/2011 17:44	EPA 300.0
G1101588			MW-4	01/18/2011	Sulfate	589	10		738	mg/L	1	01/19/2011 10:43	EPA 300.0
G1010531			MW-4	10/19/2010	Sulfate	608	10		738	mg/L	1	10/20/2010 11:47	EPA 300.0
G1007500			MW-4	07/19/2010	Sulfate	806	10	**	738	mg/L	1	07/20/2010 14:17	EPA 300.0
G1004119			MW-4	04/06/2010	Sulfate	667	10		738	mg/L	1	04/07/2010 12:47	EPA 300.0
G1001446			MW-4	01/18/2010	Sulfate	715	10		738	mg/L	1	01/20/2010 05:51	EPA 300.0
G0910278			MW-4	10/12/2009	Sulfate	787	10	*	738	mg/L	1	10/13/2009 00:12	EPA 300.0
G0907330			MW-4	07/14/2009	Sulfate	924	10	*	738	mg/L	1	07/15/2009 09:33	EPA 300.0
G0904669			MW-4	04/29/2009	Sulfate	898	10	*	738	mg/L	1	04/30/2009 01:45	EPA 300.0
G0901427			MW-4	01/22/2009	Sulfate	784	10	*	738	mg/L	1	01/22/2009 22:21	EPA 300.0
G0810386			MW-4	10/15/2008	Sulfate	1050	10	*	738	mg/L	1	10/16/2008 08:50	EPA 300.0
G0807334			MW-4	07/14/2008	Sulfate	1030	10	*	738	mg/L	1	07/14/2008 22:25	EPA 300.0
G0804285			MW-4	04/10/2008	Sulfate	837	10	*	738	mg/L	1	04/10/2008 20:29	EPA 300.0
G0801379			MW-4	01/16/2008	Sulfate	950	10	*	738	mg/L	1	01/17/2008 10:04	EPA 300.0
G0710360			MW-4	10/16/2007	Sulfate	731	10		738	mg/L	1	10/16/2007 18:50	EPA 300.0
G0707064			MW-4	07/02/2007	Sulfate	1040	10	*	738	mg/L	1	07/04/2007 00:33	EPA 300.0
G0704412			MW-4	04/17/2007	Sulfate	811	10	*	738	mg/L	1	04/18/2007 08:45	EPA 300.0
G0701360			MW-4	01/15/2007	Sulfate	695	10		738	mg/L	1	01/17/2007 09:21	EPA 300.0
G0610426			MW-4	10/19/2006	Sulfate	745	10	*	738	mg/L	1	10/19/2006 22:04	EPA 300.0
G0607332			MW-4	07/19/2006	Sulfate	858	10	*	738	mg/L	1	07/20/2006 12:49	EPA 300.0
G0604336			MW-4	04/18/2006	Sulfate	591	10		738	mg/L	1	04/19/2006 10:50	EPA 300.0
G0601272			MW-4	01/17/2006	Sulfate	1050	10	*	738	mg/L	10	01/18/2006 19:47	EPA 300.0
G0510273			MW-4	10/13/2005	Sulfate	523	10		738	mg/L	1	10/13/2005 23:01	EPA 300.0
G0507302			MW-4	07/19/2005	Sulfate	631	10		738	mg/L	1	07/20/2005 12:17	EPA 300.0
G0504215			MW-4	04/12/2005	Sulfate	559	10		738	mg/L	1	04/14/2005 02:46	EPA 300.0
G0501348			MW-4	01/20/2005	Sulfate	530	10		738	mg/L	1	01/20/2005 21:18	EPA 300.0

Sample No.	PDF	Attach	Sample ID	Date Sampled	Analyte	Result	QL	Qual	CL	Units	DF	Date/Time Analyzed	Test Method
G0410196			MW-4	10/13/2004	Sulfate	671	10		738	mg/L	1	10/14/2004 16:01	EPA 300.0
G0407267			MW-4	07/19/2004	Sulfate	571	10		0	mg/L	1	07/20/2004 08:58	EPA 300.0
G0404313			MW-4	04/21/2004	Sulfate	619	10		0	mg/L	1	04/22/2004 15:17	EPA 300.0

Statistical Probability / Trend Analysis

Probability	95 %	99 %	99.5 %
Z: 5.1575	1.645	2.327	2.575
Trend	Yes	Yes	Yes



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Analyte Trace

Please select a Date Range and Site:

Note: Date Format MM/DD/YYYY

From: 01/01/2004 To: 12/31/2017

NRG - CONEMAUGH STATION - GW - G1033.10 Search

Select Monitoring Point(s) Select Analyte(s)

MW-23 Sulfate

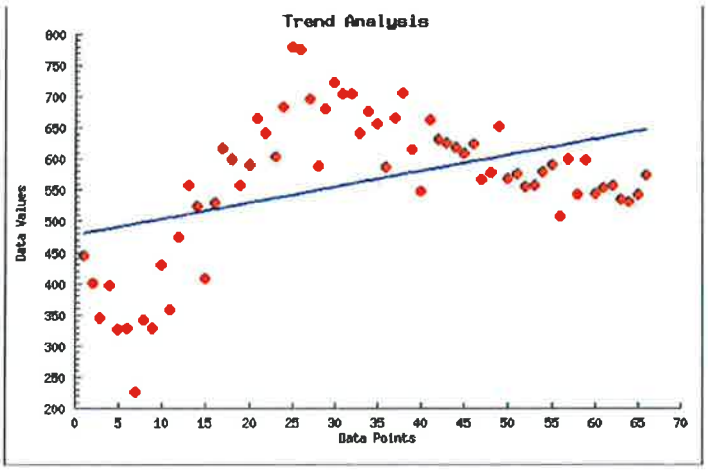
Export CSV

Sample No.	PDF	Attach	Sample ID	Date Sampled	Analyte	Result	QL	Qual	CL	Units	DF	Date/Time Analyzed	Test Method
G1710052			MW-23	10/01/2017	Sulfate	575	2			mg/L	1	10/03/2017 02:43	EPA 300.0
G1710051			MW-23	10/01/2017	Sulfate	544	10		738	mg/L	1	10/02/2017 22:21	EPA 300.0
G1707E06			MW-23	07/24/2017	Sulfate	532	2			mg/L	1	07/26/2017 07:59	EPA 300.0
G1707E05			MW-23	07/24/2017	Sulfate	536	10		738	mg/L	1	07/25/2017 20:39	EPA 300.0
G1704C52			MW-23	04/24/2017	Sulfate	558	2			mg/L	1	04/26/2017 06:56	EPA 300.0
G1704C51			MW-23	04/24/2017	Sulfate	555	10		738	mg/L	1	04/26/2017 06:01	EPA 300.0
G1704C50			MW-23	04/24/2017	Sulfate	546	2			mg/L	1	04/26/2017 02:19	EPA 300.0
G1701907			MW-23	01/18/2017	Sulfate	598	10		738	mg/L	1	01/19/2017 08:54	EPA 300.0
G1701906			MW-23	01/18/2017	Sulfate	543	2			mg/L	1	01/19/2017 09:05	EPA 300.0
G1610C34			MW-23	10/24/2016	Sulfate	600	10		738	mg/L	1	10/24/2016 21:13	EPA 300.0
G1610C33			MW-23	10/24/2016	Sulfate	509	2			mg/L	1	10/24/2016 23:20	EPA 300.0
G1607B45			MW-23	07/21/2016	Sulfate	591	2			mg/L	1	07/22/2016 09:40	EPA 300.0
G1607B44			MW-23	07/21/2016	Sulfate	581	10		738	mg/L	1	07/22/2016 07:40	EPA 300.0
G1604C65			MW-23	04/25/2016	Sulfate	558	10		738	mg/L	1	04/25/2016 23:55	EPA 300.0
G1604C64			MW-23	04/25/2016	Sulfate	557	2			mg/L	1	04/26/2016 01:11	EPA 300.0
G1602122			MW-23	02/02/2016	Sulfate	576	2			mg/L	1	02/03/2016 04:14	EPA 300.0
G1602121			MW-23	02/02/2016	Sulfate	569	10		738	mg/L	1	02/03/2016 03:58	EPA 300.0
G1512A95			MW-23	12/20/2015	Sulfate	653	2			mg/L	1	12/21/2015 12:47	EPA 300.0
G1510869			MW-23	10/15/2015	Sulfate	578	10		738	mg/L	1	10/16/2015 02:34	EPA 300.0
G1507288			MW-23	07/07/2015	Sulfate	567	10		738	mg/L	1	07/07/2015 23:26	EPA 300.0
G1504D90			MW-23	04/28/2015	Sulfate	624	10		738	mg/L	1	04/29/2015 00:50	EPA 300.0
G1501837			MW-23	01/20/2015	Sulfate	609	10		738	mg/L	1	01/20/2015 16:38	EPA 300.0
G1410675			MW-23	10/14/2014	Sulfate	619	10		738	mg/L	1	10/14/2014 19:53	EPA 300.0
G1407764			MW-23	07/15/2014	Sulfate	626	10		738	mg/L	1	07/15/2014 23:06	EPA 300.0
G1404F75			MW-23	04/24/2014	Sulfate	632	10		738	mg/L	1	04/24/2014 20:29	EPA 300.0
G1403387			MW-23	03/10/2014	Sulfate	663	10		738	mg/L	1	03/11/2014 01:30	EPA 300.0
G1310239			MW-23	10/03/2013	Sulfate	549	10		738	mg/L	1	10/03/2013 18:51	EPA 300.0
G1307887			MW-23	07/18/2013	Sulfate	615	10		738	mg/L	1	07/19/2013 13:15	EPA 300.0
G1304933			MW-23	04/18/2013	Sulfate	706	10		738	mg/L	1	04/19/2013 02:45	EPA 300.0
G1301924			MW-23	01/21/2013	Sulfate	666	10		738	mg/L	1	01/21/2013 17:38	EPA 300.0
G1210541			MW-23	10/10/2012	Sulfate	588	10		738	mg/L	1	10/11/2012 04:42	EPA 300.0
G1207823			MW-23	07/19/2012	Sulfate	656	10		738	mg/L	1	07/20/2012 13:04	EPA 300.0
G1204122			MW-23	04/03/2012	Sulfate	676	10		738	mg/L	1	04/04/2012 14:24	EPA 300.0
G1201830			MW-23	01/19/2012	Sulfate	641	10		738	mg/L	1	01/19/2012 22:58	EPA 300.0
G1110714			MW-23	10/18/2011	Sulfate	705	10		738	mg/L	1	10/19/2011 08:50	EPA 300.0
G1107694			MW-23	07/18/2011	Sulfate	703	10		738	mg/L	1	07/20/2011 02:31	EPA 300.0
G1104282			MW-23	04/07/2011	Sulfate	722	10		738	mg/L	1	04/08/2011 16:57	EPA 300.0
G1101639			MW-23	01/19/2011	Sulfate	679	10		738	mg/L	1	01/20/2011 11:02	EPA 300.0
G1010173			MW-23	10/06/2010	Sulfate	589	10		738	mg/L	1	10/07/2010 15:13	EPA 300.0
G1007592			MW-23	07/21/2010	Sulfate	696	10		738	mg/L	1	07/22/2010 12:57	EPA 300.0
G1006237			MW-23	06/08/2010	Sulfate	775	10	**	738	mg/L	1	06/09/2010 16:19	EPA 300.0
G1004535			MW-23	04/19/2010	Sulfate	780	10	**	738	mg/L	1	04/21/2010 06:36	EPA 300.0
G1001485			MW-23	01/20/2010	Sulfate	684	10		738	mg/L	1	01/21/2010 09:28	EPA 300.0
G0910538			MW-23	10/20/2009	Sulfate	605	10		738	mg/L	1	10/21/2009 07:25	EPA 300.0
G0907428			MW-23	07/16/2009	Sulfate	641	10		738	mg/L	1	07/17/2009 12:56	EPA 300.0
G0904485			MW-23	04/20/2009	Sulfate	665	10		738	mg/L	1	04/22/2009 10:11	EPA 300.0
G0901427			MW-23	01/22/2009	Sulfate	591	10		738	mg/L	1	01/22/2009 22:09	EPA 300.0
G0810070			MW-23	10/02/2008	Sulfate	559	10		738	mg/L	1	10/02/2008 20:56	EPA 300.0
G0807134			MW-23	07/03/2008	Sulfate	601	10		738	mg/L	1	07/03/2008 20:20	EPA 300.0
G0804285			MW-23	04/10/2008	Sulfate	616	10		738	mg/L	1	04/10/2008 19:14	EPA 300.0
G0801435			MW-23	01/17/2008	Sulfate	530	10		738	mg/L	1	01/18/2008 19:06	EPA 300.0
G0710360			MW-23	10/15/2007	Sulfate	409	10		738	mg/L	1	10/16/2007 18:25	EPA 300.0
G0707064			MW-23	07/03/2007	Sulfate	524	10		738	mg/L	1	07/03/2007 00:00	EPA 300.0
G0704373			MW-23	04/16/2007	Sulfate	559	10		738	mg/L	1	04/17/2007 03:57	EPA 300.0
G0701360			MW-23	01/16/2007	Sulfate	475	10		738	mg/L	1	01/17/2007 10:50	EPA 300.0
G0610489			MW-23	10/24/2006	Sulfate	359	10		738	mg/L	1	10/24/2006 19:05	EPA 300.0
G0607269			MW-23	07/17/2006	Sulfate	431	10		738	mg/L	1	07/18/2006 19:55	EPA 300.0
G0604332			MW-23	04/17/2006	Sulfate	329	10		738	mg/L	1	04/19/2006 00:40	EPA 300.0
G0601248			MW-23	01/16/2006	Sulfate	342	10		738	mg/L	1	01/17/2006 17:43	EPA 300.0
G0510273			MW-23	10/13/2005	Sulfate	227	10		738	mg/L	1	10/13/2005 23:26	EPA 300.0
G0507222			MW-23	07/13/2005	Sulfate	329	10		738	mg/L	1	07/14/2005 20:49	EPA 300.0
G0504252			MW-23	04/14/2005	Sulfate	328	10		738	mg/L	1	04/14/2005 21:09	EPA 300.0

Sample No.	PDF	Attach	Sample ID	Date Sampled	Analyte	Result	QL	Qual	CL	Units	DF	Date/Time Analyzed	Test Method
G0501322			MW-23	01/18/2005	Sulfate	397	10		738	mg/L	1	02/08/2005 06:57	EPA 300.0
G0410194			MW-23	10/13/2004	Sulfate	346	10		738	mg/L	1	10/14/2004 15:49	EPA 300.0
G0407245			MW-23	07/15/2004	Sulfate	402	10		0	mg/L	1	07/15/2004 20:10	EPA 300.0
G0404284			MW-23	04/20/2004	Sulfate	446	10		0	mg/L	1	04/21/2004 02:43	EPA 300.0

Statistical Probability / Trend Analysis

Probability	95 %	99 %	99.5 %
Z: 1.2175	1.645	2.327	2.575
Trend	No	No	No



Appendix B

Ash Disposal Site—Assessment of Corrective Measures Report

ASSESSMENT OF CORRECTIVE MEASURES REPORT
CCR RELEASE INCIDENT
ASH VALLEY REFUSE/DISPOSAL AREA

Prepared for:

GenOn Northeast Management Company
Conemaugh Generating Station
New Florence, PA 15944

Prepared by:

Aptim Environmental & Infrastructure, Inc.
Pittsburgh, Pennsylvania

January 2019

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List of Acronyms & Abbreviations

APTIM	Aptim Environmental & Infrastructure, Inc.
CCR	coal combustion residuals
CCR Rule	Disposal of Coal Combustion Residuals from Electric Utilities Final Rule
cy	cubic yards
disposal site	Conemaugh Generating Station's Ash Valley Refuse/Disposal Site
ESP	Environmental Sampling Plan
GenOn	GenOn Northeast Management Company
GPS	global positioning system
MCL	Maximum Contaminant Level
PADEP	Pennsylvania Department of Environmental Protection
Report	Assessment of Corrective Measures Report
RRCSP	Run-On and Run-Off Control System Plan
RSL	Regional Screening Level
sf	square feet
SPLP	Synthetic Precipitation Leaching Procedure
TCLP	Toxicity Characteristic Leaching Procedure
USEPA	U.S. Environmental Protection Agency

1.0 Introduction

In 2015, the Disposal of Coal Combustion Residuals from Electric Utilities Final Rule (CCR Rule) was enacted within the Federal Register under Title 40 Code of Federal Regulations §257. The CCR Rule establishes technical requirements for coal combustion residuals (CCR) disposal sites and surface impoundments under Subtitle D of the Resource Conservation and Recovery Act, which is the primary law regulating solid waste. Conemaugh Generating Station's Ash Valley Refuse/Disposal Site (disposal site), operated by GenOn Northeast Management Company (GenOn), is subject to the CCR Rule.

On August 8, 2018, a surficial (non-groundwater) release of CCR was discovered during the performance of a routine inspection of the Conemaugh disposal site and established erosion and sedimentation control features. The release most likely occurred during an extremely intense precipitation event on July 30, 2018, which was localized and rare.

As described in §§257.84(b)(5) and 257.90(d) of the CCR Rule, in the event of a release from a CCR unit, the owner or operator of a disposal site must immediately undertake necessary measures to control the source(s) of the release so as to reduce or eliminate, to the maximum extent feasible, releases of contaminants into the environment. Additionally, the owner or operator must comply with all related applicable requirements in §§257.96-257.98. For surficial (non-groundwater) spills, these requirements generally include assessing and selecting corrective measures to prevent further releases, remediating the release as necessary, and restoring the affected area to original conditions. To document compliance with the CCR Rule, an Assessment of Corrective Measures Report (Report) must be prepared and placed into the facility's operating record per §257.96(d) and §257.105(h)(10). This Report must also be noticed to the State Director per §257.106(h)(8) and posted to the publicly accessible internet site per §257.107(h)(8).

Conemaugh Station's responses and subsequent activities to the subject CCR release were in accordance with the above-referenced regulations and guidance from the U.S. Environmental Protection Agency (USEPA) issued in response to a settlement of a portion of the lawsuit challenging the CCR Rule. In the settlement, USEPA agreed to a remand on the issue of defining which non-groundwater releases are subject to the full corrective action process under §§257.96-257.98. In the interim between the settlement and issuance of a revised regulation (which was not issued prior to this report), for no-groundwater CCR release, USEPA "would recommend that compliance determinations focus primarily on the rapid remediation of detected non-groundwater releases, consistent with §257.90(d) rather than adherence to the specific corrective action procedures in §§257.96-257.98."

2.0 Facility Overview

GenOn operates the Conemaugh Generating Station located in New Florence, Pennsylvania. The station began operating in 1970 and utilizes two coal-fired boilers each with a steam turbine-driven electric generator that provides electricity to the regional electric grid. CCR materials generated through the operation of these units are managed at the disposal site located directly north of the generating station. The CCR materials that are disposed consist primarily of bottom ash, fly ash, pyrites, and Flue Gas Desulfurization by-product (gypsum). The disposal site is permitted under Pennsylvania Department of Environmental Protection (PADEP) Solid Waste Permit No. 300876.

The disposal site is divided into three stages as shown on Figure 1. Stage I is approximately 160 acres and is located farthest to the north. Stage I started receiving CCR in 1970 and was closed in 1987. Stage II, which is currently active, covers approximately 120 acres and is located directly south of Stage I. Construction of the first phase (Phase IIIA) of Stage III, located directly south of Stage II, was ongoing at the time of the CCR release.

3.0 Summary of the Ash Release

On August 8, 2018, a surficial (non-groundwater) release of CCR materials (ash) was discovered during the performance of a routine inspection of the disposal site (as required by the CCR Rule) and other established erosion and sedimentation control features. As previously noted, the release most likely occurred during an extremely intense precipitation event on July 30, 2018, which was localized and rare.

Ash that was displaced from the active Stage II disposal area was initially observed outside of the disposal site boundary immediately south of Culvert 1C, which connects a Stage III intermediate non-contact stormwater channel to the locally-named "East Valley Stream" (see Figure 2). This stream is a mitigation feature that was relocated in support of the Stage III construction and is located east of the Phase III ultimate disposal site boundary. The non-contact stormwater channel is designed to convey stormwater that falls outside of the disposal site boundary so that it does not come into contact with CCR. Although the majority of deposited CCR materials were located immediately south of Culvert 1C, small pockets of ash were also identified up to 1,800 feet south of Culvert 1C adjacent to the East Valley Stream (see Figures 3 and 4). The deposits of ash in proximity to Culvert 1C and in areas farther south were observed to range in thickness between ¼ inch to 4 inches.

The channel and stream were inspected upon the discovery of CCR material. It was subsequently determined that a contact water diversion berm (see Figure 2) adjacent to a main haul road along the southern boundary of the Phase II disposal area had been overtopped by contact stormwater (water that had fallen on active areas of the disposal site) and flowed through the referenced channel to Culvert 1C. The subject berm had been temporarily lowered prior to the release in order to facilitate the transport of construction materials to the Phase III area.

4.0 Immediate Response Actions

Conemaugh Station responded to the ash release through a series of actions relative to PADEP notification, immediate cleanup activities, and implementation of CCR Rule corrective measures assessment requirements, including the retention of professional engineering services. The following sections provide detailed information regarding each of these elements.

4.1 Notification of Release

Upon discovery of the CCR release on August 8, 2018, Conemaugh Station immediately informed PADEP regarding the incident. On August 9, 2018, PADEP conducted an inspection of the area, whereupon verbal authorization was provided for Conemaugh Station to move forward with cleanup activities. A formal report of this incident was prepared and submitted to PADEP on August 13, 2018; a copy of that report is presented in Appendix A. Additionally, as required by §257.96(a) and (f) and §257.106(h)(7) of the CCR Rule, GenOn provided notification to PADEP (via email dated August 23, 2018) that the Conemaugh Station had initiated an Assessment of Corrective Measures, effective August 8, 2018. This notification was also placed into the Conemaugh Station facility's operating record per §257.105(h)(9) and posted to the publicly-accessible website per §257.107(h)(7).

4.2 CCR Removal

In order to minimize the potential for future releases, and as required under §257.90(d), Conemaugh Station and its contractor (R&L Development) began immediately removing the displaced CCR materials following receipt of the above-noted authorization from PADEP. This involved the use of a vacuum truck in the affected reaches of the East Valley Stream and the areas downstream of Culvert 1C. The vacuum truck was utilized in order to minimize disturbance to the established vegetation and ecosystem within and adjacent to the stream bed. These actions were continued until all practical quantities of CCR were removed to minimize potential impacts to human health and/or the environment. All impacted erosion and sedimentation controls were restored and/or improved.

4.3 Retention of Professional Engineering Services

In conjunction with initiation of the Assessment of Corrective Measures activities, GenOn retained professional engineering services from Aptim Environmental & Infrastructure, Inc. (APTIM) to assist with the associated CCR Rule obligations and to evaluate the adequacy and effectiveness of the CCR removal actions with respect to protectiveness of public health, welfare, and safety.

5.0 Corrective Measures Program

5.1 Initial On-Site Inspection of Immediate CCR Removal Activities

APTIM representatives visited the site on September 26 and 28, 2018 to assess the extent of the CCR release to the ground surface. APTIM walked the entire path of the CCR release starting at the diversion berm that was overtopped (located just south of the active portion of the Stage II disposal site), along the non-contact stormwater ditch to Culvert 1C, and along the East Valley Stream until approximately 300 feet downstream of Culvert 2 (approximately 2,300 feet downstream of Culvert 1C). The following observations were made:

- No CCR was observed between the access road located just south of the active portion of the Stage II disposal site downslope to Culvert 1C.
- The height of the overtopped diversion berm, which had been temporarily lowered prior to the storm to allow materials to be delivered to the Phase III construction area, had been restored.
- Erosion controls that had been damaged during the storm were observed to have been repaired and/or improved.
- A significant portion, but not all, of the displaced CCR materials downstream of Culvert 1C and along the stream had been removed.

During the noted September 2018 visits, APTIM identified discrete locations where some CCR materials were still visible and requested additional removal activities be conducted in these areas. The majority of the additional areas identified by APTIM were located on the east side of the stream just south of Culvert 1C. The southernmost location was situated just north of the Culvert 2 weir. The additional areas were addressed by Conemaugh Station and its contractor on October 1 and 2, 2018, again with utilization of a vacuum truck to remove the displaced CCR materials.

Each of the identified CCR-impacted areas between Culvert 1C and Culvert 2 were logged with a handheld global positioning system (GPS) unit, and the resultant coordinates were used to locate these areas on Figures 3 and 4. A total of 21 individual areas were identified with a cumulative area of approximately 5,400 square feet (sf). The largest single location (the "Upper Deposit") at the outlet of Culvert 1C covered an area of approximately 4,550 sf. The remaining areas (collectively referred to as the "Lower Deposits" and designated as areas L1 through L20), were much smaller in size, ranging from 1 to 100 sf, for a cumulative total of approximately 850 sf.

5.2 Environmental Sampling Plan Development

APTIM developed an Environmental Sampling Plan (ESP) for the release area to determine whether the CCR removal activities had appropriately mitigated potential environmental impacts

or whether additional action was warranted. This ESP was developed based on site-specific considerations and incorporated both soil and surface water sampling protocols for areas south of Culvert 1C.

5.2.1 Soil Sampling

5.2.1.1 Overview

Soil sampling included both "impacted areas" (areas where CCR had deposited) and "non-impacted areas" (soils along the stream that were east of Culvert 1C). Sample locations were selected using a random number generator technique to remove bias. Samples were evaluated against site-specific groundwater protection standards and compared to background values to determine whether immediate cleanup activities were appropriate to protect public health, welfare, and safety.

5.2.1.2 Number of Samples

In order to evaluate the effectiveness of cleanup activities, a total of 26 samples were proposed to be collected, including 16 in impacted areas and 10 in non-impacted areas. It is noted that no formal guidance is provided within the CCR Rule on how many samples are required to evaluate a CCR release. Therefore, engineering judgement was used that generally follows the sampling frequency identified in Pennsylvania's Land Recycling Program (Voluntary Cleanup Program), commonly referred to as "Act 2."

The "Upper Deposit" at the outlet of Culvert 1C has an approximate area of 4,550 sf, and conservatively assuming a maximum of 4 inches of CCR was removed, the total soil volume estimated is 57 cubic yards (cy). This volume has been conservatively estimated for the purpose of determining the number of samples to be taken. However, the majority of the CCR deposit thicknesses were less than 4 inches. A total of 8 soil samples were targeted for collection in the "Upper Deposit" area.

The remaining 20 "Lower Deposit" areas have an approximate cumulative total area of 850 sf, and again assuming a conservative maximum of 4 inches of CCR was removed, the total soil volume estimated is 11 cy. A total of 8 soil samples were targeted for collection from the Lower Deposits (L1 through L20).

5.2.1.3 Location of Samples

In order to determine the sampling locations, a 50-foot by 150-foot grid was overlain on the non-impacted area with a total of 75 blocks (each grid block measuring 10 feet by feet). The 10 soil sample locations were selected using a random number generator in Excel® to provide values ranging between 1 and 75. The random sample locations generated were 1, 8, 17, 24, 30, 36, 48, 55, 62, and 66. The 10 selected soil sample locations were translated to the field and documented

using GPS coordinates. Figure 3 shows the 10 selected soil sample locations within the non-impacted area.

In order to determine the sampling locations of the impacted "Upper Deposit" area, an 80-foot by 160-foot grid was established with a total of 128 blocks (each grid block measuring 10 feet by 10 feet). The 8 soil sample locations were selected using a random number generator in Excel® to provide values ranging between 1 and 128. If a random sampling location within the grid was selected that was not within the CCR deposit limits, a new random sampling location was generated until a total of 8 samples were within the CCR deposit limits. The random sample locations generated were 15, 31, 40, 44, 70, 76, 82, and 105. The 8 selected soil sample locations were translated to the field and documented using GPS coordinates. Figure 3 shows the 8 selected soil sample locations within the "Upper Deposit" area.

The 8 soil sample locations from the "Lower Deposit" areas were again selected using a random number generator in Excel® to provide values ranging between 1 and 20. The random sample locations generated were L1, L4, L8, L11, L12, L15, L18, and L20. The 8 soil samples collected within the randomly selected "Lower Deposit" areas were completed as biased sampling. Figures 3 and 4 show the 8 selected soil sample locations within the "Lower Deposit" areas.

5.2.1.4 Comparison Methodology

Background samples were collected from the non-impacted area for comparison purposes to determine if the total metals concentrations in the impacted area soil samples were greater than those collected in the non-impacted area. If the total metals concentrations were found to be similar for both potentially impacted and non-impacted soils, it would serve as indication that CCR materials had been adequately removed. If total metals concentrations were higher in potentially impacted soils, but further testing via leaching analysis (as discussed below) yielded acceptable results when compared to site-specific groundwater standards, it would offer evidence that trace CCR likely remains after cleanup, but does not threaten public health.

5.2.1.5 Testing Methods for Soil Samples

The most likely potential exposure pathway for the impacted soils was determined to be if chemical constituents from the soils that had been underneath the CCR deposit could leach and enter the groundwater. As the CCR material had been deposited on the ground surface, the leaching would most likely occur when rainwater or surface water came into contact with the residually impacted soils.

Based on this potential exposure pathway, a Synthetic Precipitation Leaching Procedure (SPLP) laboratory evaluation was selected. This test method passes a synthetic leaching agent (intended to mimic rainwater) through the soil sample and analyzes the resulting chemical constituents in the leachate. It is noted that leachate is defined as any liquid that, in passing through matter,

extracts solutes, suspended solids, or any other component of the material through which it has passed. The SPLP testing methodology is specified in USEPA SW-846 Method 1312. Although considered, the Toxicity Characteristic Leaching Procedure (TCLP) was deemed inappropriate for use, as TCLP uses a leaching agent that is intended to simulate the leachate that would result from a municipal solid waste landfill rather than rainwater.

5.2.1.6 Use of Groundwater Protection Standards

The CCR Rule outlines the establishment of groundwater protection standards for disposal sites using chemical constituents that are known to occur in CCR, which generally includes heavy metals. The actual list of chemical constituents for which groundwater protection standards must be established is contained in Appendix IV of the CCR Rule. Accordingly, the site-specific groundwater protection standards are either federally-published Maximum Contaminant Levels (MCLs) or risk-based Regional Screening Levels (RSLs). For constituents where calculated background exceeds either the MCL or RSL, the background value serves as the groundwater protection standard. Under this line of reasoning, the immediate cleanup measures would be deemed adequate if the concentrations in the leachate generated from SPLP analysis of the soil samples collected in the impacted areas were no greater than the site-specific CCR groundwater standards previously adopted/developed for the Conemaugh disposal site.

5.2.2 Surface Water (Stream) Sampling

Two surface water samples from the East Valley Stream were proposed for collection and laboratory analysis for the CCR Appendix IV constituents, including an upstream (Sample WS-1, non-impacted) and downstream (Sample WS-2, potentially impacted) sample. Sample WS-1was proposed to be collected upstream of the CCR release to establish baseline values for the constituents being analyzed. In the event that a constituent was observed to be leachable during soil testing and was measured at an elevated concentration in the downstream surface water sample location when compared to the upstream sample, this could suggest that trace CCR may be impacting surface water. The approximate surface water sampling locations are shown on Figures 3 and 4.

5.3 Review of Pertinent Disposal Site Design Documents

Pertinent engineering reports and plans were reviewed to determine whether modifications to design or operations would be appropriate to minimize the potential for a future release. Documents reviewed included the Phase III Residual Waste Permit Drawings, prepared by GAI Consultants, Inc., dated March 2014, and the Run-on and Run-off Control System Plan (RRCSP), also prepared by GAI Consultants, Inc., dated October 2016. Both documents were prepared under the direction of a licensed professional engineer. The disposal site design, including stormwater controls, has been confirmed to be the same in both documents and meets CCR Rule requirements.

The RRSCP was developed to control the flow of stormwater on and around the disposal site. Engineered controls are used to route and collect runoff from active portions of the disposal site so that the water may be treated prior to off-site discharge through a National Pollutant Discharge Elimination System outfall. As described in the RRCSP, all constructed runoff channels and slope drains around the active Stage II area are designed to manage the 24-hour, 100-year storm event, which exceeds the regulatory requirement and is more protective than the 24-hour, 25-year design storm event specified by the CCR Rule. Temporary channels and other diversion channels around the Phase III intermediate phase areas are designed to meet CCR Rule requirements and pass the 24-year, 25-year storm. When constructed, all permanent Stage III run-on/runoff controls will be sized to manage the 24-hour, 100-year storm event.

Based on a review of site conditions, it appears that the Phase II diversion berm that was overtopped on July 30, 2018 was designed appropriately, but had been temporarily lowered to allow materials to be delivered to the Phase III construction area. This berm had not been appropriately restored prior to the rain event on July 30, but has since been addressed. Based on review of these site documents and subsequent APTIM site visits, it is concluded that the disposal site has been restored to the intended design, which is appropriate and meets regulatory requirements.

5.4 Correctives Measures Assessment

Concurrent with development of the ESP, which was intended to be used to determine the effectiveness of the cleanup activities, additional corrective measures were evaluated. These measures would be implemented in the event immediate cleanup measures did not mitigate the risk to public health. The assessment of corrective measures was completed in accordance with §§257.96-257.98 of the CCR Rule, which require that corrective measures remediate releases and restore the affected area.

5.4.1 Time Period for Assessment

Per §257.96(a), the assessment of corrective measures must be completed within 90 days of the discovery of the release, unless additional time is needed. Because of the complexities related to removal of the displaced ash in the impacted areas and the need to develop a thorough sampling and analysis plan (i.e., the ESP), APTIM's professional engineer certified that a 60-day extension was appropriate for completing the assessment of corrective measures. Notification of this extension is provided in Appendix B.

5.4.2 Requirements for Corrective Measures

Per §257.97(b)(1)-(5), the selected corrective measure used to mitigate a CCR release must:

- Be protective of human health and the environment;
- Attain the groundwater protection standard as specified pursuant to §257.95(h);
- Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in Appendix IV to this part into the environment;
- Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems; and
- Comply with standards for management of wastes as specified in §257.98(d).

5.4.3 Considered Corrective Measures

Considering that the release was a non-groundwater surficial spill (resulting in deposition of CCR materials on the ground surface), direct removal of the CCR materials (as accomplished by the immediate cleanup activities) was the initially identified approach to meet the above objectives. The removal may encompass only the CCR materials or may also include the underlying soils, if laboratory testing of collected samples indicates that they have been impacted. Therefore, two corrective measures were considered, which would be implemented once laboratory test results were received.

Option 1: No Further Action

In the event that laboratory testing of the soil and surface water samples indicate that all groundwater protection standards are achieved, no further action would be the preferred approach. These results would indicate that completed cleanup activities have been sufficient to address the predominant exposure pathway (i.e., soil impacts to groundwater) and that any potential trace amounts of CCR that remain do not pose a threat to public health and comply with all requirements in §257.97. Removal of the underlying soils would not be necessary and would, in fact, cause undue harm by disturbing the East Valley Stream ecosystem environment.

Option 2: Remove Soils in Release Area

In the event that laboratory testing of the soil and surface water samples indicate that groundwater protection standards are not met due to the CCR release, the underlying soils would be recommended for removal and appropriately disposed. Under this option, additional sampling and removal would be iteratively conducted until sample results demonstrate that groundwater protection standards have been met and the objectives outlined in §257.97 are achieved. Stripping of the soil would destroy existing plant communities (and possibly disturb aquatic habitat) along the East Valley Stream, which would need to be replanted and stabilized following soil removal activities.

5.5 Public Meeting

On December 18, 2018, a public meeting was held in the New Florence Fire Hall to provide information regarding the CCR release and response actions taken to date. A discussion of corrective measures that were intended to be undertaken based on laboratory testing results was presented. Representatives from GenOn and APTIM were both available at the meeting, including the certifying engineer of this report. No representatives from the general public were in attendance. Notice of advertisement for the Public Meeting is provided in Appendix C. This meeting was held in accordance with §257.96(e).

6.0 Sampling Results

APTIM performed both soil and surface water sampling to determine whether the CCR deposits were adequately removed and whether potential environmental impacts were effectively mitigated. The sampling activities occurred on November 13 and 14, 2018.

In accordance with the ESP, a total of 26 soil samples were collected for confirmation purposes, including 10 background samples collected from the non-impacted area and 16 confirmation samples collected from the potentially impacted areas ("Upper" and "Lower Deposits"). In addition, two surface water samples were collected. The soil and surface water sample locations are shown on Figures 3 and 4. When compared to the background samples (see Table 1), the soils in the impacted areas did show slightly elevated metals concentrations at several locations (see Table 2). As discussed in Section 5.2.1.4, these findings suggest that potential trace amounts of CCR materials may still be present in the impacted areas. However, all values for SPLP testing of soil samples (see Table 3) indicate metals concentrations were either non-detect or below the site-specific CCR groundwater protection standards. Again, as mentioned in Section 5.2.1.4, these results offer evidence that although trace amounts of CCR materials may still be present in certain impacted areas, the quantities of these residuals (i) do not constitute an unacceptable risk for potential leaching to groundwater and maintain protectiveness of human health and the environment, and (ii) are generally consistent with concentrations in soil and other surficial materials located in southwestern Pennsylvania – see Appendix D.

The surface water sampling results (see Table 4) indicate that the downstream water is generally consistent with upstream source water, although radium was measured at a slightly higher concentration at the downstream location. The minimal difference in concentration is not believed to be attributed to the CCR release due to the leachability results from the SPLP testing.

The supporting analytical laboratory reports are presented in Appendix E.

7.0 Recommendation for No Further Action

The results of laboratory testing indicate that the immediate and subsequent CCR removal activities have mitigated the threat to public health, welfare, and safety. The disposal site stormwater management design has been reviewed and found to meet all CCR regulatory requirements. At the time of the CCR release, it is acknowledged that a runoff diversion berm had been temporarily lowered, which is where the CCR material was released from the disposal site. The diversion berm has been observed by APTIM personnel to have been restored to its original condition in accordance with its design.

It is the opinion of the engineer certifying this report that no further action is warranted based on the observed conditions of the facility and laboratory testing of the soils and surface water. In fact, removing additional soils in the release area would create undue harm to the East Valley Stream ecosystem and is in conflict with the stated objectives of §257.97(b)(4) (Selection of Remedy).

Moreover, groundwater in the area of the ash release ultimately flows southward and passes through the zone monitored by the disposal site's existing CCR groundwater well network (comprised of downgradient Wells MW-9, MW-10, and MW-11). Continued sampling of these wells (most recently in October 2018) under the CCR Assessment Monitoring Program has not yielded any remarkable changes in groundwater quality. Future analytical results would be anticipated as similar and providing further confirmation that the clean-up activities were adequate in mitigating potential impacts to human health and the environment. These well locations and referenced analytical results are contained in the CCR Annual Groundwater Monitoring and Corrective Action Report, dated January 2019, to which this report is appended.

8.0 Certification

I hereby certify, as a qualified professional engineer licensed in the Commonwealth of Pennsylvania, that the information described in this report is factually accurate to the best of my knowledge. I have made the recommendations contained within this report based on a review of available information, observations from my personal on-site visit and visits by colleagues under my direction, and laboratory testing results. I attest that the suggested remedy of no further action has been completed in compliance with the requirements of §257.98.

Certified by: RICHARD SOUTHORN, PE, PG

Date: JAN 9/2019

Richard Southorn, P.E., P.G., CPSWQ
Professional Engineer Registration No. PE 085411
Aptim Environmental & Infrastructure, Inc.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
RICHARD DAVID SOUTHORN
ENGINEER
No. PE085411

1/9/2019

LICENSE EXPIRES
9/30/2019

Tables

Table 1
Background Soil Sample Results
CCR Ash Release - Ash Valley Refuse/Disposal Area
Conemaugh Generating Station

Sample ID	Date Sampled	Sample Interval (inches)	Total Antimony (mg/Kg-dry)	Total Arsenic (mg/Kg-dry)	Total Barium (mg/Kg-dry)	Total Beryllium (mg/Kg-dry)	Total Cadmium (mg/Kg-dry)	Total Chromium (mg/Kg-dry)	Total Cobalt (mg/Kg-dry)	Total Lead (mg/Kg-dry)	Total Lithium (mg/Kg-dry)	Total Mercury (mg/Kg-dry)	Total Molybdenum (mg/Kg-dry)	Total Selenium (mg/Kg-dry)	Total Thallium (mg/Kg-dry)	Total Radium-226 and 228 (pCi/g)
			Maximum Detected Value													
			< 10.0	17.2	187	1.31	< 5.0	69.4	21.2	27.9	17.8	0.057	< 2.0	2.8	< 10.0	1.58
B-1 0-4	11/13/2018	0-4	< 10.0	15.5	127	1.11	< 5.0	41.5	17.6	23.2	15.9	0.038	< 2.0	2.3	< 10.0	1.58
B-2 0-4	11/13/2018	0-4	< 10.0	11.2	123	1.05	< 5.0	41.1	15.7	22.1	12.6	0.057	< 2.0	< 2.0	< 10.0	1.25
B-3 0-4	11/13/2018	0-4	< 10.0	14.5	87.8	0.74	< 5.0	69.4	9.2	18.5	12.8	0.054	< 2.0	< 2.0	< 10.0	1.29
B-4 0-4	11/13/2018	0-4	< 10.0	12.1	179	1.12	< 5.0	42.6	21.2	24.8	16.3	0.030	< 2.0	2.2	< 10.0	1.39
B-5 0-4	11/13/2018	0-4	< 10.0	14.6	166	1.23	< 5.0	43.6	20.4	26.4	14.7	0.039	< 2.0	2.7	< 10.0	1.30
B-6 0-4	11/13/2018	0-4	< 10.0	16.5	187	1.30	< 5.0	56.5	20.1	26.6	17.8	0.055	< 2.0	2.8	< 10.0	1.34
B-7 0-4	11/13/2018	0-4	< 10.0	17.2	161	1.23	< 5.0	42.6	16.1	27.3	16.4	0.037	< 2.0	2.6	< 10.0	1.41
B-8 0-4	11/13/2018	0-4	< 10.0	14.8	160	1.29	< 5.0	53.7	19.6	25.5	15.9	0.041	< 2.0	2.4	< 10.0	1.25
B-9 0-4	11/13/2018	0-4	< 10.0	16.0	186	1.31	< 5.0	54.6	20.3	27.9	13.2	0.037	< 2.0	2.7	< 10.0	1.41
B-10 0-4	11/13/2018	0-4	< 10.0	13.1	153	1.18	< 5.0	64.5	18.2	24.9	13.4	0.033	< 2.0	2.1	< 10.0	1.26

mg/Kg-dry - milligrams per Kilogram-dry

pCi/g - pico Curies per gram

Notes:

1. Cells with "<" are represented as non-detects. Values shown correspond to the laboratory quantitation limit.

Table 2
Confirmation Soil Sample Results
CCR Ash Release - Ash Valley Refuse/Disposal Area
Conemaugh Generating Station

Sample ID	Date Sampled	Sample Interval (inches)	Total Antimony (mg/Kg-dry)	Total Arsenic (mg/Kg-dry)	Total Barium (mg/Kg-dry)	Total Beryllium (mg/Kg-dry)	Total Cadmium (mg/Kg-dry)	Total Chromium (mg/Kg-dry)	Total Cobalt (mg/Kg-dry)	Total Lead (mg/Kg-dry)	Total Lithium (mg/Kg-dry)	Total Mercury (mg/Kg-dry)	Total Molybdenum (mg/Kg-dry)	Total Selenium (mg/Kg-dry)	Total Thallium (mg/Kg-dry)	Total Radium-226 and 228 (pCi/g)
			Site-Specific Standard Value													
			< 10.0	17.2	187	1.31	< 5.0	69.4	21.2	27.9	17.8	0.057	< 2.0	2.8	< 10.0	1.58
			Maximum Detected Value													
			< 10.0	27.2	161	1.39	< 5.0	43.5	22.0	29.1	19.5	0.260	2.1	2.6	< 10.0	2.61
UD-1 0-4	11/13/2018	0-4	< 10.0 S	25.2	113	1.01	< 5.0	24.8	17.7	20.4	11.5	0.20	< 2.0	2.3	< 10.0	1.41
UD-2 0-4	11/13/2018	0-4	< 10.0	14.5	123	1.07	< 5.0	33.1	16.7	22.1	16.6	0.072	< 2.0	2.3	< 10.0	1.63
UD-3 0-4	11/13/2018	0-4	< 10.0	11.3	107	0.94	< 5.0	24.5	12.7	18.9	11.8	0.037	< 2.0	< 2.0	< 10.0	2.33
UD-4 0-4	11/13/2018	0-4	< 10.0	16.5	136	1.02	< 5.0	30.5	15.4	19.5	19.3	0.099	2.1	2.2	< 10.0	1.65
UD-5 0-4	11/13/2018	0-4	< 10.0	5.8	50.7	0.31	< 5.0	9.2	6.4	9.7	3.5	0.045	< 2.0	< 2.0	< 10.0	0.60
UD-6 0-4	11/13/2018	0-4	< 10.0	15.9	118	1.10	< 5.0	27.0	22.0	20.8	13.2	0.054	< 2.0	< 2.0	< 10.0	1.17
UD-7 0-4	11/14/2018	0-4	< 10.0	27.2	149	1.24	< 5.0	31.5	14.8	22.1	17.2	0.26	1.2 J	2.2	< 10.0	1.61
UD-8 0-4	11/14/2018	0-4	< 10.0	14.6	135	1.12	< 5.0	31.8	17.5	23.0	17.7	0.040	< 2.0	2.4	< 10.0	1.60
LD-1 0-4	11/14/2018	0-4	< 10.0	24.5	161	1.20	< 5.0	31.7	16.9	28.9	16.2	0.042	1.2 J	2.5	< 10.0	2.50
LD-2 0-4	11/14/2018	0-4	< 10.0	11.9	143	1.14	< 5.0	31.4	17.2	23.8	15.8	0.032	< 2.0	2.2	< 10.0	1.47
LD-3 0-4	11/14/2018	0-4	< 10.0	17.8	147	1.19	< 5.0	32.6	17.8	24.1	17.4	0.040	1.0 J	2.0	< 10.0	2.27
LD-4 0-4	11/14/2018	0-4	< 10.0	17.6	148	1.39	< 5.0	43.5	21.6	29.1	19.5	0.038	1.2 J	2.5	< 10.0	1.60
LD-5 0-4	11/14/2018	0-4	< 10.0	20.8	141	1.17	< 5.0	27.7	17.9	27.8	16.0	0.057	1.8 J	2.5	< 10.0	1.55
LD-6 0-4	11/14/2018	0-4	< 10.0	18.5	149	1.25	< 5.0	29.2	18.6	26.8	15.6	0.052	1.4 J	2.2	< 10.0	2.56
LD-7 0-4	11/14/2018	0-4	< 10.0	12.8	99.0	0.94	< 5.0	30.1	13.0	20.2	12.6	0.046	< 2.0	2.6	< 10.0	1.38
LD-8 0-4	11/14/2018	0-4	< 10.0	18.8	137	1.32	< 5.0	30.7	21.5	23.2	11.7	0.095	< 2.0	2.6	< 10.0	2.61

J - Indicates an estimated value.
mg/Kg-dry - milligrams per Kilogram-dry
pCi/g - pico Curies per gram
S - Spike recovery indicates a possible matrix effect. The method is in control as indicated by the LCS.

Notes:

1. Cells with "<" are represented as non-detects. Values shown correspond to the laboratory quantitation limit.
2. The Site-Specific Standard values were determined to be the Maximum Background Soil Sample values, which were sampled on November 13, 2018.

Table 3
Confirmation Leachate Sample Results - SPLP Analysis
CCR Ash Release - Ash Valley Refuse/Disposal Area
Conemaugh Generating Station

Sample ID	Date Sampled	Sample Interval (inches)	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)
			Groundwater Protection Standard														
			MCL	MCL	MCL	MCL	MCL	MCL	RSL	MCL	RSL	RSL	MCL	RSL	MCL	MCL	MCL
			0.006	0.01	2	0.004	0.005	0.1	0.006	4.0	0.15	0.04	0.002	0.1	0.05	0.002	5
			Maximum Detected Value														
			0.05 U	0.010 U	0.093	0.0005 U	0.0010 U	0.0050 U	0.0020 U	0.51	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	1.219
UD-1 0-4	11/13/2018	0-4	0.05 U	0.010 U	0.093	0.0005 U	0.0010 U	0.005 U	0.0020 U	0.47	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	0.217
UD-2 0-4	11/13/2018	0-4	0.05 U	0.010 U	0.074	0.0005 U	0.0010 U	0.005 U	0.0020 U	0.20	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	0.747
UD-3 0-4	11/13/2018	0-4	0.05 U	0.010 U	0.059	0.0005 U	0.0010 U	0.005 U	0.0020 U	0.26	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	0.674
UD-4 0-4	11/13/2018	0-4	0.05 U	0.010 U	0.060	0.0005 U	0.0010 U	0.005 U	0.0020 U	0.16	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	0.0904
UD-5 0-4	11/13/2018	0-4	0.05 U	0.010 U	0.080	0.0005 U	0.0010 U	0.005 U	0.0020 U	0.44	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	1.066
UD-6 0-4	11/13/2018	0-4	0.05 U	0.010 U	0.073	0.0005 U	0.0010 U	0.005 U	0.0020 U	0.18	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	1.057
UD-7 0-4	11/14/2018	0-4	0.05 U	0.010 U	0.070	0.0005 U	0.0010 U	0.0050 U	0.0020 U	0.51	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	0.976
UD-8 0-4	11/14/2018	0-4	0.05 U	0.010 U	0.080	0.0005 U	0.0010 U	0.0050 U	0.0020 U	0.18	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	-0.1349
LD-1 0-4	11/14/2018	0-4	0.05 U	0.010 U	0.066	0.0005 U	0.0010 U	0.0050 U	0.0020 U	0.08 J	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	0.836
LD-2 0-4	11/14/2018	0-4	0.05 U	0.010 U	0.069	0.0005 U	0.0010 U	0.0050 U	0.0020 U	0.39	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	0.778
LD-3 0-4	11/14/2018	0-4	0.05 U	0.010 U	0.062	0.0005 U	0.0010 U	0.0050 U	0.0020 U	0.09 J	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	0.515
LD-4 0-4	11/14/2018	0-4	0.05 U	0.010 U	0.074	0.0005 U	0.0010 U	0.0050 U	0.0020 U	0.14	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	-0.301
LD-5 0-4	11/14/2018	0-4	0.05 U	0.010 U	0.086	0.0005 U	0.0010 U	0.0050 U	0.0020 U	0.05 U	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	0.907
LD-6 0-4	11/14/2018	0-4	0.05 U	0.010 U	0.086	0.0005 U	0.0010 U	0.0050 U	0.0020 U	0.09 J	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	0.468
LD-7 0-4	11/14/2018	0-4	0.050 U	0.010 U	0.047	0.0005 U	0.0010 U	0.005 U	0.0020 U	0.0917 J	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	-0.032
LD-8 0-4	11/14/2018	0-4	0.05 U	0.010 U	0.062	0.0005 U	0.0010 U	0.005 U	0.0020 U	0.27	0.010 U	0.005 U	< 0.0001 J	0.010 U	0.010 U	0.010 U	1.219

J - Indicates an estimated value.
MCL - Maximum Contaminant Level
mg/L - 1 milligrams per Liter
pCi/L - pico Curies per Liter
RSL - Regional Screening Level
SPLP - Synthetic Precipitation Leaching Procedure
U - The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit.

Notes:

1. Cells with "<" are represented as non-detects. Values shown correspond to the laboratory quantitation limit.
2. As indicated, Groundwater Protection Standards are either published MCLs or risk-based RSLs.

Table 4
Surface Water Sample Results
CCR Ash Release - Ash Valley Refuse/Disposal Area
Conemaugh Generating Station

Sample ID	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)
WS-1	11/14/2018	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.3834
WS-2	11/14/2018	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.796

mg/L - milligrams per Liter
pCi/L - pico Curies per Liter
Notes:
1. Cells with "<" are represented as non-detects. Values shown correspond to the laboratory quantitation limit.

Figures

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
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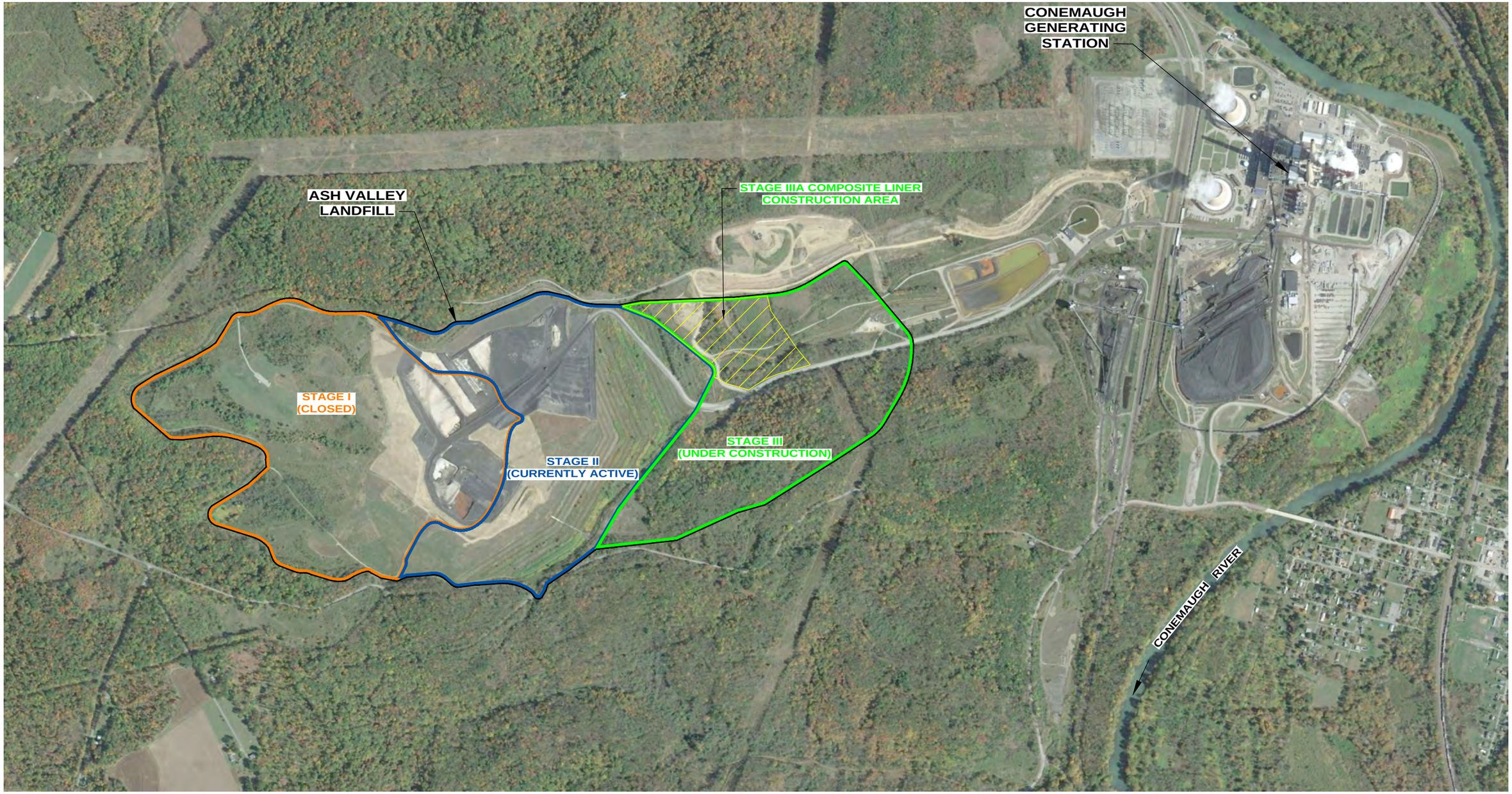

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REFERENCE:

GOOGLE EARTH AERIAL PHOTOGRAPHY, DATED 10/11/2015.

SCALE

0 1,000 2,000 FEET

APTIM

500 Penn Center Boulevard,
Suite 900
Pittsburgh, Pennsylvania 15235

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FIGURE 1

SITE LOCATION MAP

CONEMAUGH GENERATING STATION
ASH/REFUSE DISPOSAL SITE
INDIANA COUNTY, PENNSYLVANIA

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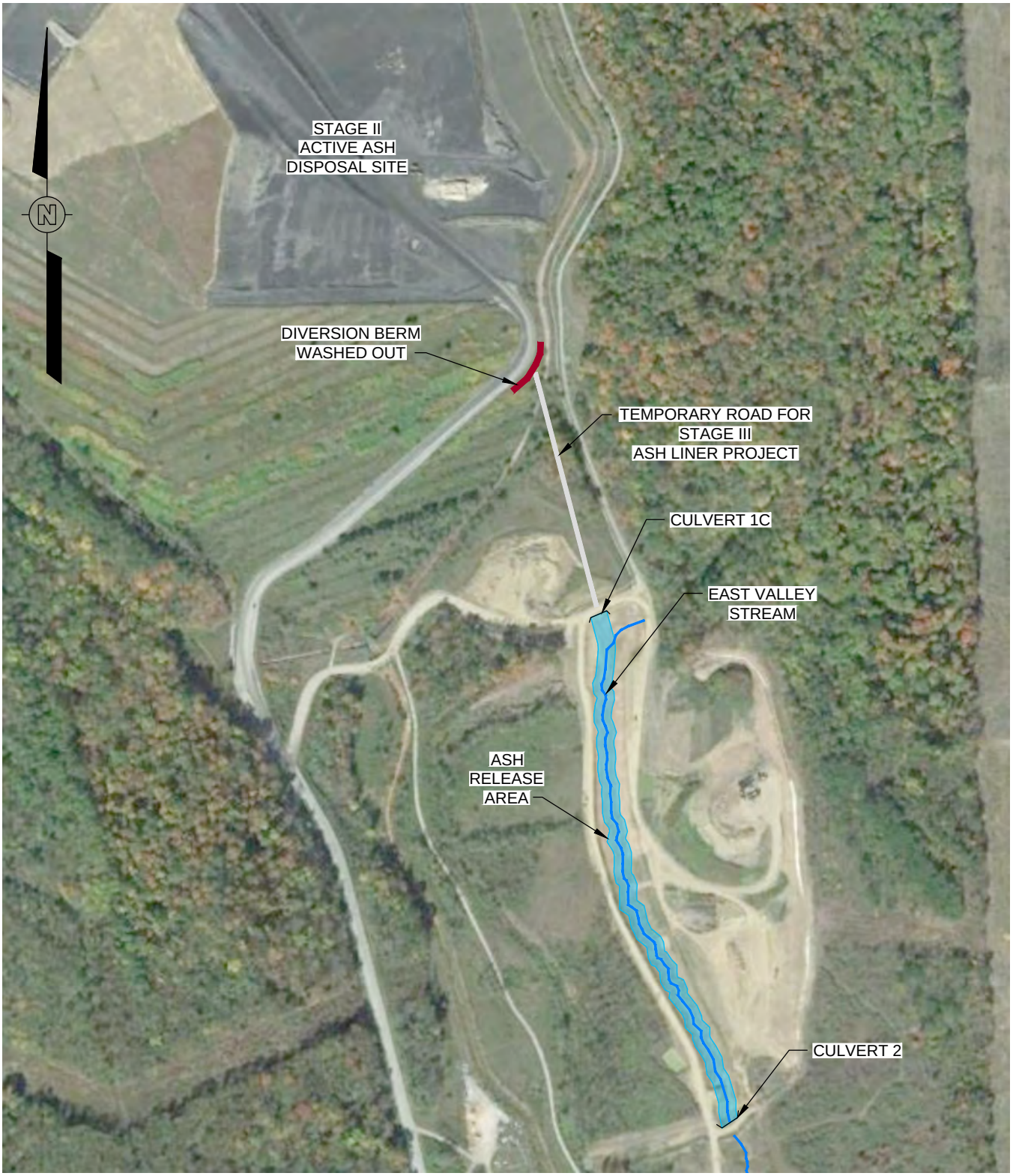
Plot Date/Time: Jan 07, 2019 - 4:11pm
Plotted By: Evan.Schlegel
Xref: Image

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	1/7/19	--	E. Schlegel	P. Andrison	R. Southorn	003138-A1



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REFERENCE:

GOOGLE EARTH AERIAL PHOTOGRAPHY, DATED 10/11/2015.

APTIM

500 Penn Center Boulevard,
Suite 900
Pittsburgh, Pennsylvania 15235

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FIGURE 2

OVERVIEW OF ASH RELEASE AREA

CONEMAUGH GENERATING STATION
ASH/REFUSE DISPOSAL SITE
INDIANA COUNTY, PENNSYLVANIA

File: O:\PROJECT\1009144003_Conemaugh\003138\003138-A1.dwg
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Plotted By: Evan.Schlegel
Xref :
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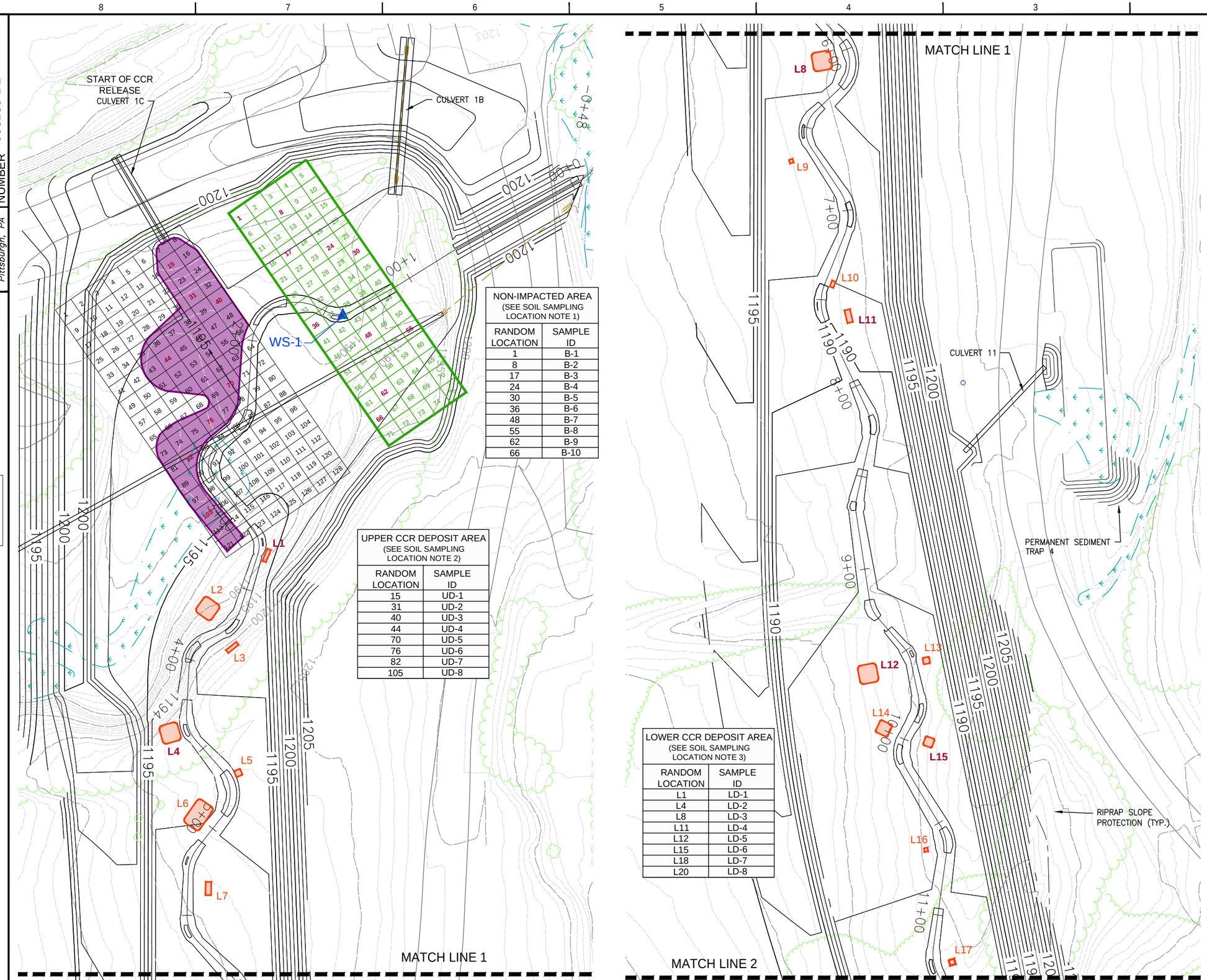

NON-IMPACTED AREA (SEE SOIL SAMPLING LOCATION NOTE 1)	
RANDOM LOCATION	SAMPLE ID
1	B-1
8	B-2
17	B-3
24	B-4
30	B-5
36	B-6
48	B-7
55	B-8
62	B-9
66	B-10

UPPER CCR DEPOSIT AREA (SEE SOIL SAMPLING LOCATION NOTE 2)	
RANDOM LOCATION	SAMPLE ID
15	UD-1
31	UD-2
40	UD-3
44	UD-4
70	UD-5
76	UD-6
82	UD-7
105	UD-8

LOWER CCR DEPOSIT AREA (SEE SOIL SAMPLING LOCATION NOTE 3)	
RANDOM LOCATION	SAMPLE ID
L1	LD-1
L4	LD-2
L8	LD-3
L11	LD-4
L12	LD-5
L15	LD-6
L18	LD-7
L20	LD-8

LEGEND:

- —1180— GROUND SURFACE CONTOUR (FT AMSL)
- TREE LINE
- STREAM
- WETLAND
- UPPER CCR DEPOSITS (TOTAL AREA ≈ 4,550 SQ. FT.)
- L9 LOWER CCR DEPOSITS (CUMULATIVE AREA = 850 SQ. FT.)
- WS-1 LOCATION OF SURFACE WATER SAMPLE
- NON-IMPACTED AREA DESIGNATED FOR SOIL SAMPLING
- 30 / L12 RANDOMLY SELECTED SAMPLE LOCATION (SEE SOIL SAMPLING LOCATION NOTES 1, 2, and 3)

GENERAL NOTES:

1. COAL COMBUSTIBLE RESIDUALS (CCR) AREAS ARE APPROXIMATE BASED ON VISUAL INSPECTIONS AND GLOBAL POSITIONING SYSTEM (GPS) COORDINATES COLLECTED BY APTIM ON SEPTEMBER 26 AND 28, 2018.

2. CCR DEPOSIT THICKNESS VARIED BETWEEN 1/4 INCH AND 4 INCHES. THE CCR DEPOSITS DECREASED IN THICKNESS AS LOCATIONS PROGRESSED DOWNSTREAM TOWARDS CULVERT 2.

SOIL SAMPLING LOCATION NOTES:

1. FOR THE NON-IMPACTED AREA, A TOTAL OF 10 SOIL SAMPLE LOCATIONS WERE RANDOMLY (DETERMINED USING A RANDOM NUMBER GENERATOR IN EXCEL®) SELECTED WITHIN THE GRID. THE SELECTED SAMPLE LOCATIONS WERE TRANSLATED TO THE FIELD USING GPS COORDINATES.

2. FOR THE UPPER DEPOSIT, A TOTAL OF 8 SOIL SAMPLE LOCATIONS WERE RANDOMLY SELECTED WITHIN THE CCR DEPOSIT LIMITS. THE SELECTED SAMPLE LOCATIONS WERE TRANSLATED TO THE FIELD USING GPS COORDINATES.

3. FOR THE LOWER DEPOSITS (L1 THROUGH L20), A TOTAL OF 8 SOIL SAMPLE LOCATIONS WERE RANDOMLY SELECTED. THE 8 SOIL SAMPLES TAKEN WITHIN THE RANDOMLY SELECTED LOWER DEPOSIT AREAS WERE BIASED SAMPLES (TAKEN WHERE TRACE CCR WAS VISIBLE, IF ANY).

4. SEE FIGURE 4 FOR LOWER DEPOSIT AREAS L18 THROUGH L20.

SCALE 0 25 50 75 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

APTIM
500 Penn Center Boulevard, Suite 900
Pittsburgh, Pennsylvania 15235

GenOn

DESIGNED BY: P. Andrison
DRAWN BY: E. Schlegel
CHECKED BY: P. Andrison
APPROVED BY: R. Southorn

SOIL AND SURFACE WATER SAMPLING LOCATIONS (1 of 2)
CONEMAUGH GENERATING STATION
ASH/REFUSE DISPOSAL SITE
INDIANA COUNTY, PENNSYLVANIA

DATE:	SCALE:	DRAWING NO.	FIGURE NO.
12/18/18	AS SHOWN	003138-D1-1	3

OFFICE Pittsburgh, PA
DRAWING NUMBER 003138-D1

VERIFY SCALE 0 1"

Xref :
Image :

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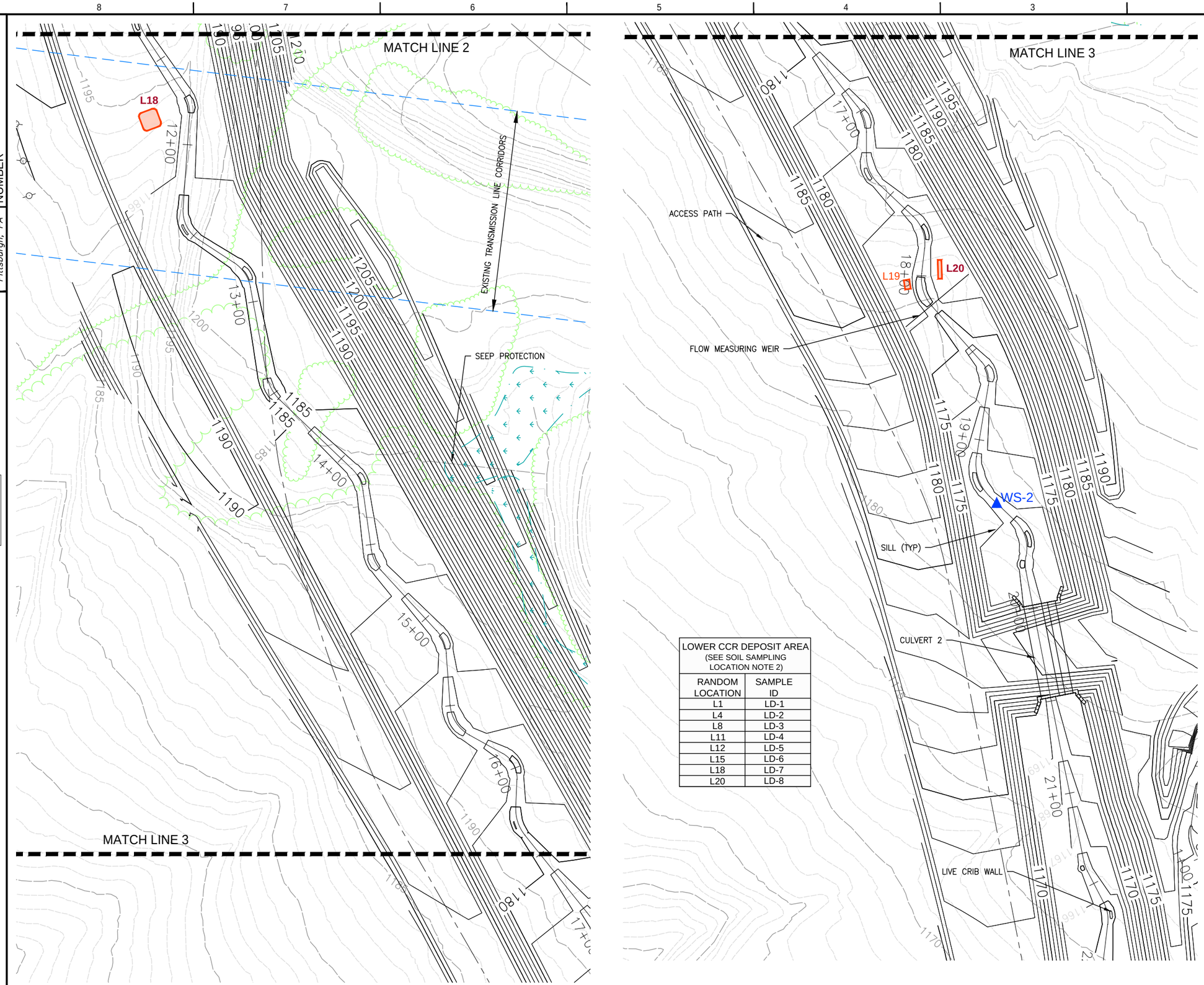
Plot Date/Time: Jan 07, 2019 - 4:22pm
Plotted By: Evan.Schlegel



LOWER CCR DEPOSIT AREA (SEE SOIL SAMPLING LOCATION NOTE 2)	
RANDOM LOCATION	SAMPLE ID
L1	LD-1
L4	LD-2
L8	LD-3
L11	LD-4
L12	LD-5
L15	LD-6
L18	LD-7
L20	LD-8

LEGEND:

- —1180— GROUND SURFACE CONTOUR (FT AMSL)
- TREE LINE
- STREAM
- WETLAND
- L19 LOWER CCR DEPOSITS (CUMULATIVE AREA = 850 SQ. FT.)
- WS-2 LOCATION OF SURFACE WATER SAMPLE
- L20 RANDOMLY SELECTED SAMPLE LOCATION (SEE SOIL SAMPLING LOCATION NOTE 2)

GENERAL NOTES:

1. COAL COMBUSTIBLE RESIDUALS (CCR) AREAS ARE APPROXIMATE BASED ON VISUAL INSPECTIONS AND GLOBAL POSITIONING SYSTEM (GPS) COORDINATES COLLECTED BY APTIM ON SEPTEMBER 26 AND 28, 2018.

2. CCR DEPOSIT THICKNESS VARIED BETWEEN 1/4 INCH AND 4 INCHES. THE CCR DEPOSITS DECREASED IN THICKNESS AS LOCATIONS PROGRESSED DOWNSTREAM TOWARDS CULVERT 2.

SOIL SAMPLING LOCATION NOTES:

1. SEE FIGURE 3 FOR LOWER DEPOSIT AREAS L1 THROUGH L17.

2. FOR THE LOWER DEPOSITS (L1 THROUGH L20), A TOTAL OF 8 SOIL SAMPLE LOCATIONS WERE RANDOMLY SELECTED. THE 8 SOIL SAMPLES TAKEN WITHIN THE RANDOMLY SELECTED LOWER DEPOSIT AREAS WERE BIASED SAMPLES (TAKEN WHERE TRACE CCR WAS VISIBLE, IF ANY).

SCALE
0 25 50 75 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

APTIM
500 Penn Center Boulevard,
Suite 900
Pittsburgh, Pennsylvania 15235

GenOn

DESIGNED BY: P. Andrison
DRAWN BY: E. Schlegel
CHECKED BY: P. Andrison
APPROVED BY: R. Southorn

SOIL AND SURFACE WATER SAMPLING LOCATIONS (2 of 2)
CONEMAUGH GENERATING STATION
ASH/REFUSE DISPOSAL SITE
INDIANA COUNTY, PENNSYLVANIA

DATE:	SCALE:	DRAWING NO.	FIGURE NO.
12/18/18	AS SHOWN	003138-D1-2	4

OFFICE Pittsburgh, PA
DRAWING NUMBER 003138-D1

VERIFY SCALE 0 1"

Xref :
Image :

File: O:\PROJECT\10091444003_Conemaugh\003138\003138-D1.dwg
Plot Date/Time: Jan 07, 2019 – 4:21pm
Plotted By: Evan.Schlegel

Appendix A

CCR Release Notification to PADEP

GenOn Northeast Management Company*
Conemaugh Generating Station
1442 Plant Road
New Florence, PA 15944

August 13, 2018

Overnight Delivery
Ms. Kristin Gearhart
Pennsylvania Department of Environmental Protection
Cambria District Office
286 Industrial Park Road
Ebensburg, PA 15931

RE: Discharge of Contact Storm Water
5 Day Written Report
NPDES Permit No. PA0005011
Conemaugh Generating Station - New Florence, PA

Dear Ms. Gearhart:

As requested on August 9, 2018, GenOn Northeast Management Company (GenOn) is providing this five-day written report of the incident that was discovered at the Conemaugh Generating Station (Station). The incident was discovered on August 8, 2018 during inspections and repair of the landfill erosion and sedimentation controls. Ash was observed adjacent to and west of the East Valley Stream, an unnamed tributary to the Conemaugh River.

Description of the Noncompliance, Cause, and Duration

Based on data gathered from the Station rain gauge located at the Ash Valley landfill, the incident occurred on July 30th between noon and 1:35 pm. Approximately, 0.6 inches of rain fell between noon and 12:30 pm saturating the landfill drainage area. Another 1 inch of rain fell within a 15-minute period between 1:20 pm and 1:35 pm. The runoff from the large drainage area caused contact storm water from the landfill to exceed the capacity of the drainage channel adjacent to the landfill haul road near the entrance to the active Stage II disposal area. The overflow of the drainage channel subsided shortly after the storm.

At this location, a portion of this contact storm water flowed out of the channel over and through the Stage III construction area (~800 linear feet) where the flow joined noncontact storm water runoff and entered a storm water sedimentation trap adjacent to Culvert 1C. Contact storm water intermixed with non-contact storm water exceeded the capacity of the sedimentation trap, flowed through Culvert 1C on the south east side of the landfill, flowed south approximately 150 feet within a vegetated storm water swale where the flow combined with East Valley Stream flow. At this time, the East Valley Stream, a stream mitigation project for the landfill expansion, was well above the normal water levels and within the heavily vegetated constructed floodplain. Based on our inspections of the East Valley stream channel and adjacent areas on August 8, 9 and 10, one to three inches of ash was observed within the Culvert 1C storm water runoff swale and area on the west side of East Valley Stream. Several smaller areas of ash were observed

*: GenOn Northeast Management Company is a subsidiary of GenOn Energy, Inc.

downstream within low areas adjacent to the stream. No ash was observed within the East Valley Stream channel.

Steps Taken or Planned to Reduce, Eliminate, and Prevent Reoccurrence

All erosion and sedimentation controls within this area of the landfill were restored and/or improved to minimize re-occurrence. Additional activities to improve the grade of the haul road are expected to be completed within the next two months. Ash has been removed from sedimentation traps as of August 10.

Plans and permits, if necessary, to remove the ash within the in areas adjacent to the stream channel are being developed. We will review our plans with the Department prior to proceeding with the removal work adjacent to and within the stream. Ash removal may include the placement of erosion and sedimentation controls and removal by mechanical means (e.g., excavator) or by utilizing vacuum trucks and laborers to loosen and remove the ash.

Lastly, Conemaugh Station also believes that the very rainy conditions experienced in the area and throughout the Commonwealth in July 2018 resulted in diminished capacity for the soil / land to absorb the unusually high rainfall and thus avoid the consequences from the July 30th event. The table below summarizes the precipitation data for July 2018 for the Commonwealth. As presented below, rainfall experienced in July 2018 was the second highest amount recorded that month during the last 124 years. Conemaugh Station believes that the July 30th event was an isolated and rare occurrence.

.....

Please do not hesitate to contact Stephen Frank (Stephen.frank@genon.com) at 724-249-3610 or John Shimshock (John.Shimshock@genon.com) at 724-235-4596 with any questions or comments concerning this report.

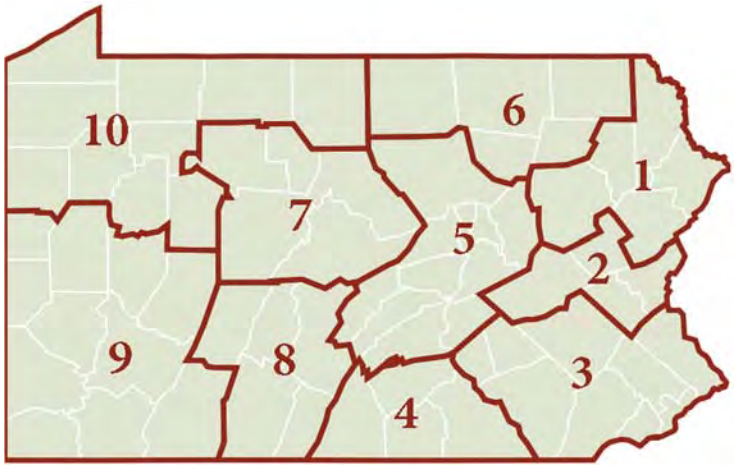
Very truly yours,

John P. Shimshock
Environmental Specialist
Conemaugh Generating Station

July 2018 Precipitation Averages (inches)

State	Average	Departure	Pct Normal	Rank	Driest	Wettest
Pennsylvania	7.37	3.10	173%	124	1.90 in 1909	7.37 in 2018
1-Pocono Mountains	7.88	3.66	187%	121	1.19 in 1936	10.95 in 1947
2-East Central Mtns	8.75	4.17	191%	120	1.01 in 1999	10.17 in 1945
3-Southeastern Piedmont	8.35	3.75	182%	120	0.85 in 1955	8.93 in 1945
4-Lower Susquehanna	9.83	5.96	254%	124	0.97 in 1983	9.83 in 2018
5-Middle Susquehanna	10.74	6.69	265%	124	1.35 in 1909	10.74 in 2018
6-Upper Susquehanna	8.44	4.42	210%	123	1.32 in 1936	8.81 in 2004
7-Central Mountains	8.21	4.00	195%	122	1.83 in 1909	9.19 in 1992
8-South Central Mtns	7.47	3.66	196%	123	0.95 in 1983	7.97 in 1989
9-Southwest Plateau	4.48	0.16	104%	76	1.75 in 1930	9.70 in 1896
10-Northwest Plateau	5.31	0.71	115%	96	1.99 in 2011	10.00 in 1992

Rankings are for the 124 years between 1895 and 2018. 1=driest; 124=wettest.
Departures and percent normal are calculated using the 1981-2010 normals.



Reference: http://www.nrcc.cornell.edu/regional/tables/tables.html

Appendix B

Notice of Time Period Extension for Assessment of Corrective Measures

APTIM
1607 East Main Street
St Charles, Illinois 60174
Tel: +1 630 762 1400
Fax: +1 30 762 1402

November 1, 2018

VIA EMAIL

Mr. Steve Frank, GenOn
Mr. John Shimshock, Conemaugh Generating Station

Subject: **Assessment of Corrective Measures—Acknowledgement of 60-day Extension**
CCR Release Incident – Ash Valley Refuse/Disposal Area
Conemaugh Generating Station
West Wheatfield Township, Indiana County, Pennsylvania

Dear Messrs. Frank and Shimshock:

As you are aware, Title 40 Code of Federal Regulations (CFR) Part 257 Subpart D addresses the management of coal combustion residuals (CCR) in landfills and surface impoundments. Conemaugh Generating Station's Ash Valley Refuse/Disposal Site (operated by GenOn Northeast Management Company [GenOn]) is subject to the CCR Rule. On August 8, 2018, a surficial (non-groundwater) release of CCR was discovered during the performance of a routine inspection of the landfill and established erosion and sedimentation control features. The release most likely occurred during an extremely intense precipitation event on July 30, 2018, which was localized and rare.

As required under §257.90(d), in order to minimize the potential for future releases, Conemaugh Station and its contractor (R&L Development) immediately removed CCR from the onsite erosion and sedimentation control features and repaired them. Conemaugh Station and its contractor have additionally continued with implementation of additional interim measures to further stabilize the situation and minimize potential impacts to human health and/or the environment (e.g., removed nearly all of the displaced CCR). In this regard, a vacuum truck was used shortly after the release and during subsequent interim actions to remove as much of the released CCR as feasible in order to protect human health and the environment. This method of removal was selected in order to minimize disturbance to the vegetation and ecosystem.

Representatives from Aptim Environmental & Infrastructure, Inc. (APTIM) visited the site on September 26th and 28th, 2018 and October 23, 2018 to assess the extent of the CCR release to the ground surface. I, as a qualified professional engineer in the Commonwealth of Pennsylvania, reviewed the above-described interim/corrective actions during the noted site visit on October 23, 2018 and found them to be appropriate to minimize the potential for future release.

APTIM is currently developing a soil and surface water sampling plan to assess whether the remedial activities undertaken immediately and shortly after the release have appropriately mitigated potential impacts to the health and/or the environment. Soil and surface water sampling will be undertaken once this plan is complete. If a potential impact to human health and/or the environment is found to be present due to the release, further corrective measures will be assessed in accordance with §257.96. The selection of any additional remedy, if required, will be conducted in accordance with §257.97 and implemented in accordance with §257.98. Because of the complexities related to removal of the displaced ash in the impacted areas, and the need to develop an adequate confirmatory sampling and analysis plan, Aptim certifies that a 60-day extension beyond the CCR Rule-specified 90 days is appropriate for completing the assessment of corrective measures. U.S. EPA acknowledged the need for such extensions in the preamble to the final CCR Rule, please see below:

> *Based on the comments received, as well as the Agency's own experience, EPA recognizes that there may be complex situations that require more time to develop a careful and well-thought out corrective measures assessment. Therefore, the final rule has been modified to allow up to an additional 60 days to complete the assessment of corrective measures, provided that a qualified professional engineer certifies that the additional time is necessary. The initial 90 days plus the additional 60 days, which is within the range of time suggested by the commenters, would provide the owner or operator up to 150 days to complete the corrective measures assessment, which EPA expects will be sufficient.* FR 80 (74) April 17, 2015, page 21406

The corrective measures assessment will be completed within 150 days of the observation of the release, representing the inclusion of a 60-day extension per the provisions of §257.96(a), and to provide sufficient time for completion of the upcoming confirmation sampling activities. Thus, the assessment and associated summary report will be completed on or before January 9, 2019.

Please contact me with any questions, either via email at Richard.Southorn@aptim.com or directly at 630-762-3327.

Sincerely,

Richard Southorn, PE, PG

Project Manager
Aptim Environmental & Infrastructure, Inc.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
RICHARD DAVID SOUTHORN
ENGINEER
No PE085411

Appendix C

Newspaper Advertisement of Public Meeting

Proof of Publication

State of Pennsylvania
County of Indiana] SS

On this 28th day of November 2018 A.D.

before me, the subscriber, a Notary Public in and for said County and State, personally appeared:

Shirley McCombs

who being duly sworn according to laws, deposes and says, that (s)he is the Solicitor of the Indiana Gazette, that the said Indiana Gazette is a daily newspaper of general circulation, published in the borough of Indiana, in the County of Indiana, State of Pennsylvania, by the Indiana Printing & Publishing Company, and was established in said Borough on the second day of July 1890, since which date, said daily newspaper has been regularly issued in said Borough and County, that annexed hereto is a true copy of a notice in the above matter exactly as the same was printed in the regular editions and issues of the said daily newspaper on the following dates, viz:

11/23, 11/24, 11/25

Affiant further deposes and says that (s)he is an employee of the publisher of the said daily newspaper and has been authorized to verify the foregoing statement and the (s)he is not interested in the subject matter of the aforesaid notice or publication and that all allegations in the foregoing statement as to time, place, and character of publication are true.

Indiana Printing & Publishing Company

By: Shirley McCombs

Sworn to and subscribed before me the day and year aforesaid.

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
BARBARA J SULLINGER
Notary Public
INDIANA BORO, INDIANA COUNTY
My Commission Expires Dec 3, 2020

Barbara J Sullinger
Signature of notarial officer

NOTICE
Public Meeting Notice

GenOn Northeast Management Company, the operator of the Conemaugh Generating Station located in West Wheatfield Township, Indiana County, PA, will hold a public meeting with interested and affected parties to discuss the incident and the assessment of corrective measures in response to a non-groundwater coal combustion residuals (CCR) release that occurred at the station's residual waste landfill on July 30, 2018. Meeting info is presented at the end of this notice. Landfill operations are subject to the requirements of U.S. EPA's CCR Rule, 40CFR257 Subpart D. The public meeting is required by the Rule, §257.96(e). Individuals will have an opportunity to provide written or oral comments relevant to this incident, not to exceed the time allotted for the meeting. The meeting will be documented as required by the Rule, §257.015 (h)(11).

WHAT: Public meeting to review Conemaugh Station's actions and corrective measures in response to a non-groundwater CCR release that occurred at the station's residual waste landfill on July 30, 2018.

WHEN: Tuesday, December 18, 2018, 6:00 PM to 8:00 PM EST

WHERE: New Florence Fire Hall, 177 13th Street, New Florence, PA 15944

11/23, 11/24, 11/25

	$179.40
Proof of Publication	$5.00
Proof of Intent	
Total	$184.40

Indiana Printing & Publishing Company, publishers of the Indiana Gazette, a daily newspaper, hereby acknowledges receipt of the aforesaid publication costs, and certifies the same have been fully paid.

Indiana Printing and Publishing Co.
P.O. Box 10, 899 Water Street, Indiana, PA 15701

By _____

Appendix D

Supporting Soil and Surficial Materials Report

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

CHEMICAL ANALYSES OF SOILS AND OTHER SURFICIAL MATERIALS OF THE CONTERMINOUS UNITED STATES

By

Josephine G. Boerngen and Hansford T. Shacklette

Open-File Report 81-197

1981

Contents

Table Page

Introduction

A sampling program was begun in 1961 that was designed to give estimates of the abundance of elements in soils and other surficial materials and in associated plants from sites selected along routes of travel, and in study areas, of U.S. Geological Survey scientists. The sampling plan was kept simple. The proposed sampling intensity consisted of one sample of soil and one of plants collected at sites about 50 mi. (81 km) along routes of travel to areas of other types of field study. Sampling sites were selected, insofar as possible, that represented soil in its natural condition. This program resulted in the sampling of 863 sites. The results of the soil analyses were published for 35 elements by plotting their concentrations, in two to five frequency classes, on maps (Shacklette, Hamilton, Boerngen, and Bowles, 1971).

Soon after this publication, interest in environmental geochemistry, particularly the application to problems of industrial and vehicular pollution, increased greatly. At the same time, advances in analytical techniques made the analysis of additional elements practical. Therefore, the samples from the first study, with some additional samples, were analyzed and reported as follows: mercury by Shacklette, Boerngen, and Turner (1971); lithium and cadmium by Shacklette, Boerngen, Cahill, and Rahill (1973); and selenium, fluorine, and arsenic by Shacklette, Boerngen, and Keith (1974).

Sampling according to this plan continued, as opportunities arose, until autumn, 1975, resulting in the sampling of 355 additional sites that were selected to give a more uniform geographical coverage of the conterminous United States. These samples were analyzed and the data were merged with those of the original samples to produce the results given in this report.

The elemental composition of only the surficial materials were given in all reports; the data on analysis of the plant samples are held in files of the U.S. Geological Survey.

This study was made possible by the cooperation of many persons in the U.S. Geological Survey. We express our appreciation to those who collected samples, as follows: Jessie M. Bowles, F. A. Branson, R. A. Cadigan, F. C. Canney, H. L. Cannon, F. W. Cater, Jr., M. A. Chaffey, Todd Church, J. J. Connor, Dwight Crowder, R. J. Ebens, R. N. Eicher, J. A. Erdman, R. F. Gantner, G. B. Gott, W. R. Griffitts, T. P. Hill, E. K. Jenne, M. I. Kaufman, J. R. Keith, Frank Kleinhampl, A. T. Miesch, R. F. Miller, R. C. Pearson, E. V. Post, Douglas Richman, James Scott, D. E. Seeland, R. C. Severson, M. H. Staatz, T. A. Steven, M. H. Strobell, V. E. Swanson, R. R. Tidball, H. A. Tourtelot, J. D. Vine, and R. W. White.

We thank the following members of the U.S. Department of Agriculture, Soil Conservation Service for providing soil samples from areas in Minnesota: Donald D. Barron, Carroll R. Carlson, Donald E. DeMartelaire, Royce R. Lewis, Charles Sutton, and Paul Nyberg.

We acknowledge the analytical support provided by the following U.S. Geological Survey chemists: Lowell Artis, Philip Aruscavage, A. J. Bartel, S. D. Botts, L. A. Bradley, J. W. Budinsky, Alice Caemmerer, J. P. Cahill, E. Y. Campbell, G. W. Chloe, Don Cole, E. F. Cooley, N. M. Conklin, W. B. Crandell, Maurice Devalliere, P. L. D. Elmore, E. J. Finlay, Johnnie Gardner, J. L. Glenn, T. F. Harms, R. C. Haven, R. H. Heidel, M. B. Hinkle, Claude Huffman, Jr., L. B. Jenkins, R. J. Knight, B. W. Lanthorn, L. M. Lee, K. W. Leong, J. B. McHugh, J. D. Mensik, V. M. Merrit, H. T. Millard, Jr., Wayne Mountjoy, H. M. Nakagawa, H. G. Neiman, Uteana Oda, C. S. E. Papp, R. L. Rahill, V. E. Shaw, G. D. Shipley, Hezekiah Smith, A. J. Sutton, Jr., J. A. Thomas, Barbara Tobin, J. E. Troxel, J. H. Turner, and G. H. VanSickle.

We were assisted in computer programming for the data by J. B. Fife and George VanTrump, Jr.

Sample collection, preparation, and analysis

The sampling sites were selected, if possible, to represent surficial materials that were altered very little from their natural condition and that supported native or cultivated plants suitable for sampling. In practice, this site selection necessitated sampling away from roadcuts and fills, but in some areas only cultivated fields were available for sampling. The materials sampled included soil as defined by soil scientists, beach and dune sands, very stony lithosols, and organic deposits generally considered to be peat instead of soil. Most samples were collected at a depth of about 8 in. (20 cm), which reduced or avoided the effects of surface contamination. In zonal soils, this depth commonly is within the range of the B soil horizon (zone of element accumulation). Some lithosols over near-surface bedrock did not extend downward to 8 in. (20 cm); they were sampled at the bottom of soil development in the profile.

Areas of field studies commonly were sampled more intensively than at intervals of 50 miles (81 km). Samples used from these studies were selected to represent about the same geographical coverage as did those along roads.

The soil samples were dried in the laboratory, pulverized and sieved, and the minus-2mm fractions were used for analysis. The methods of analysis used for some elements were changed during the course of the study as new techniques and instruments became available. The results published in the first report (Shacklette, Hamilton, Boerngen, and Bowles, 1971) were obtained for most elements by use of a semiquantitative six-step emission spectrographic method (Neiman, 1976). Other methods were used for the following elements: atomic absorption, with flame (Huffman and Dinnin, 1976) for mercury, lithium, magnesium, sodium, rubidium, and zinc; atomic absorption, flameless (Vaughn, 1967) for mercury; X-ray fluorescence spectrometry (Wahlberg, 1976) for calcium, germanium, iron, potassium, selenium, silver, sulfur, and titanium; combustion (Huffman and Dinnin, 1976), total carbon; and neutron activation (Millard, 1975, 1976) for thorium and uranium.

Location, description, and concentration of elements for samples of surficial materials

Table 1 provides one page of descriptive material for 50 samples, arranged alphabetically by Postal Service abbreviations for state names and by county names, followed by four pages of analytical data for these samples, then proceeds to the descriptive page for the next 50 samples, and so on through the table. The state names in the descriptive material of site locations are abbreviated according to the system used by the Government Printing Office (GPO). The following table gives these abbreviations.

State	GPO	Postal Service	State	GPO	Postal Service
Alabama	Ala.	AL	Nebraska	Nebr.	NE
Arizona	Ariz.	AZ	Nevada	Nev.	NV
Arkansas	Ark.	AR	New Hampshire	N.H.	NH
California	Calif.	CA	New Jersey	N.J.	NJ
Colorado	Colo.	CO	New Mexico	N. Mex.	NM
Connecticut	Conn.	CT	New York	N.Y.	NY
Delaware	Del.	DE	North Carolina	N.C.	NC
Florida	Fla.	FL	North Dakota	N. Dak.	ND
Georgia	Ga.	GA	Ohio	Ohio	OH
Idaho	Idaho	ID	Oklahoma	Okla.	OK
Illinois	Ill.	IL	Oregon	Oreg.	OR
Indiana	Ind.	IN	Pennsylvania	Pa.	PA
Iowa	Iowa	IA	Rhode Island	R.I.	RI
Kansas	Kans.	KS	South Carolina	S.C.	SC
Kentucky	Ky.	KY	South Dakota	S. Dak.	SD
Louisiana	La.	LA	Tennessee	Tenn.	TN
Maine	Maine	ME	Texas	Tex.	TX
Maryland	Md.	MD	Utah	Utah	UT
Massachusetts	Mass.	MA	Vermont	Vt.	VT
Michigan	Mich.	MI	Virginia	Va.	VA
Minnesota	Minn.	MN	Washington	Wash.	WA
Mississippi	Miss.	MS	West Virginia	W. Va.	WV
Missouri	Mo.	MO	Wisconsin	Wis.	WI
Montana	Mont.	MT	Wyoming	Wyo.	WY

The location of the sampling sites is given by north latitude and west longitude in degrees and minutes, and the collection date is given by year and month. The format used for table 1 allows only 70 spaces for site and soil descriptions, therefore, this column is written in telegraphic style, employing numerous abbreviations, minimum punctuation, and the elimination of unnecessary connectives in the statements in order to give as much information as possible in the limited space. The sampling sites are located more precisely by a descriptive reference to landmarks, such as highways, towns, rivers, or other geographic features. The distances of

the sites from these landmarks are approximate, generally rounded to whole numbers. The descriptions of the surficial materials closely follow those made at the sites by the collectors, and are usually expressed in nontechnical terms. A list of the abbreviations that were used follows.

Abbreviation	Word or term	Abbreviation	Word or term
ALLUV	Alluvium	NAT	National
ALT	Alternate	NAT FOR	National forest
BLM	Bureau of Land Management	N.P.	National Park
BR	Branch	NR	Near
BRWN	Brown	PK	Park
C.H.	Courthouse	QUAD	Quadrangle
CO	County	QUAT	Quaternary
CR	Creek	R.	River
DECID.	Deciduous	RD	Road
FT	Fort	RES	Reservation
HATC	Hatchery	RR	Railroad
HOR	Horizon	RT	State Route
HTS	Heights	RX	Rocks
I	Interstate Highway	SED	Sedimentary
IN.	Inch or inches	SERV	Service
IRR	Irrigation	SH	Shale
JCT	Junction	SPGS	Springs
LGHT	Light	SS	Sandstone
LS	Limestone	TERT	Tertiary
MED	Medium	TPK	Turnpike
MI	Mile	US	U.S. Highway
MT	Mount or mountain	YDS	Yards
MX	Mixed		

Bismuth, cadmium, praseodymium, and silver were found infrequently in measurable concentrations in the samples. Data for these elements are given in the following table.

SAMPLE NO.	STATE	COUNTY	LATI-TUDE	LONGI-TUDE	DATE COLLECTED	LOCATION, DESCRIPTION, AND CONCENTRATION (PPM) OF ELEMENTS	
						BISMUTH	
GC171650	AZ	PINAL	33 18	111 5	64 5	US 60-70 W EDGE OF SUPERIOR; STONY ROUGH SOIL	15
250450	CA	INYO	36 28	117 52	66 6	RT 190 OWENS LAKE 5 MI S KEELER; SAND NEAR PLAYA	15
						CADMIUM	
060250	CA	KERN	35 30	119 38	70 7	JCT RT 33 AND UNNUMBERED RD 10 MI NW BUTTONWILLOW; SOIL NOT DESCRIBED	1.0
242750	CA	NEVADA	39 14	121 2	66 7	I-40 AT CISCO; SOIL NOT DESCRIBED	1.0
243150	CA	SANTA CLARA	36 58	121 33	66 7	US 101 AT RT 152 EXIT GILROY; SOIL NOT DESCRIBED	10.0
270650	CA	SHASTA	40 31	121 30	68 9	IN LASSEN VOLCANIC N.P. 3 MI SE MANZANITA LAKE; B HORIZON SOIL	1.0
185450	CO	MOFFAT	40 15	108 40	65 6	US 40 5 MI E MASSADONA; BROWN CLAYEY SILT 8 IN. DEPTH	1.0
066950	CO	SUMMIT	39 33	106 9	72 9	US 6 .5 MI E OFFICERS GULCH CAMPGROUND; BROWN GRAVELLY SOIL ON TILL	11.0
155850	KS	BOURBON	37 45	94 55	63 10	US 54 10 MI W FT. SCOTT; DARK PRAIRIE SOIL OVER LIMESTONE	1.5
024850	KS	LOGAN	39 7	101 44	71 10	US 40 AT OAKLEY; BLACK PRAIRIE SOIL	2.0
023550	MT	CASCADE	47 32	111 10	71 5	1 MI NORTH MALSTROM AIR BASE; CULTIVATED, PLOW ZONE	2.0
191350	NM	CHAVES	33 22	104 50	65 6	US 70 18 MI SW ROSWELL; VERY DRY, TAN, MANY CHERT FRAGMENTS	1.5
042250	OH	AUGLAIZE	40 30	83 55	66 10	US 33 1 MI NW LAKEVIEW; BROWN SILTY LOAM CULTIVATED	1.0
267450	SD	BROWN	45 25	98 7	68 8	RT 37 1 MI S GROTON; GRAY MOTTLED B HORIZON LACUSTRINE CLAY, GRASSLAND	1.0
152150	TX	HARRIS	29 47	95 38	63 7	US 90 2 MI E ADDICKS; DARK ALLUVIAL CLAY	1.0
022750	VA	WYTHE	36 58	80 57	72 9	RT 121 AT MAX MEADOWS; MUCK	4.0
056050	WI	POLK	45 31	92 35	70 5	RT 35 2 MI S LUCK; YELLOW SANDY LOAM	1.0
						PRASEODYMIUM	
070350	AL	MONTGOMERY	32 17	86 12	73 1	US 231 5 MI S MONTGOMERY; SANDY LOAM	100
						SILVER	
171450	AZ	COCONINO	34 33	111 18	64 5	RT 87 AT CLINTS WELL; DARK FOREST SOIL	3.0
033150	CO	CLEAR CREEK	39 47	105 47	65 8	US 40 ON BERTHOUD PASS; BROWN, ON GRANITE AND GNEISS RUBBLE	2.0
186250	ID	BANNOCK	42 47	112 24	65 6	I-15 8 MI SE POCATELLO; BROWN SILT, 4 IN. DEPTH	3.0
023550	MT	CASCADE	47 32	111 10	71 5	1 MI NORTH MALSTROM AIR BASE; CULTIVATED, PLOW ZONE	.7
263150	UT	SUMMIT	40 52	111 15	68 7	I-80 2 MI S RT 133 EXIT NEAR STREAM BED; BLACK ORGANIC ALLUVIUM	5.0
022750	VA	WYTHE	36 58	80 57	72 9	RT 121 AT MAX MEADOWS; MUCK	3.0

Some elements were looked for in all samples but were not found. These elements, analyzed by the semiquantative spectrographic method, and their approximate lower detection limits, in parts per million, are as follows: gold, 20; hafnium, 100; indium, 10; platinum, 30; palladium, 1; rhenium, 30; tantalum, 200; tellurium, 2,000; and thallium, 50. If lanthanum or cerium was found in a sample, the following elements, with their stated lower detection limits, were looked for in the same sample but were not found: dysprosium, 50; erbium, 50; gadolinium, 50; holmium, 20; lutetium, 30; terbium, 300; and thulium, 20.

The following symbols used in table 1 are explained as follows: N, not detected in the sample; leaders (--), no data available; <, less than the stated value; and >, greater than the stated value.

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Table 1.--Location, description, and concentration of elements for samples of surficial materials

[Data are divided into five-page units. The first page of each unit gives the sample numbers for 50 samples, the state and county names listed alphabetically, the latitude and longitude in degrees and minutes, the date of sample collection, the location of the sampling site, and the description of the sample. The following 4 pages give analytical results for 46 elements for each of the 50 samples in this unit. The second unit follows alphabetically by state and county, and so on through the entire table]

Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	State	County	Latitude	Longitude	Date Colln.	Site and Soil Descriptions
GC268950	OR	MALHEUR	44 0	117 0	68 9	US 20-26 10 MI E VALE; B HORIZON SOIL
GC269050	OR	MALHEUR	43 47	117 56	68 9	US 20 ABOUT 10 MI E JUNTURA; B HORIZON SOIL
GC026950	OR	MARION	45 1	122 59	71 9	I-5 2.6 MI N JCT I-5 & US 99E; SOIL ON SILT DEPOSIT
GC269550	OR	MARION	44 50	123 5	68 9	I-5 S OF TURNER; B HORIZON SOIL
GC035350	OR	MORROW	45 50	119 36	65 8	I-80-US30 3 MI E US 730 JCT; MED BROWN SAND
GC035650	OR	MULTNOMAH	45 32	122 17	65 8	AT CORBETT OFF I-80; BROWN SILT
GC060650	OR	SHERMAN	45 20	120 46	70 10	US 97 1 MI S GRASS VALLEY; DARK GRAY SILT OVER BASALT
GC076650	OR	TILLAMOOK	45 44	123 56	73 9	RT 101 1 MI N MANZANITA; REDDISH-YELLOW LOAM
GC076750	OR	TILLAMOOK	45 12	123 55	73 9	US 101 4 MI S CLOVERDALE; PEBBLY LOAM
GC035250	OR	UMATILLA	45 40	118 45	65 8	US 30 1 MI E PENDLETON; GRAY SILT ON BASALT
GC269450	OR	UMATILLA	45 3	118 59	68 9	US 395 ABOUT 8 MI N DALE; B HORIZON SOIL
GC035150	OR	UNION	45 20	118 6	65 8	US 30 N EDGE LA GRANDE; GRAY-BROWN CLAY LOAM
GC035550	OR	WASCO	45 42	121 21	65 8	I-80N 3 MI W ROWENA; BROWN SILT, RESIDUAL ON BASALT
GC041650	PA	BEDFORD	39 57	78 20	66 10	PA TPK 6 MI W EXIT 12; LIGHT ORANGE-BROWN SANDY LOAM
GC059550	PA	CENTRE	41 2	77 57	70 9	I-80 .5 MI S JCT RT 144 ON GRAVEL TRAIL; SOIL NOT DESCRIBED
GC041350	PA	CHESTER	40 7	75 50	66 10	PA TPK 5 MI E EXIT 22; BROWN CLAY LOAM
GC041550	PA	CUMBERLAND	40 10	77 30	66 10	PA TPK 10 MI E EXIT 15; YELLOWISH CLAY LOAM
GC041450	PA	DAUPHIN	40 10	76 37	66 10	PA TPK 8 MI W EXIT 20; RED SANDY CLAY LOAM
GC003050	PA	ERIE	41 56	80 29	62 5	I-90 AT US 6N INTERCHANGE; YELLOWISH-ORANGE SAND
GC030950	PA	ERIE	42 11	79 50	72 9	RT 89 3 MI S OF NORTH EAST; HEAVY CLAY FOREST SOIL
GC041750	PA	FAYETTE	40 5	79 20	66 10	PA TPK 2 MI E EXIT 9; YELLOWISH BROWN SILTY CLAY LOAM
GC061150	PA	JEFFERSON	41 9	78 54	70 9	US 322 2.5 MI E RT 28 JCT; SOIL NOT DESCRIBED
GC184550	PA	LEHIGH	40 44	75 37	67 11	NE EXIT PENN. TPK NEAR SLATINGTON; SOIL NOT DESCRIBED
GC061350	PA	LYCOMING	41 12	77 8	70 9	RT 645 3.9 MI W JCT US 15; SOIL NOT DESCRIBED
GC061050	PA	MERCER	41 12	80 17	70 9	4.5 MI W JCT US 62 AND US 19; SOIL NOT DESCRIBED
GC184050	PA	SULLIVAN	41 23	76 30	67 10	US 220 2 MI S LAPORTE; B HORIZON FROM SANDSTONE
GC184450	PA	SUSQUEHANNA	41 38	75 38	67 11	I-81 5 MI S LENOX; SOIL NOT DESCRIBED
GC061450	PA	TIOGA	41 40	77 5	70 9	US 15 2.7 MI S OF N TURNOFF TO ARNOT; SOIL NOT DESCRIBED
GC041850	PA	WASHINGTON	40 10	80 15	66 10	I-70 AT WASHINGTON; YELLOWISH-ORANGE SILTY LOAM
GC006050	RI	PROVIDENCE	41 49	71 43	62 10	US 6 AT JCT RT 102; SANDY B HORIZON
GC062950	SC	AIKEN	33 24	81 33	70 10	US 78 2 MI S WINDSOR; SANDY, AZONAL, YOUNG PINE STAND
GC196650	SC	CLARENDON	33 52	80 0	65 7	US 378 2 MI E TURBEVILLE; LIGHT YELLOW SAND
GC063050	SC	DARLINGTON	34 18	79 50	70 10	CO RD 1 MI E DOVESVILLE; SANDY, AZONAL, PINE PLANTATION
GC196750	SC	HORRY	33 50	79 14	65 7	US 378 11 MI W CONWAY; BLACK SAND AND MUCK
GC196850	SC	HORRY	33 50	78 40	65 7	US 17 AT LITTLE RIVER; YELLOW SAND
GC196350	SC	MC CORMICK	33 51	82 22	65 7	US 378 1 MI E GEORGIA STATE LINE; RED CLAY WITH QUARTZ FRAGMENTS
GC063150	SC	ORANGEBURG	33 20	80 57	70 10	CO RD 1 MI E COPE; SANDY, AZONAL, MATURE PINE FOREST
GC196550	SC	RICHLAND	33 56	80 56	65 7	US 378 10 MI E COLUMBIA; YELLOW SAND
GC196450	SC	SALUDA	34 0	81 39	65 7	US 378 10 MI E SALUDA; RED LITHOSOL WITH QUARTZ FRAGMENTS
GC211050	SC	SPARTANBURG	34 55	82 0	65 7	US 29 .4 MI W I-85 AT SPARTANBURG; SOIL NOT DESCRIBED
GC267550	SD	BEADLE	44 33	98 19	68 8	RT 37 7 MI S RT 28 JCT, N HURON; DARK BROWN GRAVELLY, CULTIVATED
GC028850	SD	BENNETT	43 13	101 27	72 9	US 18 11 MI E MARTIN; DARK SILT LOAM
GC029250	SD	BON HOMME	43 5	98 5	72 9	RT 46 12 MI E WAGNER; BLACK CLAY LOAM
GC055250	SD	BROOKINGS	44 0	96 45	70 5	US 14 2 MI W BROOKINGS; BLACK PRAIRIE
GC267450	SD	BROWN	45 25	98 7	68 8	RT 37 1 MI S GROTON; GRAY MOTTLED B HORIZON LACUSTRINE CLAY, GRASSLAND
GC054450	SD	BUTTE	44 35	103 24	70 5	US 212 JCT RT 79; DARK CLAYEY SOIL
GC055150	SD	CODINGTON	44 30	97 3	70 5	US 81 3 MI S WATERTOWN; BLACK PRAIRIE
GC084150	SD	CORSON	45 51	101 55	74 11	STANDING ROCK INDIAN RESERVATION; SOIL DERIVED FROM SANDSTONE
GC054750	SD	DEWEY	44 54	100 42	70 5	US 212 6 MI E RIDGEVIEW; PRAIRIE CLAY LOAM
GC267750	SD	DOUGLAS	43 17	98 20	68 8	US 281 1 MI S .5 MI E ARMOUR; DARK CLAY LOAM, PRAIRIE GROUP, CULT.

Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	Al %	As ppm	B ppm	Ba ppm	Be ppm	Br ppm	C %	Ca %	Ce ppm	Co ppm	Cr ppm	Cu ppm
GC268950	>10.00	4.3	20	1,000	1.0	--	--	2.60	N	15	70.0	30.0
GC269050	>10.00	3.8	<20	700	1.0	--	--	4.50	N	30	30.0	150.0
GC026950	>10.00	6.2	30	1,500	3.0	1.9	2.2	1.21	<150	20	70.0	30.0
GC269550	>10.00	6.0	N	300	N	--	--	.20	N	30	70.0	100.0
GC035350	>10.00	2.6	N	700	N	--	--	2.40	N	20	50.0	20.0
GC035650	>10.00	4.4	N	700	N	--	--	3.20	N	15	100.0	20.0
GC060650	>10.00	5.7	<20	700	1.5	--	--	2.32	<150	15	50.0	50.0
GC076650	>10.00	10.3	30	500	N	10.8	4.2	.54	N	10	70.0	70.0
GC076750	10.00	5.5	<20	300	N	7.4	10.4	.19	N	5	150.0	70.0
GC035250	>10.00	6.9	N	700	N	--	--	2.20	N	20	50.0	30.0
GC269450	7.00	1.7	N	500	N	--	--	4.60	N	30	100.0	150.0
GC035150	>10.00	4.2	N	700	N	--	--	1.80	N	30	100.0	30.0
GC035550	>10.00	1.9	N	700	N	--	--	3.40	N	30	50.0	30.0
GC041650	7.00	29.0	70	300	2.0	--	--	.05	150	30	70.0	50.0
GC059550	5.00	6.1	30	300	N	--	--	.06	N	3	30.0	10.0
GC041350	7.00	5.2	20	500	1.5	--	--	.30	150	20	50.0	70.0
GC041550	10.00	9.9	50	500	1.5	--	--	.20	150	15	100.0	50.0
GC041450	7.00	7.0	70	300	3.0	--	--	.20	150	20	70.0	50.0
GC003050	1.50	6.3	30	300	N	--	--	.53	N	7	15.0	15.0
GC030950	7.00	15.7	50	500	N	5.3	4.1	.43	<150	10	70.0	50.0
GC041750	7.00	10.0	50	500	2.0	--	--	.45	150	30	70.0	50.0
GC061150	3.00	3.8	30	200	N	--	--	.03	N	3	15.0	7.0
GC184550	5.00	16.0	70	300	1.5	--	--	.10	N	15	30.0	50.0
GC061350	10.00	17.0	50	500	2.0	--	--	.04	<150	15	100.0	50.0
GC061050	7.00	14.0	50	500	1.0	--	--	.15	150	10	50.0	20.0
GC184050	3.00	11.0	30	150	N	--	--	.05	N	7	15.0	15.0
GC184450	5.00	14.0	70	200	1.5	--	--	.25	N	10	30.0	15.0
GC061450	7.00	10.0	50	300	1.0	--	--	.06	<150	10	30.0	20.0
GC041850	10.00	31.0	50	500	3.0	--	--	.25	150	30	100.0	70.0
GC006050	>10.00	3.5	N	500	N	--	--	1.10	N	10	50.0	15.0
GC062950	--	4.9	--	--	--	--	--	--	--	--	--	--
GC196650	1.50	1.1	50	70	N	--	--	.10	N	N	15.0	5.0
GC063050	--	3.2	--	--	--	--	--	--	--	--	--	--
GC196750	.70	1.0	50	70	N	--	--	.10	N	N	5.0	3.0
GC196850	.70	--	50	50	N	--	--	.10	N	N	5.0	5.0
GC196350	>10.00	4.3	N	300	N	--	--	.40	N	7	50.0	50.0
GC063150	--	6.8	--	--	--	--	--	--	--	--	--	--
GC196550	1.50	7.4	50	70	7.0	--	--	--	N	N	15.0	5.0
GC196450	3.00	2.9	N	200	N	--	--	.20	N	N	10.0	15.0
GC211050	>10.00	3.4	N	300	N	--	--	.25	N	10	50.0	30.0
GC267550	7.00	15.0	20	700	1.0	--	--	.80	N	10	50.0	50.0
GC028850	5.00	1.7	<20	1,000	N	<.5	.9	.76	N	<3	15.0	7.0
GC029250	7.00	13.5	50	700	1.5	1.4	3.5	1.27	<150	10	70.0	50.0
GC055250	5.00	7.0	30	500	N	--	1.8	1.00	N	7	30.0	10.0
GC267450	7.00	3.9	30	500	1.0	--	--	7.00	N	7	50.0	30.0
GC054450	7.00	17.0	70	1,000	1.0	--	1.5	1.20	N	10	70.0	30.0
GC055150	7.00	10.0	30	700	1.0	--	4.9	1.00	N	7	70.0	15.0
GC084150	7.00	1.9	50	1,000	2.0	<.5	2.2	1.22	N	10	70.0	20.0
GC054750	10.00	12.0	70	1,000	1.0	--	1.6	1.10	N	7	70.0	20.0
GC267750	>10.00	15.0	50	700	1.0	--	--	.55	N	10	70.0	50.0

Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	F %	Fe %	Ga ppm	Ge ppm	Hg ppm	I ppm	K %	La ppm	Li ppm	Mg %	Mn ppm	Mo ppm
GC268950	.039	5.00	30	--	.03	--	2.20	50	23	1.500	700	N
GC269050	.043	7.00	30	--	.02	--	1.40	50	12	3.000	1,000	5
GC026950	.070	7.00	20	1.78	.06	1.0	1.78	50	18	.700	1,000	N
GC269550	.016	>10.00	70	--	.11	--	.45	N	18	.300	1,500	N
GC035350	.031	3.00	30	--	.05	--	2.00	30	16	1.500	700	N
GC035650	.019	3.00	30	--	.28	--	1.80	30	20	1.000	700	N
GC060650	.037	7.00	20	--	.02	--	1.30	50	25	1.000	500	N
GC076650	.050	7.00	20	1.37	.07	4.8	1.34	<30	25	.700	700	N
GC076750	--	5.00	20	1.21	.06	2.1	.62	N	28	.500	100	N
GC035250	.043	5.00	30	--	.02	--	1.80	50	27	1.500	700	N
GC269450	.015	7.00	30	--	.03	--	.90	N	14	1.500	1,500	--
GC035150	.037	5.00	30	--	.11	--	1.20	50	23	1.000	1,000	5
GC035550	.030	7.00	30	--	.38	--	1.10	N	16	1.500	1,000	N
GC041650	.033	3.00	30	--	.06	--	2.00	70	37	.500	500	N
GC059550	.009	1.50	5	--	.13	--	.78	30	18	.100	150	N
GC041350	.026	5.00	30	--	.07	--	1.90	100	28	.700	1,000	3
GC041550	.080	5.00	30	--	.12	--	2.00	70	55	1.000	200	N
GC041450	.053	5.00	30	--	.07	--	1.30	70	47	1.000	1,500	N
GC003050	.009	1.50	15	--	.04	--	1.08	N	14	.300	300	N
GC030950	--	3.00	15	1.82	.11	2.2	1.51	<30	39	.500	700	N
GC041750	.040	7.00	30	--	.06	--	1.90	70	64	.700	700	N
GC061150	.004	.70	N	--	.05	--	.36	30	12	.070	300	N
GC184550	.061	3.00	15	--	.08	--	2.30	30	27	.300	300	3
GC061350	.008	7.00	30	--	.08	--	3.26	50	78	.700	700	N
GC061050	.027	3.00	15	--	.06	--	1.25	70	35	.300	700	N
GC184050	.034	1.50	15	--	.10	--	.75	30	41	.300	200	N
GC184450	.026	1.50	15	--	.14	--	1.20	30	40	.300	700	N
GC061450	.029	3.00	15	--	.25	--	1.29	50	39	.300	1,500	N
GC041850	.060	7.00	50	--	.05	--	2.50	70	80	.500	300	N
GC006050	.061	3.00	20	--	.24	--	1.50	N	24	.700	500	N
GC062950	.061	--	--	--	.03	--	--	--	6	--	--	--
GC196650	.002	.30	N	--	.05	--	.02	30	7	.050	20	N
GC063050	.017	--	--	--	.03	--	--	--	<5	--	--	--
GC196750	<.001	.15	N	--	.09	--	.04	N	<5	.020	20	N
GC196850	.011	.30	N	--	.03	--	.03	N	6	.030	70	N
GC196350	.012	3.00	30	--	.13	--	.65	N	12	.200	100	N
GC063150	<.001	--	--	--	.06	--	--	--	<5	--	--	--
GC196550	<.001	.50	N	--	.07	--	.05	30	10	.050	50	N
GC196450	<.001	1.50	10	--	.07	--	.60	N	10	.070	200	N
GC211050	.003	3.00	15	--	.06	--	.36	N	17	.100	150	N
GC267550	.022	5.00	15	--	.08	--	2.00	30	23	1.500	5,000	3
GC028850	--	1.00	10	1.06	.02	.6	1.41	N	10	.200	200	N
GC029250	.050	2.00	15	1.52	.05	2.1	1.93	50	25	.500	1,000	N
GC055250	.017	1.50	15	--	.05	<.5	1.40	N	17	.500	500	N
GC267450	.030	2.00	15	--	.03	--	1.70	30	27	2.000	3,000	N
GC054450	.100	3.00	20	--	.08	.6	2.00	30	61	1.000	200	N
GC055150	.028	2.00	15	--	.53	<.5	1.60	N	21	.700	1,000	N
GC084150	.040	3.00	15	1.04	.07	1.4	1.98	<30	17	.700	1,500	N
GC054750	.062	3.00	20	--	.06	.6	1.60	30	41	.700	200	N
GC267750	.041	5.00	20	--	.11	--	2.10	50	34	1.500	700	3

Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	Na %	Nb ppm	Nd ppm	Ni ppm	P %	Pb ppm	Rb ppm	S %	Sb ppm	Sc ppm	Se ppm	Si %
GC268950	1.50	10	<70	30	.030	10	--	--	--	15	.3	--
GC269050	1.00	10	70	20	.090	10	--	--	--	30	<.1	--
GC026950	2.00	10	N	15	--	20	100	.13	<1	15	.2	29
GC269550	.30	20	--	30	.120	20	--	--	--	30	.8	--
GC035350	1.50	20	N	20	.030	15	--	--	--	20	<.1	--
GC035650	2.00	20	N	30	.060	20	--	--	--	15	.2	--
GC060650	2.00	10	70	20	--	15	--	--	--	20	<.1	--
GC076650	1.00	10	N	7	--	20	60	<.08	<1	20	.8	24
GC076750	.50	10	--	15	--	15	55	.10	2	10	.3	20
GC035250	1.50	20	N	30	.024	20	--	--	--	20	.4	--
GC269450	2.00	20	--	70	.060	N	--	--	--	30	<.1	--
GC035150	1.50	30	N	50	.016	30	--	--	--	20	.4	--
GC035550	2.00	15	N	20	.090	30	--	--	--	20	<.1	--
GC041650	.50	15	70	30	.040	30	--	--	--	15	.3	--
GC059550	.20	10	N	<5	--	15	--	--	--	5	.4	--
GC041350	.70	10	150	30	.080	30	--	--	--	15	1.3	--
GC041550	.70	15	70	30	.030	20	--	--	--	15	.4	--
GC041450	1.00	15	70	30	.030	30	--	--	--	15	.4	--
GC003050	.70	10	--	15	.052	15	--	--	--	7	.1	--
GC030950	.70	<10	<70	20	--	30	85	<.08	<1	10	.2	31
GC041750	.50	15	70	50	.040	30	--	--	--	15	.7	--
GC061150	<.05	10	N	N	--	<10	--	--	--	5	.3	--
GC184550	.15	10	70	30	.040	30	--	--	--	15	1.1	--
GC061350	.50	10	70	50	--	10	--	--	--	15	.4	--
GC061050	.50	10	100	15	--	20	--	--	--	10	.4	--
GC184050	.15	15	70	15	.024	15	--	--	--	7	.5	--
GC184450	.70	15	70	15	.050	30	--	--	--	7	.4	--
GC061450	.30	10	70	10	--	20	--	--	--	7	.6	--
GC041850	.50	15	70	30	.060	30	--	--	--	15	.3	--
GC006050	1.50	15	N	15	.040	15	--	--	--	10	.9	--
GC062950	--	--	--	--	--	--	--	--	--	--	<.1	--
GC196650	N	20	N	N	.004	N	--	--	--	N	.2	--
GC063050	--	--	--	--	--	--	--	--	--	--	.1	--
GC196750	N	N	N	N	.012	N	--	--	--	N	.1	--
GC196850	N	15	N	N	.002	N	--	--	--	N	.1	--
GC196350	.15	N	N	15	.004	N	--	--	--	15	1.3	--
GC063150	--	--	--	--	--	--	--	--	--	--	<.1	--
GC196550	N	20	N	7	.004	N	--	--	--	N	.2	--
GC196450	.30	N	N	5	.008	N	--	--	--	10	.5	--
GC211050	.07	10	--	20	.006	N	--	--	--	10	.5	--
GC267550	1.00	10	N	70	.030	15	--	--	--	10	.7	--
GC028850	1.00	N	--	5	--	15	70	<.08	<1	5	<.1	28
GC029250	1.00	<10	70	50	--	20	75	<.08	2	10	<.1	29
GC055250	--	N	--	15	.065	15	--	--	--	5	.4	36
GC267450	1.50	10	<70	30	.030	10	--	--	--	7	.4	--
GC054450	--	<10	N	30	.052	15	--	--	--	10	1.9	29
GC055150	--	<10	--	20	.161	70	--	--	--	7	.6	30
GC084150	1.00	10	N	30	--	15	80	<.08	<1	10	<.1	31
GC054750	--	<10	N	30	.052	15	--	--	--	15	.4	29
GC267750	1.00	10	<70	70	.024	15	--	--	--	10	.9	--

Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	Sn ppm	Sr ppm	Ti %	Th ppm	U ppm	V ppm	Y ppm	Yb ppm	Zn %	Zr ppm
GC268950	--	500	.500	--	--	150	50	3.0	50	200
GC269050	--	300	.700	--	--	500	70	7.0	70	150
GC026950	1.79	500	1.000	9.23	3.15	200	30	3.0	89	150
GC269550	--	70	.700	--	--	500	20	3.0	85	150
GC035350	--	500	.700	--	--	150	30	5.0	40	150
GC035650	--	700	.500	--	--	150	30	3.0	70	150
GC060650	--	500	.700	--	--	150	50	3.0	88	200
GC076650	1.44	150	1.000	7.76	3.58	150	20	3.0	77	200
GC076750	.22	70	.500	--	3.01	200	10	2.0	59	100
GC035250	--	500	.700	--	--	150	30	5.0	50	200
GC269450	--	300	.700	--	--	300	30	5.0	65	100
GC035150	--	300	.700	--	--	150	30	5.0	55	150
GC035550	--	700	1.000	--	--	200	30	5.0	75	150
GC041650	--	150	.700	--	--	100	50	7.0	60	200
GC059550	--	30	.300	--	--	20	15	2.0	24	200
GC041350	--	70	.700	--	--	150	100	10.0	130	150
GC041550	--	150	.700	--	--	150	30	3.0	60	150
GC041450	--	150	.700	--	--	150	30	3.0	80	150
GC003050	--	70	.150	--	--	30	15	3.0	42	200
GC030950	1.79	150	.300	12.79	3.10	100	20	3.0	155	200
GC041750	--	150	.700	--	--	100	30	5.0	110	200
GC061150	--	10	.500	--	--	15	20	3.0	31	500
GC184550	--	30	.300	--	--	70	30	3.0	115	200
GC061350	--	150	.700	--	--	100	20	3.0	67	150
GC061050	--	70	.500	--	--	70	30	3.0	113	300
GC184050	--	30	.200	--	--	30	20	3.0	55	200
GC184450	--	30	.300	--	--	50	30	3.0	90	300
GC061450	--	50	.500	--	--	50	30	3.0	80	200
GC041850	--	150	.500	--	--	100	30	5.0	80	150
GC006050	--	150	.300	--	--	70	20	2.0	30	150
GC062950	--	--	--	--	--	--	--	--	--	--
GC196650	--	N	.500	--	--	15	20	3.0	--	500
GC063050	--	--	--	--	--	--	--	--	--	--
GC196750	--	N	.100	--	--	N	N	N	--	150
GC196850	--	N	.200	--	--	N	N	1.0	--	700
GC196350	--	N	.200	--	--	150	N	1.0	25	50
GC063150	--	--	--	--	--	--	--	--	--	--
GC196550	--	N	.300	--	--	15	30	3.0	--	500
GC196450	--	50	.200	--	--	30	20	3.0	--	100
GC211050	--	20	.200	--	--	100	N	1.0	--	100
GC267550	--	200	.300	--	--	100	30	3.0	60	150
GC028850	.34	200	.150	--	1.99	30	10	1.5	31	150
GC029250	1.48	200	.200	8.59	3.13	150	20	3.0	107	200
GC055250	--	150	.200	--	--	50	15	1.5	54	150
GC267450	--	300	.200	--	--	100	20	2.0	60	150
GC054450	--	200	.300	--	--	200	30	3.0	134	100
GC055150	--	150	.300	--	--	70	20	3.0	150	200
GC084150	.62	200	.200	9.86	2.23	150	20	3.0	79	100
GC054750	--	300	.300	--	--	150	20	3.0	100	100
GC267750	--	200	.300	--	--	150	30	5.0	75	200

Appendix E

Analytical Laboratory Reports

Background Samples (B-1 through B-10)

GEOCHEMICAL TESTING
Environmental and Energy Analysis

2005 N. Center Ave.
Somerset, PA 15501

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

Friday, December 28, 2018

John Shimshock
GENON - CONEMAUGH STATION CCR
CONEMAUGH STATION
PO BOX K
NEW FLORENCE, PA 15944

RE: Conemaugh CCR IV Background Order No.: G1811861

Dear John Shimshock:

Geochemical Testing received 10 sample(s) on 11/14/2018 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

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306PA DEP

CLIENT: GENON - CONEMAUGH STATION CCR
Project: Conemaugh CCR IV Background
Lab Order: G1811861

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

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

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *28-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	B-1 0-4
Lab Order:	G1811861		
Project:	Conemaugh CCR IV Background	**Sampled By:**	APTIM
Lab ID:	G1811861-001	**Collection Date:**	11/13/2018 11:20:00 A
Matrix:	SOLID	**Received Date:**	11/14/2018 8:54:37 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.71+/-0.0401	0.077		pCi/g	1		12/06/18 7:05 PM
Radium-228	0.87+/-0.0742	0.092		pCi/g	1		12/06/18 7:05 PM

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 6:42 PM
Arsenic	15.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:30 PM
Barium	127	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:30 PM
Beryllium	1.11	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:30 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:30 PM
Chromium	41.5	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:30 PM
Cobalt	17.6	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:30 PM
Lead	23.2	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:30 PM
Lithium	15.9	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:30 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:30 PM
Selenium	2.3	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:30 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:30 PM

TOTAL METALS		Analyst: **RLL**				**EPA 7473**
Mercury	0.038	0.010		mg/Kg-dry	1	11/20/18 2:36 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *28-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	B-2 0-4
Lab Order:	G1811861		
Project:	Conemaugh CCR IV Background	**Sampled By:**	APTIM
Lab ID:	G1811861-002	**Collection Date:**	11/13/2018 11:25:00 A
Matrix:	SOLID	**Received Date:**	11/14/2018 8:54:37 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.55+/-0.0321	0.070		pCi/g	1		12/07/18 9:15 PM
Radium-228	0.70+/-0.0678	0.073		pCi/g	1		12/07/18 9:15 PM

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 7:05 PM
Arsenic	11.2	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:34 PM
Barium	123	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:34 PM
Beryllium	1.05	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:34 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:34 PM
Chromium	41.1	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:34 PM
Cobalt	15.7	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:34 PM
Lead	22.1	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:34 PM
Lithium	12.6	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:34 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:34 PM
Selenium	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:34 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:34 PM

TOTAL METALS		Analyst: **RLL**				**EPA 7473**
Mercury	0.057	0.010		mg/Kg-dry	1	11/20/18 2:36 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *28-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	B-3 0-4
Lab Order:	G1811861		
Project:	Conemaugh CCR IV Background	**Sampled By:**	APTIM
Lab ID:	G1811861-003	**Collection Date:**	11/13/2018 11:30:00 A
Matrix:	SOLID	**Received Date:**	11/14/2018 8:54:37 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.58+/-0.0342	0.072		pCi/g	1		12/08/18 11:15 PM
Radium-228	0.71+/-0.0637	0.086		pCi/g	1		12/08/18 11:15 PM

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 7:09 PM
Arsenic	14.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:39 PM
Barium	87.8	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:39 PM
Beryllium	0.74	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:39 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:39 PM
Chromium	69.4	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:39 PM
Cobalt	9.2	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:39 PM
Lead	18.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:39 PM
Lithium	12.8	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:39 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:39 PM
Selenium	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:39 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:39 PM

TOTAL METALS		Analyst: **RLL**				**EPA 7473**
Mercury	0.054	0.010		mg/Kg-dry	1	11/20/18 2:36 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *28-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	B-4 0-4
Lab Order:	G1811861		
Project:	Conemaugh CCR IV Background	**Sampled By:**	APTIM
Lab ID:	G1811861-004	**Collection Date:**	11/13/2018 11:35:00 A
Matrix:	SOLID	**Received Date:**	11/14/2018 8:54:37 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.58+/-0.0329	0.066		pCi/g	1		12/10/18 12:06 AM
Radium-228	0.81+/-0.0687	0.091		pCi/g	1		12/10/18 12:06 AM

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 7:14 PM
Arsenic	12.1	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:44 PM
Barium	179	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:44 PM
Beryllium	1.12	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:44 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:44 PM
Chromium	42.6	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:44 PM
Cobalt	21.2	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:44 PM
Lead	24.8	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:44 PM
Lithium	16.3	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:44 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:44 PM
Selenium	2.2	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:44 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:44 PM

TOTAL METALS		Analyst: **RLL**				**EPA 7473**
Mercury	0.030	0.010		mg/Kg-dry	1	11/20/18 2:36 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *28-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	B-5 0-4
Lab Order:	G1811861		
Project:	Conemaugh CCR IV Background	**Sampled By:**	APTIM
Lab ID:	G1811861-005	**Collection Date:**	11/13/2018 11:40:00 A
Matrix:	SOLID	**Received Date:**	11/14/2018 8:54:37 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.56+/-0.0319	0.065		pCi/g	1		12/10/18 7:11 PM
Radium-228	0.74+/-0.0614	0.071		pCi/g	1		12/10/18 7:11 PM

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:32 AM
Arsenic	14.6	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:32 AM
Barium	166	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:32 AM
Beryllium	1.23	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:32 AM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:32 AM
Chromium	43.6	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:32 AM
Cobalt	20.4	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:32 AM
Lead	26.4	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:32 AM
Lithium	14.7	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:32 AM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:32 AM
Selenium	2.7	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:32 AM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:32 AM

TOTAL METALS		Analyst: **RLL**				**EPA 7473**
Mercury	0.039	0.010		mg/Kg-dry	1	11/20/18 2:36 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *28-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	B-6 0-4
Lab Order:	G1811861		
Project:	Conemaugh CCR IV Background	**Sampled By:**	APTIM
Lab ID:	G1811861-006	**Collection Date:**	11/13/2018 11:45:00 A
Matrix:	SOLID	**Received Date:**	11/14/2018 8:54:37 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.6+/-0.0344	0.070		pCi/g	1		12/11/18 7:23 AM
Radium-228	0.74+/-0.0634	0.081		pCi/g	1		12/11/18 7:23 AM

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:51 AM
Arsenic	16.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:51 AM
Barium	187	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:51 AM
Beryllium	1.30	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:51 AM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:51 AM
Chromium	56.5	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:51 AM
Cobalt	20.1	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:51 AM
Lead	26.6	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:51 AM
Lithium	17.8	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:51 AM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:51 AM
Selenium	2.8	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:51 AM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:51 AM

TOTAL METALS		Analyst: **RLL**				**EPA 7473**
Mercury	0.055	0.010		mg/Kg-dry	1	11/20/18 2:36 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *28-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	B-7 0-4
Lab Order:	G1811861		
Project:	Conemaugh CCR IV Background	**Sampled By:**	APTIM
Lab ID:	G1811861-007	**Collection Date:**	11/13/2018 11:50:00 A
Matrix:	SOLID	**Received Date:**	11/14/2018 8:54:37 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.62+/-0.0342	0.067		pCi/g	1		12/11/18 7:52 PM
Radium-228	0.79+/-0.0671	0.088		pCi/g	1		12/11/18 7:52 PM

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:55 AM
Arsenic	17.2	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:55 AM
Barium	161	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:55 AM
Beryllium	1.23	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:55 AM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:55 AM
Chromium	42.6	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:55 AM
Cobalt	16.1	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:55 AM
Lead	27.3	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:55 AM
Lithium	16.4	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:55 AM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:55 AM
Selenium	2.6	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:55 AM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 11:55 AM

TOTAL METALS		Analyst: **RLL**				**EPA 7473**
Mercury	0.037	0.010		mg/Kg-dry	1	11/20/18 2:36 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *28-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	B-8 0-4
Lab Order:	G1811861		
Project:	Conemaugh CCR IV Background	**Sampled By:**	APTIM
Lab ID:	G1811861-008	**Collection Date:**	11/13/2018 11:55:00 A
Matrix:	SOLID	**Received Date:**	11/14/2018 8:54:37 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.6+/-0.0341	0.068		pCi/g	1		12/12/18 7:58 AM
Radium-228	0.65+/-0.0669	0.079		pCi/g	1		12/12/18 7:58 AM

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 12:00 PM
Arsenic	14.8	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 12:00 PM
Barium	160	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 12:00 PM
Beryllium	1.29	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 12:00 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 12:00 PM
Chromium	53.7	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 12:00 PM
Cobalt	19.6	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 12:00 PM
Lead	25.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 12:00 PM
Lithium	15.9	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 12:00 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 12:00 PM
Selenium	2.4	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 12:00 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 12:00 PM

TOTAL METALS		Analyst: **RLL**				**EPA 7473**
Mercury	0.041	0.010		mg/Kg-dry	1	11/20/18 2:36 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *28-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	B-9 0-4
Lab Order:	G1811861		
Project:	Conemaugh CCR IV Background	**Sampled By:**	APTIM
Lab ID:	G1811861-009	**Collection Date:**	11/13/2018 12:00:00 P
Matrix:	SOLID	**Received Date:**	11/14/2018 8:54:37 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.62+/-0.0345	0.071		pCi/g	1		12/12/18 8:31 PM
Radium-228	0.79+/-0.0672	0.086		pCi/g	1		12/12/18 8:31 PM

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:37 PM
Arsenic	16.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:37 PM
Barium	186	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:37 PM
Beryllium	1.31	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:37 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:37 PM
Chromium	54.6	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:37 PM
Cobalt	20.3	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:37 PM
Lead	27.9	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:37 PM
Lithium	13.2	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:37 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:37 PM
Selenium	2.7	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:37 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:37 PM

TOTAL METALS		Analyst: **RLL**				**EPA 7473**
Mercury	0.037	0.010		mg/Kg-dry	1	11/20/18 2:36 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *28-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	B-10 0-4
Lab Order:	G1811861		
Project:	Conemaugh CCR IV Background	**Sampled By:**	APTIM
Lab ID:	G1811861-010	**Collection Date:**	11/13/2018 12:05:00 P
Matrix:	SOLID	**Received Date:**	11/14/2018 8:54:37 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.57+/-0.0313	0.062		pCi/g	1		12/13/18 10:19 AM
Radium-228	0.69+/-0.0593	0.068		pCi/g	1		12/13/18 10:19 AM

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:42 PM
Arsenic	13.1	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:42 PM
Barium	153	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:42 PM
Beryllium	1.18	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:42 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:42 PM
Chromium	64.5	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:42 PM
Cobalt	18.2	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:42 PM
Lead	24.9	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:42 PM
Lithium	13.4	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:42 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:42 PM
Selenium	2.1	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:42 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:42 PM

TOTAL METALS		Analyst: **RLL**				**EPA 7473**
Mercury	0.033	0.010		mg/Kg-dry	1	11/20/18 2:36 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 12.16

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: GENON	**Contact (Company):** APTIM	**Phone:** (412) 380-4272
Address: CONEMAUGH	e-mail: patricia.andrison@aptim.com	Fax: ( )
City: NEW FLORENCE **State:** PA **Zip:** 15944	**Sampled by:** PATTI ANDRISON AND	**State Sampled:** PA
WO#: 6181861	Project: EVAN SCHLEGEL	PO/Quote#:

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other		

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
***NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG*								
B-1 0-4	001	SO	11/13/18	1120	G	SEE BOTTLES	Field Filtered: Y / N	1
B-1 4-8	—	SO	11/13/18	1122	G		Field Filtered: Y / N	1
B-2 0-4	002	SO	11/13/18	1125	G		Field Filtered: Y / N	1
B-2 4-8	—	SO	11/13/18	1127	G		Field Filtered: Y / N	1
B-3 0-4	003	SO	11/13/18	1130	G		Field Filtered: Y / N	1
B-3 4-8	—	SO	11/13/18	1132	G		Field Filtered: Y / N	1
B-4 0-4	004	SO	11/13/18	1135	G		Field Filtered: Y / N	1
B-4 4-8	—	SO	11/13/18	1137	G		Field Filtered: Y / N	1

Note Deficiencies Here:

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
APTIM Patricia M Andrison	11/13/18	1615	[signature]	11-14-18	2054

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: X Yes or ___ No | Cooler Temp (°C) on receipt: 5

Sample Receiving (1st Review): JS | Client Support (2nd Review): ___

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 12 16

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: GENON	**Contact (Company):** APTIM	**Phone:** (412) 380-4272
Address: CONEMAUGH	e-mail:	Fax: ( )
City: NEW FLORENCE **State:** PA **Zip:** 15944	**Sampled by:** PATTI ANDERSON AND	**State Sampled:** PA
WO#: 61811861	Project: EVAN SCHLEGEL	PO/Quote#:

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other		

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
**NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG								
B-5 0-4	005	SO	11/13/18	1140	G	SEE BOTTLES	Field Filtered: Y / N	1
B-5 4-8	—	SO	11/13/18	1142	G		Field Filtered: Y / N	1
B-6 0-4	006	SO	11/13/18	1145	G		Field Filtered: Y / N	1
B-6 4-8	—	SO	11/13/18	1147	G		Field Filtered: Y / N	1
B-7 0-4	~~006~~ 007	SO	11/13/18	1150	G		Field Filtered: Y / N	1
B-7 4-8	—	SO	11/13/18	1152	G		Field Filtered: Y / N	1
B-8 0-4	008	SO	11/13/18	1155	G		Field Filtered: Y / N	1
B-8 4-8	—	SO	11/13/18	1157	G		Field Filtered: Y / N	1

Note Deficiencies Here:

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
APTIM Patricia M Anderson	11/13/18	1615	[illegible]	11-13-18	1054

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ✓ Yes or ___ No | Cooler Temp (°C) on receipt: 5

Sample Receiving (1st Review): JS | Client Support (2nd Review): ___

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 12.16

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: GENON	**Contact (Company):** APTIM	**Phone:** (412) 380-4272
Address: CONEMAUGH	e-mail:	Fax: ( )
City: NEW FLORENCE **State:** PA **Zip:** 15944	**Sampled by:** Patti Andrison and	**State Sampled:** PA
WO#: 61811861	Project: Evan Schlegel	PO/Quote#:

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other		

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
**NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG								
B-9 0-4	009	SO	11/13/18	1200	G	SEE BOTTLES	Field Filtered: Y / N	1
B-9 4-8	—	SO	11/13/18	1202	G		Field Filtered: Y / N	1
B-10 0-4	010	SO	11/13/18	1205	G		Field Filtered: Y / N	1
B-10 4-8	—	SO	11/13/18	1207	G		Field Filtered: Y / N	1
UD-1 0-4	—	SO	11/13/18	1330	G		Field Filtered: Y / N	3
UD-1 4-8	—	SO	11/13/18	1335	G		Field Filtered: Y / N	3
UD-2 0-4	—	SO	11/13/18	1345	G		Field Filtered: Y / N	3
UD-2 4-8	—	SO	11/13/18	1350	G		Field Filtered: Y / N	3

Note Deficiencies Here:

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
APTIM Patricia M Andrison	11/13/18	1615	[illegible]	11-14-18	0054

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: X Yes or ___ No | Cooler Temp (°C) on receipt: 5

Sample Receiving (1st Review): JJ | Client Support (2nd Review): ___

Confirmation Soil and Leachate Samples
(UD-1 through UD-8 and LD-1 through LD-8)

GEOCHEMICAL TESTING
Environmental and Energy Analysis

2005 N. Center Ave.
Somerset, PA 15501

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

Friday, December 21, 2018

John Shimshock
GENON - CONEMAUGH STATION CCR
CONEMAUGH STATION
PO BOX K
NEW FLORENCE, PA 15944

RE: Conemaugh CCR IV SPLP Order No.: G1811860

Dear John Shimshock:

Geochemical Testing received 6 sample(s) on 11/14/2018 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

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306PA DEP

CLIENT: GENON - CONEMAUGH STATION CCR
Project: Conemaugh CCR IV SPLP
Lab Order: G1811860

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

The radiological analysis (Radium 226 by EPA 903.1; Radium 228 by EPA 904.0) was subcontracted to Pace Analytical (PADEP 65-00282). A copy of the subcontractor's laboratory report is enclosed with this Analytical Report.

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

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-1 0-4
Lab Order:	G1811860		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811860-001	**Collection Date:**	11/13/2018 1:30:00 PM
Matrix:	SOLID	**Received Date:**	11/14/2018 7:39:08 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.20	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.47	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 12:09 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0	S	mg/Kg-dry	1	11/20/18 1:30 PM	11/26/18 11:24 AM
Arsenic	25.2	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:39 PM
Barium	113	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:39 PM
Beryllium	1.01	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:39 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:39 PM
Chromium	24.8	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:39 PM
Cobalt	17.7	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:39 PM
Lead	20.4	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:39 PM
Lithium	11.5	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:39 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:39 PM
Selenium	2.3	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:39 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:39 PM

NOTES:
S - Spike recovery indicates a possible matrix effect. The method is in control as indicated by the LCS.

SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 9:20 AM	11/19/18 1:49 PM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:46 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:46 PM
Barium	0.093	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 1:46 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:46 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:46 PM
Chromium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:46 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:46 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:46 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:46 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:46 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:46 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:46 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.70+/-0.0756	0.073		pCi/g	1		11/15/18 6:45 PM
Radium-228	0.71+/-0.0647	0.097		pCi/g	1		11/15/18 6:45 PM

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Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-1 0-4
Lab Order:	G1811860		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811860-001	**Collection Date:**	11/13/2018 1:30:00 PM
Matrix:	SOLID	**Received Date:**	11/14/2018 7:39:08 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:
QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.366+-0.382	0.5		pCi/L	1		12/06/18 10:42 AM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	-0.149+-0.331	0.8		pCi/L	1		12/05/18 12:09 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	6.56			S.U.	1		11/15/18 8:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	8.01			S.U.	1		11/15/18 9:16 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-2 0-4
Lab Order:	G1811860		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811860-002	**Collection Date:**	11/13/2018 1:45:00 PM
Matrix:	SOLID	**Received Date:**	11/14/2018 7:39:08 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.072	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.20	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 1:03 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 6:19 PM
Arsenic	14.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:48 PM
Barium	123	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:48 PM
Beryllium	1.07	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:48 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:48 PM
Chromium	33.1	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:48 PM
Cobalt	16.7	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:48 PM
Lead	22.1	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:48 PM
Lithium	16.6	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:48 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:48 PM
Selenium	2.3	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:48 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:48 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 9:20 AM	11/19/18 1:51 PM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:51 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:51 PM
Barium	0.074	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 1:51 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:51 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:51 PM
Chromium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:51 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:51 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:51 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:51 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:51 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:51 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:51 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.71+/-0.0788	0.074		pCi/g	1		11/16/18 6:52 AM
Radium-228	0.92+/-0.0751	0.088		pCi/g	1		11/16/18 6:52 AM

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Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-2 0-4
Lab Order:	G1811860		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811860-002	**Collection Date:**	11/13/2018 1:45:00 PM
Matrix:	SOLID	**Received Date:**	11/14/2018 7:39:08 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.503+-0.523	0.8		pCi/L	1		12/14/18 10:03 PM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	0.244+-0.301	0.6		pCi/L	1		12/14/18 2:12 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	4.87			S.U.	1		11/15/18 8:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	7.03			S.U.	1		11/15/18 9:16 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-3 0-4
Lab Order:	G1811860		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811860-003	**Collection Date:**	11/13/2018 2:05:00 PM
Matrix:	SOLID	**Received Date:**	11/14/2018 7:39:08 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.037	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.26	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 1:21 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 6:24 PM
Arsenic	11.3	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:53 PM
Barium	107	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:53 PM
Beryllium	0.94	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:53 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:53 PM
Chromium	24.5	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:53 PM
Cobalt	12.7	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:53 PM
Lead	18.9	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:53 PM
Lithium	11.8	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:53 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:53 PM
Selenium	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:53 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 5:53 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 9:55 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:55 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:55 PM
Barium	0.059	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 1:55 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:55 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:55 PM
Chromium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:55 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:55 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:55 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:55 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:55 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:55 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 1:55 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.99+/-0.0504	0.054		pCi/g	1		11/16/18 7:57 PM
Radium-228	1.34+/-0.0862	0.045		pCi/g	1		11/16/18 7:57 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-3 0-4
Lab Order:	G1811860		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811860-003	**Collection Date:**	11/13/2018 2:05:00 PM
Matrix:	SOLID	**Received Date:**	11/14/2018 7:39:08 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.394+-0.410	0.6		pCi/L	1		12/06/18 10:42 AM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	0.280+-0.460	1.0		pCi/L	1		12/05/18 12:09 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	7.66			S.U.	1		11/15/18 8:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	8.42			S.U.	1		11/15/18 9:16 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-4 0-4
Lab Order:	G1811860		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811860-004	**Collection Date:**	11/13/2018 2:20:00 PM
Matrix:	SOLID	**Received Date:**	11/14/2018 7:39:08 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.099	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.16	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 1:39 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 6:28 PM
Arsenic	16.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:16 PM
Barium	136	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:16 PM
Beryllium	1.02	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:16 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:16 PM
Chromium	30.5	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:16 PM
Cobalt	15.4	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:16 PM
Lead	19.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:16 PM
Lithium	19.3	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:16 PM
Molybdenum	2.1	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:16 PM
Selenium	2.2	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:16 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:16 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 10:01 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:18 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:18 PM
Barium	0.060	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 2:18 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:18 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:18 PM
Chromium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:18 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:18 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:18 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:18 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:18 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:18 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:18 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.82+/-0.0442	0.074		pCi/g	1		11/16/18 7:59 PM
Radium-228	0.83+/-0.0696	0.089		pCi/g	1		11/16/18 7:59 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-4 0-4
Lab Order:	G1811860		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811860-004	**Collection Date:**	11/13/2018 2:20:00 PM
Matrix:	SOLID	**Received Date:**	11/14/2018 7:39:08 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.148+-0.409	0.8		pCi/L	1		12/14/18 10:03 PM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	-0.0576+-0.299	0.7		pCi/L	1		12/14/18 2:12 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	3.97			S.U.	1		11/15/18 8:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	6.64			S.U.	1		11/15/18 9:16 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-5 0-4
Lab Order:	G1811860		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811860-005	**Collection Date:**	11/13/2018 3:00:00 PM
Matrix:	SOLID	**Received Date:**	11/14/2018 7:39:08 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.045	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.44	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 1:57 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 6:33 PM
Arsenic	5.8	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:20 PM
Barium	50.7	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:20 PM
Beryllium	0.31	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:20 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:20 PM
Chromium	9.2	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:20 PM
Cobalt	6.4	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:20 PM
Lead	9.7	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:20 PM
Lithium	3.5	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:20 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:20 PM
Selenium	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:20 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:20 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 10:02 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:23 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:23 PM
Barium	0.080	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 2:23 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:23 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:23 PM
Chromium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:23 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:23 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:23 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:23 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:23 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:23 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:23 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.35+/-0.0283	0.065		pCi/g	1		11/19/18 6:56 PM
Radium-228	0.25+/-0.0473	0.078		pCi/g	1		11/19/18 6:56 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-5 0-4
Lab Order:	G1811860		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811860-005	**Collection Date:**	11/13/2018 3:00:00 PM
Matrix:	SOLID	**Received Date:**	11/14/2018 7:39:08 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:
QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.564+-0.527	0.7		pCi/L	1		12/06/18 10:42 AM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	0.502+-0.418	0.8		pCi/L	1		12/05/18 12:09 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	6.13			S.U.	1		11/15/18 8:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	8.75			S.U.	1		11/15/18 9:16 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-6 0-4
Lab Order:	G1811860		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811860-006	**Collection Date:**	11/13/2018 3:10:00 PM
Matrix:	SOLID	**Received Date:**	11/14/2018 7:39:08 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.054	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.18	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 2:15 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 6:37 PM
Arsenic	15.9	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:25 PM
Barium	118	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:25 PM
Beryllium	1.10	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:25 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:25 PM
Chromium	27.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:25 PM
Cobalt	22.0	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:25 PM
Lead	20.8	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:25 PM
Lithium	13.2	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:25 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:25 PM
Selenium	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:25 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/21/18 6:25 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 10:04 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:28 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:28 PM
Barium	0.073	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 2:28 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:28 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:28 PM
Chromium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:28 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:28 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:28 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:28 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:28 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:28 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:28 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.58+/-0.0361	0.079		pCi/g	1		11/20/18 7:31 PM
Radium-228	0.59+/-0.0562	0.077		pCi/g	1		11/20/18 7:31 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-6 0-4
Lab Order:	G1811860		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811860-006	**Collection Date:**	11/13/2018 3:10:00 PM
Matrix:	SOLID	**Received Date:**	11/14/2018 7:39:08 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.737+-0.668	1.0		pCi/L	1		12/10/18 1:33 PM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	0.320+-0.300	0.6		pCi/L	1		12/10/18 1:12 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	4.11			S.U.	1		11/15/18 8:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	7.16			S.U.	1		11/15/18 9:16 AM

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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, December 12, 2018

John Shimshock
GENON - CONEMAUGH STATION CCR
CONEMAUGH STATION
PO BOX K
NEW FLORENCE, PA 15944

RE: Conemaugh CCR IV SPLP Order No.: G1811867

Dear John Shimshock:

Geochemical Testing received 4 sample(s) on 11/15/2018 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

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I.D. 56-00306PA DEP

CLIENT: GENON - CONEMAUGH STATION CCR
Project: Conemaugh CCR IV SPLP
Lab Order: G1811867

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

The radiological analysis (Radium 226 by EPA 903.1; Radium 228 by EPA 904.0) was subcontracted to Pace Analytical (PADEP 65-00282). A copy of the subcontractor's laboratory report is enclosed with this Analytical Report.

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

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-7 0-4
Lab Order:	G1811867		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811867-001	**Collection Date:**	11/14/2018 9:30:00 AM
Matrix:	SOLID	**Received Date:**	11/15/2018 6:32:36 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.26	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.51	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 2:33 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:46 PM
Arsenic	27.2	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:46 PM
Barium	149	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:46 PM
Beryllium	1.24	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:46 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:46 PM
Chromium	31.5	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:46 PM
Cobalt	14.8	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:46 PM
Lead	22.1	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:46 PM
Lithium	17.2	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:46 PM
Molybdenum	1.2	2.0	J	mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:46 PM
Selenium	2.2	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:46 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:46 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 10:06 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:32 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:32 PM
Barium	0.070	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 2:32 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:32 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:32 PM
Chromium	0.0050	0.0050	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:32 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:32 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:32 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:32 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:32 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:32 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:32 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.71+/-0.0380	0.073		pCi/g	1		11/21/18 7:47 AM
Radium-228	0.90+/-0.0735	0.086		pCi/g	1		11/21/18 7:47 AM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-7 0-4
Lab Order:	G1811867		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811867-001	**Collection Date:**	11/14/2018 9:30:00 AM
Matrix:	SOLID	**Received Date:**	11/15/2018 6:32:36 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:
QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.132+-0.301	0.2		pCi/L	1		12/06/18 9:43 PM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	0.844+-0.439	0.8		pCi/L	1		12/05/18 12:09 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	4.68			S.U.	1		11/15/18 8:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	8.29			S.U.	1		11/15/18 9:16 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-8 0-4
Lab Order:	G1811867		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811867-003	**Collection Date:**	11/14/2018 9:50:00 AM
Matrix:	SOLID	**Received Date:**	11/15/2018 6:32:36 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.040	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.18	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 2:51 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:51 PM
Arsenic	14.6	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:51 PM
Barium	135	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:51 PM
Beryllium	1.12	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:51 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:51 PM
Chromium	31.8	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:51 PM
Cobalt	17.5	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:51 PM
Lead	23.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:51 PM
Lithium	17.7	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:51 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:51 PM
Selenium	2.4	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:51 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:51 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 10:26 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:46 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:46 PM
Barium	0.080	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 2:46 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:46 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:46 PM
Chromium	0.0050	0.0050	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:46 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:46 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:46 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:46 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:46 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:46 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 2:46 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.71+/-0.0385	0.074		pCi/g	1		11/21/18 8:20 PM
Radium-228	0.89+/-0.0732	0.083		pCi/g	1		11/21/18 8:20 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	UD-8 0-4
Lab Order:	G1811867		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811867-003	**Collection Date:**	11/14/2018 9:50:00 AM
Matrix:	SOLID	**Received Date:**	11/15/2018 6:32:36 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.0821+-0.581	1.2		pCi/L	1		12/07/18 12:08 PM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	-0.217+-0.347	0.9		pCi/L	1		12/05/18 3:36 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	6.05			S.U.	1		11/15/18 8:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	7.53			S.U.	1		11/15/18 9:16 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-1 0-4
Lab Order:	G1811867		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811867-005	**Collection Date:**	11/14/2018 10:05:00 A
Matrix:	SOLID	**Received Date:**	11/15/2018 6:32:36 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.042	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.08	0.05	J	mg/L	1	11/16/18 11:45 AM	11/16/18 3:08 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:55 PM
Arsenic	24.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:55 PM
Barium	161	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:55 PM
Beryllium	1.20	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:55 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:55 PM
Chromium	31.7	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:55 PM
Cobalt	16.9	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:55 PM
Lead	28.9	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:55 PM
Lithium	16.2	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:55 PM
Molybdenum	1.2	2.0	J	mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:55 PM
Selenium	2.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:55 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 1:55 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 10:49 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:10 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:10 PM
Barium	0.066	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 5:10 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:10 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:10 PM
Chromium	0.0050	0.0050	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:10 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:10 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:10 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:10 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:10 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:10 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:10 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	1.11+/-0.0567	0.052		pCi/g	1		11/21/18 8:20 PM
Radium-228	1.39+/-0.0877	0.038		pCi/g	1		11/21/18 8:20 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-1 0-4
Lab Order:	G1811867		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811867-005	**Collection Date:**	11/14/2018 10:05:00 A
Matrix:	SOLID	**Received Date:**	11/15/2018 6:32:36 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.349+-0.364	0.5		pCi/L	1		12/06/18 10:00 PM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	0.487+-0.402	0.8		pCi/L	1		12/05/18 12:09 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	4.54			S.U.	1		11/17/18 1:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	7.52			S.U.	1		11/15/18 9:16 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-2 0-4
Lab Order:	G1811867		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811867-007	**Collection Date:**	11/14/2018 10:55:00 A
Matrix:	SOLID	**Received Date:**	11/15/2018 6:32:36 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.032	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.39	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 3:26 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:00 PM
Arsenic	11.9	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:00 PM
Barium	143	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:00 PM
Beryllium	1.14	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:00 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:00 PM
Chromium	31.4	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:00 PM
Cobalt	17.2	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:00 PM
Lead	23.8	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:00 PM
Lithium	15.8	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:00 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:00 PM
Selenium	2.2	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:00 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:00 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:17 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 6:52 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 6:52 PM
Barium	0.069	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 6:52 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 6:52 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 6:52 PM
Chromium	0.0050	0.0050	U	mg/L	1	11/19/18 11:25 AM	11/20/18 6:52 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 6:52 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 6:52 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 6:52 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 6:52 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 6:52 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 6:52 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.64+/-0.0354	0.069		pCi/g	1		11/22/18 9:01 AM
Radium-228	0.83+/-0.0693	0.088		pCi/g	1		11/22/18 9:01 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-2 0-4
Lab Order:	G1811867		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811867-007	**Collection Date:**	11/14/2018 10:55:00 A
Matrix:	SOLID	**Received Date:**	11/15/2018 6:32:36 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:
QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.477+-0.498	0.7		pCi/L	1		12/07/18 12:08 PM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	0.301+-0.570	1.2		pCi/L	1		12/05/18 3:36 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	3.67			S.U.	1		11/18/18 11:00 AM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	10.7			S.U.	1		11/15/18 9:16 AM

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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, December 12, 2018

John Shimshock
GENON - CONEMAUGH STATION CCR
CONEMAUGH STATION
PO BOX K
NEW FLORENCE, PA 15944

RE: Conemaugh CCR IV SPLP Order No.: G1811869

Dear John Shimshock:

Geochemical Testing received 4 sample(s) on 11/15/2018 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

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I.D. 56-00306PA DEP

CLIENT: GENON - CONEMAUGH STATION CCR
Project: Conemaugh CCR IV SPLP
Lab Order: G1811869

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

The radiological analysis (Radium 226 by EPA 903.1; Radium 228 by EPA 904.0) was subcontracted to Pace Analytical (PADEP 65-00282). A copy of the subcontractor's laboratory report is enclosed with this Analytical Report.

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

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-3 0-4
Lab Order:	G1811869		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811869-001	**Collection Date:**	11/14/2018 11:15:00 A
Matrix:	SOLID	**Received Date:**	11/15/2018 6:58:38 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.040	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.09	0.05	J	mg/L	1	11/16/18 11:45 AM	11/16/18 4:20 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:09 PM
Arsenic	17.8	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:09 PM
Barium	147	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:09 PM
Beryllium	1.19	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:09 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:09 PM
Chromium	32.6	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:09 PM
Cobalt	17.8	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:09 PM
Lead	24.1	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:09 PM
Lithium	17.4	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:09 PM
Molybdenum	1.0	2.0	J	mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:09 PM
Selenium	2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:09 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:09 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:16 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:33 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:33 PM
Barium	0.062	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 5:33 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:33 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:33 PM
Chromium	0.0050	0.0050	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:33 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:33 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:33 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:33 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:33 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:33 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:33 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.97+/-0.0496	0.054		pCi/g	1		11/22/18 11:36 PM
Radium-228	1.3+/-0.0828	0.036		pCi/g	1		11/22/18 11:36 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-3 0-4
Lab Order:	G1811869		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811869-001	**Collection Date:**	11/14/2018 11:15:00 A
Matrix:	SOLID	**Received Date:**	11/15/2018 6:58:38 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.155+-0.353	0.2		pCi/L	1		12/06/18 10:00 PM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	0.360+-0.353	0.7		pCi/L	1		12/05/18 12:09 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	3.71			S.U.	1		11/17/18 1:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	6.46			S.U.	1		11/15/18 9:16 AM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-4 0-4
Lab Order:	G1811869		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811869-003	**Collection Date:**	11/14/2018 11:40:00 A
Matrix:	SOLID	**Received Date:**	11/15/2018 6:58:38 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.038	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.14	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 5:14 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:33 PM
Arsenic	17.6	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:33 PM
Barium	148	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:33 PM
Beryllium	1.39	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:33 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:33 PM
Chromium	43.5	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:33 PM
Cobalt	21.6	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:33 PM
Lead	29.1	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:33 PM
Lithium	19.5	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:33 PM
Molybdenum	1.2	2.0	J	mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:33 PM
Selenium	2.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:33 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 2:33 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:25 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:37 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:37 PM
Barium	0.074	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 5:37 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:37 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:37 PM
Chromium	0.0050	0.0050	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:37 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:37 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:37 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:37 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:37 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:37 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:37 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.73+/-0.0407	0.070		pCi/g	1		11/22/18 11:37 PM
Radium-228	0.87+/-0.0732	0.094		pCi/g	1		11/22/18 11:37 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-4 0-4
Lab Order:	G1811869		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811869-003	**Collection Date:**	11/14/2018 11:40:00 A
Matrix:	SOLID	**Received Date:**	11/15/2018 6:58:38 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	-0.227+-0.394	1.0		pCi/L	1		12/07/18 12:08 PM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	-0.074+-0.479	1.0		pCi/L	1		12/05/18 3:36 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	3.81			S.U.	1		11/17/18 1:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	6.61			S.U.	1		11/15/18 9:16 AM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-5 0-4
Lab Order:	G1811869		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811869-005	**Collection Date:**	11/14/2018 11:55:00 A
Matrix:	SOLID	**Received Date:**	11/15/2018 6:58:38 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.057	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.05	0.05	U	mg/L	1	11/16/18 11:45 AM	11/16/18 5:32 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:10 PM
Arsenic	20.8	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:10 PM
Barium	141	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:10 PM
Beryllium	1.17	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:10 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:10 PM
Chromium	27.7	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:10 PM
Cobalt	17.9	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:10 PM
Lead	27.8	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:10 PM
Lithium	16.0	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:10 PM
Molybdenum	1.8	2.0	J	mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:10 PM
Selenium	2.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:10 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:10 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:26 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:42 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:42 PM
Barium	0.086	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 5:42 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:42 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:42 PM
Chromium	0.0050	0.0050	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:42 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:42 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:42 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:42 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:42 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:42 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:42 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.74+/-0.0398	0.071		pCi/g	1		11/23/18 7:41 PM
Radium-228	0.81+/-0.0682	0.088		pCi/g	1		11/23/18 7:41 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-5 0-4
Lab Order:	G1811869		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811869-005	**Collection Date:**	11/14/2018 11:55:00 A
Matrix:	SOLID	**Received Date:**	11/15/2018 6:58:38 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.379+-0.577	1.0		pCi/L	1		12/06/18 10:00 PM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	0.528+-0.438	0.9		pCi/L	1		12/05/18 12:10 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	3.83			S.U.	1		11/17/18 1:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	6.33			S.U.	1		11/15/18 9:16 AM

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-6 0-4
Lab Order:	G1811869		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811869-007	**Collection Date:**	11/14/2018 12:10:00 P
Matrix:	SOLID	**Received Date:**	11/15/2018 6:58:38 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.052	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.09	0.05	J	mg/L	1	11/16/18 11:45 AM	11/16/18 5:50 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:15 PM
Arsenic	18.5	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:15 PM
Barium	149	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:15 PM
Beryllium	1.25	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:15 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:15 PM
Chromium	29.2	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:15 PM
Cobalt	18.6	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:15 PM
Lead	26.8	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:15 PM
Lithium	15.6	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:15 PM
Molybdenum	1.4	2.0	J	mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:15 PM
Selenium	2.2	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:15 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:15 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:28 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:46 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:46 PM
Barium	0.086	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 5:46 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:46 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:46 PM
Chromium	0.0050	0.0050	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:46 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:46 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:46 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:46 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:46 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:46 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:46 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	1.14+/-0.0570	0.054		pCi/g	1		11/23/18 7:43 PM
Radium-228	1.42+/-0.0895	0.035		pCi/g	1		11/23/18 7:43 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-6 0-4
Lab Order:	G1811869		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811869-007	**Collection Date:**	11/14/2018 12:10:00 P
Matrix:	SOLID	**Received Date:**	11/15/2018 6:58:38 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.206+-0.386	0.8		pCi/L	1		12/07/18 12:08 PM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	0.262+-0.421	0.9		pCi/L	1		12/05/18 3:36 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	3.50			S.U.	1		11/18/18 11:00 AM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	7.20			S.U.	1		11/15/18 9:16 AM

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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, December 12, 2018

John Shimshock
GENON - CONEMAUGH STATION CCR
CONEMAUGH STATION
PO BOX K
NEW FLORENCE, PA 15944

RE: Conemaugh CCR IV SPLP Order No.: G1811870

Dear John Shimshock:

Geochemical Testing received 2 sample(s) on 11/15/2018 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

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306PA DEP

Geochemical Testing

Date: *12-Dec-18*

CLIENT: GENON - CONEMAUGH STATION CCR
Project: Conemaugh CCR IV SPLP
Lab Order: G1811870

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

The radiological analysis (Radium 226 by EPA 903.1; Radium 228 by EPA 904.0) was subcontracted to Pace Analytical (PADEP 65-00282). A copy of the subcontractor's laboratory report is enclosed with this Analytical Report.

Legend:

ND - Not Detected
J - Indicates an estimated value.
U - The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit.
B - Analyte detected in the associated Method Blank
Q - Qualifier QL -Quantitation Limit DF - Dilution Factor

S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
** - Value exceeds Action Limit
H - Method Hold Time Exceeded
MCL - Contaminant Limit

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-7 0-4
Lab Order:	G1811870		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811870-001	**Collection Date:**	11/14/2018 12:30:00 P
Matrix:	SOLID	**Received Date:**	11/15/2018 7:21:44 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.046	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.0917	0.0500	J	mg/L	1	11/16/18 11:45 AM	11/16/18 6:28 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:38 PM
Arsenic	12.8	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:38 PM
Barium	99.0	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:38 PM
Beryllium	0.94	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:38 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:38 PM
Chromium	30.1	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:38 PM
Cobalt	13.0	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:38 PM
Lead	20.2	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:38 PM
Lithium	12.6	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:38 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:38 PM
Selenium	2.6	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:38 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:38 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:30 AM
SPLP METALS FLUID #1		Analyst: **MXS**				**EPA 200.2**	**EPA 200.7**
Antimony	0.050	0.050	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:51 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:51 PM
Barium	0.047	0.005		mg/L	1	11/19/18 11:25 AM	11/20/18 5:51 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:51 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:51 PM
Chromium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:51 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:51 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:51 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:51 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:51 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:51 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 11:25 AM	11/20/18 5:51 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	0.57+/-0.0333	0.069		pCi/g	1		11/24/18 11:54 PM
Radium-228	0.81+/-0.0699	0.093		pCi/g	1		11/24/18 11:54 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-7 0-4
Lab Order:	G1811870		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811870-001	**Collection Date:**	11/14/2018 12:30:00 P
Matrix:	SOLID	**Received Date:**	11/15/2018 7:21:44 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.205+-0.355	0.6		pCi/L	1		12/06/18 10:42 AM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	-0.237+-0.379	0.9		pCi/L	1		12/05/18 12:09 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	3.60			S.U.	1		11/17/18 1:00 PM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	8.63			S.U.	1		11/15/18 9:16 AM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-8 0-4
Lab Order:	G1811870		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811870-003	**Collection Date:**	11/14/2018 12:55:00 P
Matrix:	SOLID	**Received Date:**	11/15/2018 7:21:44 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: **RLL**					**EPA 7473**
Mercury	0.095	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
SPLP INORGANICS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	0.27	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 6:45 PM
TOTAL METALS		Analyst: **MXS**				**EPA 3050**	**EPA 6010**
Antimony	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:43 PM
Arsenic	18.8	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:43 PM
Barium	137	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:43 PM
Beryllium	1.32	0.10		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:43 PM
Cadmium	< 5.0	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:43 PM
Chromium	30.7	5.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:43 PM
Cobalt	21.5	0.5		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:43 PM
Lead	23.2	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:43 PM
Lithium	11.7	1.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:43 PM
Molybdenum	< 2.0	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:43 PM
Selenium	2.6	2.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:43 PM
Thallium	< 10.0	10.0		mg/Kg-dry	1	11/20/18 1:30 PM	11/23/18 3:43 PM
SPLP METALS FLUID #1		Analyst: **GXI**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:32 AM
SPLP METALS FLUID #1		Analyst: **JEK**				**EPA 200.2**	**EPA 200.7**
Antimony	0.05	0.05	U	mg/L	1	11/19/18 12:05 PM	11/20/18 2:06 PM
Arsenic	0.010	0.010	U	mg/L	1	11/19/18 12:05 PM	11/20/18 2:06 PM
Barium	0.062	0.005		mg/L	1	11/19/18 12:05 PM	11/20/18 2:06 PM
Beryllium	0.0005	0.0005	U	mg/L	1	11/19/18 12:05 PM	11/20/18 2:06 PM
Cadmium	0.0010	0.0010	U	mg/L	1	11/19/18 12:05 PM	11/20/18 2:06 PM
Chromium	0.005	0.005	U	mg/L	1	11/19/18 12:05 PM	11/20/18 2:06 PM
Cobalt	0.0020	0.0020	U	mg/L	1	11/19/18 12:05 PM	11/20/18 2:06 PM
Lead	0.010	0.010	U	mg/L	1	11/19/18 12:05 PM	11/20/18 2:06 PM
Lithium	0.005	0.005	U	mg/L	1	11/19/18 12:05 PM	11/20/18 2:06 PM
Molybdenum	0.010	0.010	U	mg/L	1	11/19/18 12:05 PM	11/20/18 2:06 PM
Selenium	0.010	0.010	U	mg/L	1	11/19/18 12:05 PM	11/20/18 2:06 PM
Thallium	0.010	0.010	U	mg/L	1	11/19/18 12:05 PM	11/20/18 2:06 PM
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**
Radium-226	1.08+/-0.0552	0.059		pCi/g	1		11/25/18 12:08 AM
Radium-228	1.53+/-0.0971	0.040		pCi/g	1		11/25/18 12:08 AM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *12-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	LD-8 0-4
Lab Order:	G1811870		
Project:	Conemaugh CCR IV SPLP	**Sampled By:**	APTIM
Lab ID:	G1811870-003	**Collection Date:**	11/14/2018 12:55:00 P
Matrix:	SOLID	**Received Date:**	11/15/2018 7:21:44 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
GAMMA SPECTROSCOPY		Analyst: **AM**					**EPA 901.1**

NOTES:

QL is equal to the MDA

Result includes the uncertainty which is calculated at the 95% confidence level (1.96-sigma).

The reported value for Ra-226 is the average of its daughter's Pb-214 and Bi-214 activity due to the possibility of U-235 interference.

Ra-228 and Ac-228 are assumed to be in secular equilibrium. The results for Ra-228 are inferred from Ac-228.

SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1 MOD**
Radium 226	0.792+-0.627	0.9		pCi/L	1		12/07/18 12:08 PM
SPLP RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0 MOD**
Radium 228	0.427+-0.397	0.8		pCi/L	1		12/05/18 3:36 PM
SPLP FLUID #1		Analyst: **ALD**					**EPA 1312**
Final pH Metals	5.14			S.U.	1		11/18/18 11:00 AM
SPLP FLUID #3		Analyst: **MAG**					**EPA 1312**
Final pH Non Metals	9.56			S.U.	1		11/15/18 9:16 AM

I.D. 56-00306 PA DEP

Shuttle/Cooler ID#:

CHAIN OF CUSTODY

Geochemical Testing

Form F-5002, 12.16

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: GENON	**Contact (Company):** APM	**Phone:** (412) 380-6272
Address: CONEMAUGH	e-mail:	Fax: ( )
City: NEW FLORENCE **State:** PA **Zip:** 15944	**Sampled by:** Beth Anderson and	**State Sampled:** PA
WO#: 61811860	Project: Evan Schlegel	PO/Quote#:

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other		

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
**NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG								
B-9 0-4	—	SO	11/13/18	1200	G	SEE BOTTLES	Field Filtered: Y / N	1
B-9 4-8	—	SO	11/13/18	1202	G		Field Filtered: Y / N	1
B-10 0-4	—	SO	11/13/18	1205	G		Field Filtered: Y / N	1
B-10 4-8	—	SO	11/13/18	1207	G		Field Filtered: Y / N	1
UD-1 0-4	001	SO	11/13/18	1330	G		Field Filtered: Y / N	3
UD-1 4-8	—	SO	11/13/18	1335	G		Field Filtered: Y / N	3
UD-2 0-4	002	SO	11/13/18	1345	G		Field Filtered: Y / N	3
UD-2 4-8	—	SO	11/13/18	1350	G		Field Filtered: Y / N	3

Note Deficiencies Here:

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Beth Anderson	11/13/18	1615	[illegible]	11-14-18	1939

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: Y Yes or ___ No

Cooler Temp (°C) on receipt: 4

Sample Receiving (1st Review): JS

Client Support (2nd Review): ___

Shuttle/Cooler ID#:

CHAIN OF CUSTODY

Geochemical Testing

Form F-5002, 12.16

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: GENON	**Contact (Company):** APTIM	**Phone:** (412) 380-4272
Address: CONEMAUGH	e-mail: patricia.andrison@aptim.com	Fax: ( )
City: NEW FLORENCE **State:** PA **Zip:** 15944	**Sampled by:** Patti Andrison	**State Sampled:** PA
WO#: 6181860	Project: Evan Schlegel	PO/Quote#:

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other		

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
**NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG								
UD-3 0-4	003	SO	11/13/18	1405	G	SEE BOTTLES	Field Filtered: Y / N	3
UD-3 4-8	—	SO	11/13/18	1410	G		Field Filtered: Y / N	3
UD-4 0-4	004	SO	11/13/18	1420	G		Field Filtered: Y / N	3
UD-4 4-8	—	SO	11/13/18	1425	G		Field Filtered: Y / N	3
UD-5 0-4	005	SO	11/13/18	1500	G		Field Filtered: Y / N	3
UD-5 ~~4~~ 4-8	—	SO	11/13/18	1505	G		Field Filtered: Y / N	3
UD-6 0-4	006	SO	11/13/18	1510	G		Field Filtered: Y / N	3
UD-6 4-8	—	SO	11/13/18	1520	G		Field Filtered: Y / N	3

Note Deficiencies Here:

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
APTIM Patricia M Andrison	11/13/18	1615	[signature]	11-14-18	1939

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ✓ Yes or ___ No | Cooler Temp (°C) on receipt: 4

Sample Receiving (1st Review): JS | Client Support (2nd Review): ___

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 12.16

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: GENON	**Contact (Company):** APTM	**Phone:** (412) 380-4272
Address: CONEMAUGH	e-mail:	Fax: ( )
City: NEW FLORENCE **State:** PA **Zip:**	**Sampled by:** PATTI ANDRISON AND	**State Sampled:** PA
WO#: 61811867	**Project:** EVAN SCHLEGEL	PO/Quote#:

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other		

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
**NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG								
UD-7 0-4	001	SO	11/14/18	0930	G	SEE BOTTLES	Field Filtered: Y / N	3
UD-7 4-8	002	|	|	0935	G	HOLD	Field Filtered: Y / N	3
UD-8 0-4	003	|	|	0950	G	SEE BOTTLES	Field Filtered: Y / N	3
UD-8 4-8	004	|	|	0955	G	HOLD	Field Filtered: Y / N	3
LD-1 0-4	005			1005	G	SEE BOTTLES	Field Filtered: Y / N	3
LD-1 4-8	006			1015	G	HOLD	Field Filtered: Y / N	3
LD-2 0-4	007			1055	G	SEE BOTTLES	Field Filtered: Y / N	3
LD-2 4-8	008	↓	↓	1100	G	HOLD	Field Filtered: Y / N	3

Note Deficiencies Here:

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Patricia M Andrison APTM	11/14/18	1400	Don Paul	11-15-18	6.32

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: X Yes or ___ No | Cooler Temp (°C) on receipt: 4

Sample Receiving (1st Review): [illegible] | Client Support (2nd Review): _____

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 12.16

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client:	GEN ON	**Contact (Company):**	APTIM	**Phone:**	(412) 380-4272
Address:	CONEMAUGH	e-mail:		Fax: ( )	
City:	NEW FLORENCE **State:** PA **Zip:**	**Sampled by:**	PATTI ANDRISON AND	**State Sampled:**	PA
WO#:	61811869	Project:	EVAN SCHLEGEL	PO/Quote#:	

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other		

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
**NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG								
LD-3 0-4	001	SO	11/14/18	1115	G	SEE BOTTLES	Field Filtered: Y / N	3
LD-3 4-8	002			1120		HOLD	Field Filtered: Y / N	3
LD-4 0-4	003			1140		SEE BOTTLES	Field Filtered: Y / N	3
LD-4 4-8	004			1145		HOLD	Field Filtered: Y / N	3
LD-5 0-4	005			1155		SEE BOTTLES	Field Filtered: Y / N	3
LD-5 4-8	006			1200		HOLD	Field Filtered: Y / N	3
LD-6 0-4	007			1210		SEE BOTTLES	Field Filtered: Y / N	3
LD-6 4-8	008			1215		HOLD	Field Filtered: Y / N	3

Note Deficiencies Here:

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Patricia McGinnis APTIM	11/14/18	1400	Don Pal	11-15-18	6:58

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: X Yes or ___ No | Cooler Temp (°C) on receipt: 5

Sample Receiving (1st Review): MK | Client Support (2nd Review): ___

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 12.16

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: GEN ON	**Contact (Company):** APTIM	**Phone:** (412) 380-4272
Address: CONEMAUGH	e-mail:	Fax: ( )
City: NEW FLORENCE **State:** PA **Zip:**	**Sampled by:** PATTI ANDRISON AND	**State Sampled:**
WO#: 61811870	Project: EVAN SCHLEGEL	PO/Quote#:

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other		

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
**NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG								
LD-7 0-4	001	SO	11/14/18	1230	G	SEE BOTTLES	Field Filtered: Y / N	3
LD-7 4-8	002	SO	|	1240	|	HOLD	Field Filtered: Y / N	3
LD-8 0-4	003	SO	|	1255	|	SEE BOTTLES	Field Filtered: Y / N	3
LD-8 4-8	–	SO	▽	—	↓	PMA ~~HOLD~~ NO SAMPLES TAKEN	Field Filtered: Y / N	0
							Field Filtered: Y / N	
							Field Filtered: Y / N	
							Field Filtered: Y / N	
							Field Filtered: Y / N	

Note Deficiencies Here:

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Patricia M Gamble APTIM	11/14/18	1400	[signature]	11-14-18	7:21

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: 1 Yes or ___ No | Cooler Temp (°C) on receipt: 4

Sample Receiving (1st Review): [initials] | Client Support (2nd Review): ___

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

December 06, 2018

Ms. Leslie Nemeth
Geochemical Testing
2005 N. Center Avenue
Somerset, PA 15501

RE: Project: G1811860
Pace Project No.: 30272445

Dear Ms. Nemeth:
Enclosed are the analytical results for sample(s) received by the laboratory on November 21, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
724-850-5615
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: G1811860
Pace Project No.: 30272445

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: G1811860
Pace Project No.: 30272445

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30272445001	**G1811860-001**	Water	11/15/18 09:16	11/21/18 09:30
30272445002	**G1811860-003**	Water	11/15/18 09:16	11/21/18 09:30
30272445003	**G1811860-005**	Water	11/15/18 09:16	11/21/18 09:30

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Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: G1811860
Pace Project No.: 30272445

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30272445001	**G1811860-001**	EPA 903.1	MK1	1
		EPA 904.0	JLW	1
30272445002	**G1811860-003**	EPA 903.1	MK1	1
		EPA 904.0	JLW	1
30272445003	**G1811860-005**	EPA 903.1	MK1	1
		EPA 904.0	JLW	1

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811860
Pace Project No.: 30272445

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Geochemical Testing
Date: December 06, 2018

General Information:
3 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811860
Pace Project No.: 30272445

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Geochemical Testing
Date: December 06, 2018

General Information:
3 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G1811860
Pace Project No.: 30272445

Sample: G1811860-001 **Lab ID: 30272445001** Collected: 11/15/18 09:16 Received: 11/21/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample date on Chain of Custody is SPLP extraction date, no extraction time listed.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.366 ± 0.382 (0.539) C:NA T:91%**	pCi/L	12/06/18 10:42	13982-63-3	
Radium-228	EPA 904.0	**-0.149 ± 0.331 (0.802) C:74% T:90%**	pCi/L	12/05/18 12:09	15262-20-1	

Sample: G1811860-003 **Lab ID: 30272445002** Collected: 11/15/18 09:16 Received: 11/21/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample date on Chain of Custody is SPLP extraction date, no extraction time listed.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.394 ± 0.410 (0.611) C:NA T:95%**	pCi/L	12/06/18 10:42	13982-63-3	
Radium-228	EPA 904.0	**0.280 ± 0.460 (0.999) C:78% T:82%**	pCi/L	12/05/18 12:09	15262-20-1	

Sample: G1811860-005 **Lab ID: 30272445003** Collected: 11/15/18 09:16 Received: 11/21/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample date on Chain of Custody is SPLP extraction date, no extraction time listed.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.564 ± 0.527 (0.748) C:NA T:86%**	pCi/L	12/06/18 10:42	13982-63-3	
Radium-228	EPA 904.0	**0.502 ± 0.418 (0.836) C:74% T:85%**	pCi/L	12/05/18 12:09	15262-20-1	

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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811860
Pace Project No.: 30272445

QC Batch: 321860 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30272445001, 30272445002, 30272445003

METHOD BLANK: 1569350 Matrix: Water
Associated Lab Samples: 30272445001, 30272445002, 30272445003

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.236 ± 0.358 (0.774) C:81% T:77%	pCi/L	12/05/18 12:08	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811860
Pace Project No.: 30272445

QC Batch: 321859 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 30272445001, 30272445002, 30272445003

METHOD BLANK: 1569347 Matrix: Water
Associated Lab Samples: 30272445001, 30272445002, 30272445003

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.234 ± 0.459 (0.839) C:NA T:91%	pCi/L	12/06/18 09:57	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALIFIERS

Project: G1811860
Pace Project No.: 30272445

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 04.13

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: Geochemical Testing	**Contact (Company):** Leslie Nemeth	**Phone:** (814) 443-1671
Address: 2005 North Center Avenue	e-mail: lnemeth@geo-ces.com	Fax: (814) 445-6729
City: Somerset **State:** PA **Zip:** 15501	**Sampled by:** Client	**Preservatives by** __Sampler__GT
WO#:	Project:	PO/Quote#: P2015-8996

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other	Containers Supplied by: ☐ Client ☐ GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	SPLP Ext Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers	
***NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG*									
G1811860-001		nHZ / HZ	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2	001
		nHZ / HZ					Field Filtered: Y / N		
G1811860-003		nHZ / HZ	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2	002
		nHZ / HZ					Field Filtered: Y / N		
G1811860-005		nHZ / HZ	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2	003
		nHZ / HZ					Field Filtered: Y / N		
		nHZ / HZ					Field Filtered: Y / N		
		nHZ / HZ					Field Filtered: Y / N		

WO# : 30272445

30272445

Note Deficiencies Here: 10 Day Rush Please - If Possible

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Leslie Nemeth	11/20/2018	8:00:00	[signature] PACE	11/21/18	0930

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ___Yes or ✓ No | Cooler Temp (°C) on receipt: NA

Sample Receiving (1st Review):_____ | Client Support (2nd Review):_____

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: GeoChem Project#: 30272445

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 1Z 544 067 03473 6 9547

Label JVB
LIMS Login JVB

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Thermometer Used NA Type of Ice: Wet Blue None

Cooler Temperature Observed Temp ____ °C Correction Factor: ____ °C Final Temp: ____ °C

Temp should be above freezing to 6°C

pH paper Lot# 1UD2981 Date and Initials of person examining contents: 11/25/18 JVB

Comments:	Yes	No	N/A	
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓			2.
Chain of Custody Relinquished:	✓			3.
Sampler Name & Signature on COC:		✓		4.
Sample Labels match COC: -Includes date/time/ID Matrix: WT		✓		5. date on samples is 11.16.18 / no time on any samples
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):		✓		7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used:	✓			10.
-Pace Containers Used:		✓		
Containers Intact:	✓			11.
Orthophosphate field filtered			✓	12.
Hex Cr Aqueous Compliance/NPDES sample field filtered			✓	13.
Organic Samples checked for dechlorination:			✓	14.
Filtered volume received for Dissolved tests			✓	15.
All containers have been checked for preservation.	✓			16. pH<2
All containers needing preservation are found to be in compliance with EPA recommendation.	✓			
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed JVB Date/time of preservation Lot # of added preservative
Headspace in VOA Vials (>6mm):			✓	17.
Trip Blank Present:		✓		18.
Trip Blank Custody Seals Present			✓	
Rad Aqueous Samples Screened > 0.5 mrem/hr		✓		Initial when completed: JVB Date: 11/25/18

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

December 17, 2018

Ms. Leslie Nemeth
Geochemical Testing
2005 N. Center Avenue
Somerset, PA 15501

RE: Project: G1811860
Pace Project No.: 30272707

Dear Ms. Nemeth:
Enclosed are the analytical results for sample(s) received by the laboratory on November 27, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
724-850-5615
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: G1811860
Pace Project No.: 30272707

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: G1811860
Pace Project No.: 30272707

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30272707001	**G1811860-002**	Water	11/15/18 09:16	11/27/18 13:40
30272707002	**G1811860-004**	Water	11/15/18 09:16	11/27/18 13:40

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Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: G1811860
Pace Project No.: 30272707

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30272707001	**G1811860-002**	EPA 903.1	MK1	1
		EPA 904.0	VAL	1
30272707002	**G1811860-004**	EPA 903.1	MK1	1
		EPA 904.0	VAL	1

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811860
Pace Project No.: 30272707

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Geochemical Testing
Date: December 17, 2018

General Information:
2 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811860
Pace Project No.: 30272707

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Geochemical Testing
Date: December 17, 2018

General Information:
2 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G1811860
Pace Project No.: 30272707

Sample: G1811860-002 **Lab ID: 30272707001** Collected: 11/15/18 09:16 Received: 11/27/18 13:40 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample collection dates and times were not present on the sample containers.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.503 ± 0.523 (0.778) C:NA T:84%**	pCi/L	12/14/18 22:03	13982-63-3	
Radium-228	EPA 904.0	**0.244 ± 0.301 (0.636) C:77% T:84%**	pCi/L	12/14/18 14:12	15262-20-1	

Sample: G1811860-004 **Lab ID: 30272707002** Collected: 11/15/18 09:16 Received: 11/27/18 13:40 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample collection dates and times were not present on the sample containers.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.148 ± 0.409 (0.794) C:NA T:90%**	pCi/L	12/14/18 22:03	13982-63-3	
Radium-228	EPA 904.0	**-0.0576 ± 0.299 (0.705) C:83% T:86%**	pCi/L	12/14/18 14:12	15262-20-1	

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811860
Pace Project No.: 30272707

QC Batch: 322728 | Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 | Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30272707001, 30272707002

METHOD BLANK: 1572965 | Matrix: Water
Associated Lab Samples: 30272707001, 30272707002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	-0.260 ± 0.319 (0.788) C:82% T:79%	pCi/L	12/14/18 14:11	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811860
Pace Project No.: 30272707

QC Batch: 322685 | Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 | Analysis Description: 903.1 Radium-226
Associated Lab Samples: 30272707001, 30272707002

METHOD BLANK: 1572868 | Matrix: Water
Associated Lab Samples: 30272707001, 30272707002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0834 ± 0.490 (1.00) C:NA T:88%	pCi/L	12/14/18 21:48	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: G1811860
Pace Project No.: 30272707

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 04.13

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: Geochemical Testing	**Contact (Company):** Leslie Nemeth	**Phone:** (814) 443-1671
Address: 2005 North Center Avenue	e-mail: lnemeth@geo-ces.com	Fax: (814) 445-6729
City: Somerset **State:** PA **Zip:** 15501	**Sampled by:** Client	**Preservatives by** __Sampler__GT
WO#:	Project:	PO/Quote#: P2019-8998

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other	Containers Supplied by: ☐ Client ☐ GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	Extraction Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
***NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG*								
G1811860-002		nHZ / HZ WW	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2 001
		nHZ / HZ					Field Filtered: Y / N	
G1811860-004		nHZ / HZ WW	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2 002
		nHZ / HZ					Field Filtered: Y / N	
~~G1811860-006~~ 36		nHZ / HZ ~~WW~~	~~11/15/2018~~	~~9:16~~	~~G~~	~~"~~	Field Filtered: Y / N ~~HNO3~~	~~2~~
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ						
		nHZ / HZ						

WO# : 30272707

30272707

Note Deficiencies Here: 10 Day Rush Please PA

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Leslie Nemeth	11/21/2018	8:00:00	Ben Martin	11-28 27-18	1340
				BM 11-28-18	

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ___Yes or ✓No | Cooler Temp (°C) on receipt: N/A

Sample Receiving (1st Review):_____ | Client Support (2nd Review):_____

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: Geochem Project# 30272707

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label BLM
LIMS Login BLM

Tracking #: 1Z 544 007 03 4748 0425

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Thermometer Used N/A Type of Ice: Wet Blue None

Cooler Temperature Observed Temp N/A °C Correction Factor: — °C Final Temp: — °C

Temp should be above freezing to 6°C

pH paper Lot# 10D2981

Date and Initials of person examining contents: BLM 11-27-18

Comments:	Yes	No	N/A	
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓			2.
Chain of Custody Relinquished:	✓			3.
Sampler Name & Signature on COC:		✓		4.
Sample Labels match COC: -Includes date/time/ID Matrix: WT		✓		5. No date or time on samples.
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):		✓		7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used:	✓			10.
-Pace Containers Used:		✓		
Containers Intact:	✓			11.
Orthophosphate field filtered			✓	12.
Hex Cr Aqueous Compliance/NPDES sample field filtered			✓	13.
Organic Samples checked for dechlorination:			✓	14.
Filtered volume received for Dissolved tests			✓	15.
All containers have been checked for preservation.	✓			16. PH<2
All containers needing preservation are found to be in compliance with EPA recommendation.	✓			
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed BLM; Date/time of preservation; Lot # of added preservative
Headspace in VOA Vials (>6mm):			✓	17.
Trip Blank Present:			✓	18.
Trip Blank Custody Seals Present			✓	
Rad Aqueous Samples Screened > 0.5 mrem/hr		✓		Initial when completed: BLM Date: 11-28-18

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

December 11, 2018

Ms. Leslie Nemeth
Geochemical Testing
2005 N. Center Avenue
Somerset, PA 15501

RE: Project: G1811860
Pace Project No.: 30272858

Dear Ms. Nemeth:
Enclosed are the analytical results for sample(s) received by the laboratory on November 29, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
724-850-5615
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: G1811860
Pace Project No.: 30272858

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: G1811860
Pace Project No.: 30272858

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30272858001	**G1811860-006**	Water	11/15/18 00:01	11/29/18 10:15

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: G1811860
Pace Project No.: 30272858

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30272858001	**G1811860-006**	EPA 903.1	MK1	1
		EPA 904.0	VAL	1

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811860
Pace Project No.: 30272858

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Geochemical Testing
Date: December 11, 2018

General Information:
1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811860
Pace Project No.: 30272858

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Geochemical Testing
Date: December 11, 2018

General Information:
1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G1811860
Pace Project No.: 30272858

Sample: G1811860-006 **Lab ID: 30272858001** Collected: 11/15/18 00:01 Received: 11/29/18 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.737 ± 0.668 (0.984)** **C:NA T:96%**	pCi/L	12/10/18 13:33	13982-63-3	
Radium-228	EPA 904.0	**0.320 ± 0.300 (0.607)** **C:77% T:84%**	pCi/L	12/10/18 13:12	15262-20-1	

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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811860
Pace Project No.: 30272858

QC Batch: 322748 | Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 | Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30272858001

METHOD BLANK: 1573038 | Matrix: Water
Associated Lab Samples: 30272858001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	-0.00649 ± 0.285 (0.668) C:75% T:88%	pCi/L	12/10/18 13:10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811860
Pace Project No.: 30272858

QC Batch: 322747 | Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 | Analysis Description: 903.1 Radium-226
Associated Lab Samples: 30272858001

METHOD BLANK: 1573037 | Matrix: Water
Associated Lab Samples: 30272858001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.380 ± 0.528 (0.882) C:NA T:87%	pCi/L	12/10/18 13:07	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: G1811860
Pace Project No.: 30272858

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 04.13

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: Geochemical Testing	**Contact (Company):** Leslie Nemeth	**Phone:** (814) 443-1671
Address: 2005 North Center Avenue	e-mail: lnemeth@geo-ces.com	Fax: (814) 445-6729
City: Somerset **State:** PA **Zip:** 15501	**Sampled by:** Client	**Preservatives by** __Sampler__GT
WO#:	Project:	PO/Quote#: P2018-9008

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other	Containers Supplied by: ☐ Client ☐ GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	SPLP Ext Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
**NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG								
G1811860-006		nHZ / HZ WW	11/15/2018		G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					/ N	
		nHZ / HZ					/ N	
		nHZ / HZ					N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	

WO# : 30272858

30272858

Note Deficiencies Here: 10 Day Rush Please PA

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Leslie Nemeth	11/27/2018	8:00:00	Emily Sp PACE	11-29-18	1015

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ___Yes or ___No | Cooler Temp (°C) on receipt: _____

Sample Receiving (1st Review):_____ | Client Support (2nd Review):_____

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: GeoChem Project # # 30272858

Label	ET
LIMS Login	ET

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 12 544 007 03 4612 5856

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Thermometer Used N/A Type of Ice: Wet Blue (None)

Cooler Temperature Observed Temp — °C Correction Factor: — °C Final Temp: — °C

Temp should be above freezing to 6°C

Comments:	Yes	No	N/A	pH paper Lot# 10D2981	Date and Initials of person examining contents: ET 11-29-18
Chain of Custody Present:	✓			1.	
Chain of Custody Filled Out:	✓			2.	
Chain of Custody Relinquished:	✓			3.	
Sampler Name & Signature on COC:		✓		4.	
Sample Labels match COC: -Includes date/time/ID Matrix: WT	✓			5.	
Samples Arrived within Hold Time:	✓			6.	
Short Hold Time Analysis (<72hr remaining):		✓		7.	
Rush Turn Around Time Requested:		✓		8.	
Sufficient Volume:	✓			9.	
Correct Containers Used:	✓			10.	
-Pace Containers Used:		✓			
Containers Intact:	✓			11.	
Orthophosphate field filtered			✓	12.	
Hex Cr Aqueous Compliance/NPDES sample field filtered			✓	13.	
Organic Samples checked for dechlorination:			✓	14.	
Filtered volume received for Dissolved tests			✓	15.	
All containers have been checked for preservation.	✓			16. pH<2	
All containers needing preservation are found to be in compliance with EPA recommendation.	✓				
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed ET	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):			✓	17.	
Trip Blank Present:		✓		18.	
Trip Blank Custody Seals Present			✓		
Rad Aqueous Samples Screened > 0.5 mrem/hr		✓		Initial when completed: ET	Date: 11-29-18

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

December 07, 2018

Ms. Leslie Nemeth
Geochemical Testing
2005 N. Center Avenue
Somerset, PA 15501

RE: Project: G1811867
Pace Project No.: 30272447

Dear Ms. Nemeth:
Enclosed are the analytical results for sample(s) received by the laboratory on November 21, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
724-850-5615
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: G1811867
Pace Project No.: 30272447

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: G1811867
Pace Project No.: 30272447

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30272447001	**G1811867-001**	Water	11/15/18 09:16	11/21/18 09:30
30272447002	**G1811867-005**	Water	11/15/18 09:16	11/21/18 09:30

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: G1811867
Pace Project No.: 30272447

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30272447001	**G1811867-001**	EPA 903.1	MK1	1
		EPA 904.0	JLW	1
30272447002	**G1811867-005**	EPA 903.1	MK1	1
		EPA 904.0	JLW	1

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811867
Pace Project No.: 30272447

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Geochemical Testing
Date: December 07, 2018

General Information:
2 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811867
Pace Project No.: 30272447

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Geochemical Testing
Date: December 07, 2018

General Information:
2 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G1811867
Pace Project No.: 30272447

Sample: G1811867-001 **Lab ID: 30272447001** Collected: 11/15/18 09:16 Received: 11/21/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample date on Chain of Custody is SPLP extraction date, no extraction time listed.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.132 ± 0.301 (0.179) C:NA T:90%**	pCi/L	12/06/18 21:43	13982-63-3	
Radium-228	EPA 904.0	**0.844 ± 0.439 (0.782) C:73% T:91%**	pCi/L	12/05/18 12:09	15262-20-1	

Sample: G1811867-005 **Lab ID: 30272447002** Collected: 11/15/18 09:16 Received: 11/21/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample date on Chain of Custody is SPLP extraction date, no extraction time listed.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.349 ± 0.364 (0.513) C:NA T:90%**	pCi/L	12/06/18 22:00	13982-63-3	
Radium-228	EPA 904.0	**0.487 ± 0.402 (0.803) C:73% T:82%**	pCi/L	12/05/18 12:09	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811867
Pace Project No.: 30272447

QC Batch: 321860 | Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 | Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30272447001, 30272447002

METHOD BLANK: 1569350 | Matrix: Water
Associated Lab Samples: 30272447001, 30272447002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.236 ± 0.358 (0.774) C:81% T:77%	pCi/L	12/05/18 12:08	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811867
Pace Project No.: 30272447

QC Batch: 321861 | Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 | Analysis Description: 903.1 Radium-226
Associated Lab Samples: 30272447001, 30272447002

METHOD BLANK: 1569351 | Matrix: Water
Associated Lab Samples: 30272447001, 30272447002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.278 ± 0.387 (0.646) C:NA T:93%	pCi/L	12/06/18 21:43	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: G1811867
Pace Project No.: 30272447

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 04.13

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: Geochemical Testing	**Contact (Company):** Leslie Nemeth	**Phone:** (814) 443-1671
Address: 2005 North Center Avenue	e-mail: lnemeth@geo-ces.com	Fax: (814) 445-6729
City: Somerset **State:** PA **Zip:** 15501	**Sampled by:** Client	**Preservatives by** __Sampler__GT
WO#:	Project:	PO/Quote#: P2018-4996

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other	Containers Supplied by: ☐ Client ☐ GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	SPLP Ext Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers	
***NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG*									
G1811867-001		nHZ / HZ	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2	001
		nHZ / HZ					Field Filtered: Y / N		
G1811867-005		nHZ / HZ	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2	002
		nHZ / HZ					Field Filtered: Y / N		
		nHZ / HZ					Filtered: Y / N		
		nHZ / HZ					Filtered: Y / N		
		nHZ / HZ					Filtered: Y / N		
		nHZ / HZ					Field Filtered: Y / N		

WO#: 30272447

30272447

Note Deficiencies Here: 10 Day Rush Please - If Possible

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Leslie Nemeth	11/20/2018	8:00:00	[illegible] PATC	11/21/18	0930

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ___Yes or ✓No | Cooler Temp (°C) on receipt: NA

Sample Receiving (1st Review):_____ | Client Support (2nd Review):_____

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: GeoChem Project#: 30272447

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 1Z 544 067 03473 6 9547

Label JVB
LIMS Login JVB

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Thermometer Used NA Type of Ice: Wet Blue None

Cooler Temperature Observed Temp ___ °C Correction Factor: ___ °C Final Temp: ___ °C

Temp should be above freezing to 6°C

pH paper Lot# 10D2981 Date and Initials of person examining contents: 11/25/18 JVB

Comments:	Yes	No	N/A	
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓			2.
Chain of Custody Relinquished:	✓			3.
Sampler Name & Signature on COC:		✓		4.
Sample Labels match COC: -Includes date/time/ID Matrix: WT		✓		5. date on samples is 11/16.18 / no time on samples
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):		✓		7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used:	✓			10.
-Pace Containers Used:		✓		
Containers Intact:	✓			11.
Orthophosphate field filtered			✓	12.
Hex Cr Aqueous Compliance/NPDES sample field filtered			✓	13.
Organic Samples checked for dechlorination:			✓	14.
Filtered volume received for Dissolved tests			✓	15.
All containers have been checked for preservation.	✓			16. pH<2
All containers needing preservation are found to be in compliance with EPA recommendation.	✓			
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed JVB Date/time of preservation Lot # of added preservative
Headspace in VOA Vials (>6mm):			✓	17.
Trip Blank Present:		✓		18.
Trip Blank Custody Seals Present			✓	
Rad Aqueous Samples Screened > 0.5 mrem/hr		✓		Initial when completed: JVB Date: 11/25/18

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

December 10, 2018

Ms. Leslie Nemeth
Geochemical Testing
2005 N. Center Avenue
Somerset, PA 15501

RE: Project: G1811867
Pace Project No.: 30272705

Dear Ms. Nemeth:
Enclosed are the analytical results for sample(s) received by the laboratory on November 27, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
724-850-5615
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: G1811867
Pace Project No.: 30272705

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: G1811867
Pace Project No.: 30272705

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30272705001	**G1811867-003**	Water	11/15/18 09:16	11/27/18 13:40
30272705002	**G1811867-007**	Water	11/15/18 09:16	11/27/18 13:40

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: G1811867
Pace Project No.: 30272705

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30272705001	**G1811867-003**	EPA 903.1	KAC	1
		EPA 904.0	VAL	1
30272705002	**G1811867-007**	EPA 903.1	KAC	1
		EPA 904.0	VAL	1

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811867
Pace Project No.: 30272705

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Geochemical Testing
Date: December 10, 2018

General Information:
2 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811867
Pace Project No.: 30272705

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Geochemical Testing
Date: December 10, 2018

General Information:
2 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G1811867
Pace Project No.: 30272705

Sample: G1811867-003 **Lab ID: 30272705001** Collected: 11/15/18 09:16 Received: 11/27/18 13:40 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample collection dates and times were not present on the sample containers.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0821 ± 0.581 (1.16) C:NA T:84%**	pCi/L	12/07/18 12:08	13982-63-3	
Radium-228	EPA 904.0	**-0.217 ± 0.347 (0.854) C:73% T:79%**	pCi/L	12/05/18 15:36	15262-20-1	

Sample: G1811867-007 **Lab ID: 30272705002** Collected: 11/15/18 09:16 Received: 11/27/18 13:40 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample collection dates and times were not present on the sample containers.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.477 ± 0.498 (0.702) C:NA T:68%**	pCi/L	12/07/18 12:08	13982-63-3	
Radium-228	EPA 904.0	**0.301 ± 0.570 (1.25) C:70% T:57%**	pCi/L	12/05/18 15:36	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811867
Pace Project No.: 30272705

QC Batch: 322128 | Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 | Analysis Description: 903.1 Radium-226
Associated Lab Samples: 30272705001, 30272705002

METHOD BLANK: 1570359 | Matrix: Water
Associated Lab Samples: 30272705001, 30272705002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.279 ± 0.434 (0.752) C:NA T:94%	pCi/L	12/07/18 12:08	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811867
Pace Project No.: 30272705

QC Batch: 322129 | Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 | Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30272705001, 30272705002

METHOD BLANK: 1570360 | Matrix: Water
Associated Lab Samples: 30272705001, 30272705002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.115 ± 0.366 (0.825) C:74% T:77%	pCi/L	12/05/18 15:35	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: G1811867
Pace Project No.: 30272705

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 04.13

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: Geochemical Testing	**Contact (Company):** Leslie Nemeth	**Phone:** (814) 443-1671
Address: 2005 North Center Avenue	e-mail: lnemeth@geo-ces.com	Fax: (814) 445-6729
City: Somerset **State:** PA **Zip:** 15501	**Sampled by:** Client	**Preservatives by** __Sampler__GT
WO#:	Project:	PO/Quote#: P2018-8198

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other	Containers Supplied by: ☐ Client ☐ GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	Extraction Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
***NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG*								
G1811867-003		nHZ / HZ WW	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2 001
		nHZ / HZ					Field Filtered: Y / N	
G1811867-007		nHZ / HZ WW	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2 002
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ						
		nHZ / HZ						
		nHZ / HZ						

WO#: 30272705

30272705

Note Deficiencies Here: 10 Day Rush Please PA

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Leslie Nemeth	11/21/2018	8:00:00	Ben Mumtom	11-27-18	1340

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ___Yes or ✓No | Cooler Temp (°C) on receipt: N/A

Sample Receiving (1st Review):_____ | Client Support (2nd Review):_____

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: Geochem Project #: 30272705

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label BLM
LIMS Login BLM

Tracking #: 1Z 544 007 03 4748 0425

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Thermometer Used N/A Type of Ice: Wet Blue None

Cooler Temperature Observed Temp N/A °C Correction Factor: — °C Final Temp: — °C

Temp should be above freezing to 6°C

Comments:	Yes	No	N/A	pH paper Lot# 10D2981 / Date and Initials of person examining contents: BLM 11-27-18
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓			2.
Chain of Custody Relinquished:	✓			3.
Sampler Name & Signature on COC:		✓		4.
Sample Labels match COC: -Includes date/time/ID Matrix: WT		✓		5. No date or time on samples
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):		✓		7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used:	✓			10.
-Pace Containers Used:		✓		
Containers Intact:	✓			11.
Orthophosphate field filtered			✓	12.
Hex Cr Aqueous Compliance/NPDES sample field filtered			✓	13.
Organic Samples checked for dechlorination:			✓	14.
Filtered volume received for Dissolved tests			✓	15.
All containers have been checked for preservation.	✓			16. PH<2
All containers needing preservation are found to be in compliance with EPA recommendation.	✓			
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed BLM / Date/time of preservation / Lot # of added preservative
Headspace in VOA Vials (>6mm):			✓	17.
Trip Blank Present:			✓	18.
Trip Blank Custody Seals Present			✓	
Rad Aqueous Samples Screened > 0.5 mrem/hr		✓		Initial when completed: BLM Date: 11-28-18

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

December 07, 2018

Ms. Leslie Nemeth
Geochemical Testing
2005 N. Center Avenue
Somerset, PA 15501

RE: Project: G1811869
Pace Project No.: 30272448

Dear Ms. Nemeth:
Enclosed are the analytical results for sample(s) received by the laboratory on November 21, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
724-850-5615
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: G1811869
Pace Project No.: 30272448

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: G1811869
Pace Project No.: 30272448

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30272448001	**G1811869-001**	Water	11/15/18 09:16	11/21/18 09:30
30272448002	**G1811869-005**	Water	11/15/18 09:16	11/21/18 09:30

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: G1811869
Pace Project No.: 30272448

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30272448001	**G1811869-001**	EPA 903.1	MK1	1
		EPA 904.0	JLW	1
30272448002	**G1811869-005**	EPA 903.1	MK1	1
		EPA 904.0	JLW	1

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811869
Pace Project No.: 30272448

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Geochemical Testing
Date: December 07, 2018

General Information:
2 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811869
Pace Project No.: 30272448

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Geochemical Testing
Date: December 07, 2018

General Information:
2 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G1811869
Pace Project No.: 30272448

Sample: G1811869-001 **Lab ID: 30272448001** Collected: 11/15/18 09:16 Received: 11/21/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample date on Chain of Custody is SPLP extraction date, no extraction time listed.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.155 ± 0.353 (0.209) C:NA T:84%**	pCi/L	12/06/18 22:00	13982-63-3	
Radium-228	EPA 904.0	**0.360 ± 0.353 (0.721) C:74% T:84%**	pCi/L	12/05/18 12:09	15262-20-1	

Sample: G1811869-005 **Lab ID: 30272448002** Collected: 11/15/18 09:16 Received: 11/21/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample date on Chain of Custody is SPLP extraction date, no extraction time listed.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.379 ± 0.577 (0.993) C:NA T:91%**	pCi/L	12/06/18 22:00	13982-63-3	
Radium-228	EPA 904.0	**0.528 ± 0.438 (0.883) C:77% T:82%**	pCi/L	12/05/18 12:10	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811869
Pace Project No.: 30272448

QC Batch: 321860 | Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 | Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30272448001, 30272448002

METHOD BLANK: 1569350 | Matrix: Water
Associated Lab Samples: 30272448001, 30272448002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.236 ± 0.358 (0.774) C:81% T:77%	pCi/L	12/05/18 12:08	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811869
Pace Project No.: 30272448

QC Batch: 321861 | Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 | Analysis Description: 903.1 Radium-226
Associated Lab Samples: 30272448001, 30272448002

METHOD BLANK: 1569351 | Matrix: Water
Associated Lab Samples: 30272448001, 30272448002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.278 ± 0.387 (0.646) C:NA T:93%	pCi/L	12/06/18 21:43	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: G1811869
Pace Project No.: 30272448

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 04.13

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: Geochemical Testing	**Contact (Company):** Leslie Nemeth	**Phone:** (814) 443-1671
Address: 2005 North Center Avenue	e-mail: lnemeth@geo-ces.com	Fax: (814) 445-6729
City: Somerset **State:** PA **Zip:** 15501	**Sampled by:** Client	**Preservatives by** __Sampler__GT
WO#:	Project:	PO/Quote#: P2018-8996

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other	Containers Supplied by: ☐ Client ☐ GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	SPLP Ext Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
***NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG*								
G1811869-001		nHZ / HZ	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2
		nHZ / HZ					Field Filtered: Y / N	
G1811869-005		nHZ / HZ	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	

WO# : 30272448

30272448

Note Deficiencies Here: 10 Day Rush Please - If Possible

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Leslie Nemeth	11/20/2018	8:00:00	[signature] PACE	11/21/18	0930

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ___Yes or ✓No | Cooler Temp (°C) on receipt: NA

Sample Receiving (1st Review):_____ | Client Support (2nd Review):_____

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: GeoChem Project # 30272448

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 1Z 544 067 03473 6 9547

Label DB
LIMS Login DB

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Thermometer Used NA Type of Ice: Wet Blue None

Cooler Temperature Observed Temp ___ °C Correction Factor: ___ °C Final Temp: ___ °C

Temp should be above freezing to 6°C

pH paper Lot# 100 2981 Date and Initials of person examining contents: 11/25/18 JB

Comments:	Yes	No	N/A	
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓			2.
Chain of Custody Relinquished:	✓			3.
Sampler Name & Signature on COC:		✓		4.
Sample Labels match COC: -Includes date/time/ID Matrix: WT		✓		5. date on samples is 11.16.18 / no time on samples
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):		✓		7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used: -Pace Containers Used:	✓	✓		10.
Containers Intact:	✓			11.
Orthophosphate field filtered			✓	12.
Hex Cr Aqueous Compliance/NPDES sample field filtered			✓	13.
Organic Samples checked for dechlorination:			✓	14.
Filtered volume received for Dissolved tests			✓	15.
All containers have been checked for preservation. All containers needing preservation are found to be in compliance with EPA recommendation. exceptions: VOA, coliform, TOC, O&G, Phenolics	✓ ✓			16. pH<2 Initial when completed DB Date/time of preservation Lot # of added preservative
Headspace in VOA Vials (>6mm):			✓	17.
Trip Blank Present: Trip Blank Custody Seals Present	✓		✓	18.
Rad Aqueous Samples Screened > 0.5 mrem/hr		✓		Initial when completed: DB Date: 11/25/18

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-7 16Feb2016)

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

December 06, 2018

Ms. Leslie Nemeth
Geochemical Testing
2005 N. Center Avenue
Somerset, PA 15501

RE: Project: G1811870
Pace Project No.: 30272446

Dear Ms. Nemeth:
Enclosed are the analytical results for sample(s) received by the laboratory on November 21, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
724-850-5615
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: G1811870
Pace Project No.: 30272446

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: G1811870
Pace Project No.: 30272446

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30272446001	**G1811870-001**	Water	11/15/18 09:16	11/21/18 09:30

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: G1811870
Pace Project No.: 30272446

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30272446001	**G1811870-001**	EPA 903.1	MK1	1
		EPA 904.0	JLW	1

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811870
Pace Project No.: 30272446

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Geochemical Testing
Date: December 06, 2018

General Information:
1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811870
Pace Project No.: 30272446

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Geochemical Testing
Date: December 06, 2018

General Information:
1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G1811870
Pace Project No.: 30272446

Sample: G1811870-001 **Lab ID: 30272446001** Collected: 11/15/18 09:16 Received: 11/21/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Comments: • Sample date on Chain of Custody is SPLP extraction date, no extraction time listed.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.205 ± 0.355 (0.634)** **C:NA T:92%**	pCi/L	12/06/18 10:42	13982-63-3	
Radium-228	EPA 904.0	**-0.237 ± 0.379 (0.933)** **C:68% T:83%**	pCi/L	12/05/18 12:09	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811870
Pace Project No.: 30272446

QC Batch: 321860 | Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 | Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30272446001

METHOD BLANK: 1569350 | Matrix: Water
Associated Lab Samples: 30272446001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.236 ± 0.358 (0.774) C:81% T:77%	pCi/L	12/05/18 12:08	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811870
Pace Project No.: 30272446

QC Batch: 321859 | Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 | Analysis Description: 903.1 Radium-226
Associated Lab Samples: 30272446001

METHOD BLANK: 1569347 | Matrix: Water
Associated Lab Samples: 30272446001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.234 ± 0.459 (0.839) C:NA T:91%	pCi/L	12/06/18 09:57	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: G1811870
Pace Project No.: 30272446

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 04.13

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: Geochemical Testing	**Contact (Company):** Leslie Nemeth	**Phone:** (814) 443-1671
Address: 2005 North Center Avenue	e-mail: lnemeth@geo-ces.com	Fax: (814) 445-6729
City: Somerset **State:** PA **Zip:** 15501	**Sampled by:** Client	**Preservatives by** __Sampler__GT
WO#:	Project:	PO/Quote#: P2018-89916

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other	Containers Supplied by: ☐ Client ☐ GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	SPLP Ext Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
**NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG								
G1811870-001		nHZ / HZ	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	

001

WO#: 30272446

30272446

Note Deficiencies Here: 10 Day Rush Please - If Possible

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Leslie Nemeth	11/20/2018	8:00:00	[signature] PACE	11/21/18	0930

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ___Yes or ✓ No | Cooler Temp (°C) on receipt: NA

Sample Receiving (1st Review):_____ | Client Support (2nd Review):_____

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: GeoChem Project #: 30272446

Label	JVB
LIMS Login	JVB

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 1Z 544 067 03472 6 9547

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Thermometer Used NA Type of Ice: Wet Blue (None)

Cooler Temperature Observed Temp ___ °C Correction Factor: ___ °C Final Temp: ___ °C

Temp should be above freezing to 6°C

pH paper Lot# 10D2981 Date and Initials of person examining contents: 11/25/18 JVB

Comments:	Yes	No	N/A	
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓			2.
Chain of Custody Relinquished:	✓			3.
Sampler Name & Signature on COC:		✓		4.
Sample Labels match COC: -Includes date/time/ID Matrix: WT		✓		5. date on samples is 11.16.18 / no time on samples
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):		✓		7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used:	✓			10.
-Pace Containers Used:		✓		
Containers Intact:	✓			11.
Orthophosphate field filtered			✓	12.
Hex Cr Aqueous Compliance/NPDES sample field filtered			✓	13.
Organic Samples checked for dechlorination:			✓	14.
Filtered volume received for Dissolved tests			✓	15.
All containers have been checked for preservation.	✓			16.
All containers needing preservation are found to be in compliance with EPA recommendation.	✓			pH<2
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed: JVB Date/time of preservation: Lot # of added preservative:
Headspace in VOA Vials (>6mm):			✓	17.
Trip Blank Present:		✓		18.
Trip Blank Custody Seals Present			✓	
Rad Aqueous Samples Screened > 0.5 mrem/hr		✓		Initial when completed: JVB Date: 11/25/18

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

December 10, 2018

Ms. Leslie Nemeth
Geochemical Testing
2005 N. Center Avenue
Somerset, PA 15501

RE: Project: G1811870
Pace Project No.: 30272661

Dear Ms. Nemeth:
Enclosed are the analytical results for sample(s) received by the laboratory on November 27, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
724-850-5615
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: G1811870
Pace Project No.: 30272661

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: G1811870
Pace Project No.: 30272661

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30272661001	**G1811870-003**	Water	11/15/18 09:16	11/27/18 13:40

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: G1811870
Pace Project No.: 30272661

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30272661001	**G1811870-003**	EPA 903.1	KAC	1
		EPA 904.0	VAL	1

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811870
Pace Project No.: 30272661

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Geochemical Testing
Date: December 10, 2018

General Information:
1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811870
Pace Project No.: 30272661

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Geochemical Testing
Date: December 10, 2018

General Information:
1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G1811870
Pace Project No.: 30272661

Sample: G1811870-003 **Lab ID: 30272661001** Collected: 11/15/18 09:16 Received: 11/27/18 13:40 Matrix: Water
PWS: Site ID: Sample Type:

Comments: • Sample collection dates and times were not present on the sample containers.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.792 ± 0.627 (0.852)** **C:NA T:85%**	pCi/L	12/07/18 12:08	13982-63-3	
Radium-228	EPA 904.0	**0.427 ± 0.397 (0.808)** **C:75% T:82%**	pCi/L	12/05/18 15:36	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811870
Pace Project No.: 30272661

QC Batch: 322128 | Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 | Analysis Description: 903.1 Radium-226
Associated Lab Samples: 30272661001

METHOD BLANK: 1570359 | Matrix: Water
Associated Lab Samples: 30272661001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.279 ± 0.434 (0.752) C:NA T:94%	pCi/L	12/07/18 12:08	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811870
Pace Project No.: 30272661

QC Batch: 322129 | Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 | Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30272661001

METHOD BLANK: 1570360 | Matrix: Water
Associated Lab Samples: 30272661001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.115 ± 0.366 (0.825) C:74% T:77%	pCi/L	12/05/18 15:35	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: G1811870
Pace Project No.: 30272661

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 04.13

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: Geochemical Testing	**Contact (Company):** Leslie Nemeth	**Phone:** (814) 443-1671
Address: 2005 North Center Avenue	e-mail: lnemeth@geo-ces.com	Fax: (814) 445-6729
City: Somerset **State:** PA **Zip:** 15501	**Sampled by:** Client	**Preservatives by** __Sampler__GT
WO#:	Project:	PO/Quote#: P2018-4998

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other	Containers Supplied by: ☐ Client ☐ GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	Extraction Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
***NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG*								
G1811870-003		nHZ / HZ WW	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Filtered: Y / N	
		nHZ / HZ					Filtered: Y / N	
		nHZ / HZ					Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	
		nHZ / HZ					Field Filtered: Y / N	

601

WO# : 30272661

30272661

Note Deficiencies Here: 10 Day Rush Please PA

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Leslie Nemeth	11/21/2018	8:00:00	Ben Munton	11-27-18	1340

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ___Yes or ✓No | Cooler Temp (°C) on receipt: N/A

Sample Receiving (1st Review):_____ | Client Support (2nd Review):_____

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: Geochem Project # #: 30272661

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label ET
LIMS Login ET

Tracking #: 1Z 544 007 03 4748 0425

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Thermometer Used N/A Type of Ice: Wet Blue (None)

Cooler Temperature Observed Temp N/A °C Correction Factor: — °C Final Temp: — °C

Temp should be above freezing to 6°C

pH paper Lot# 10D2981

Date and Initials of person examining contents: BLM 11-27-18

Comments:	Yes	No	N/A	
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓			2.
Chain of Custody Relinquished:	✓			3.
Sampler Name & Signature on COC:		✓		4.
Sample Labels match COC: -Includes date/time/ID Matrix: WT		✓		5. No date or time on sample
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):		✓		7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used:	✓			10.
-Pace Containers Used:		✓		
Containers Intact:	✓			11.
Orthophosphate field filtered			✓	12.
Hex Cr Aqueous Compliance/NPDES sample field filtered			✓	13.
Organic Samples checked for dechlorination:			✓	14.
Filtered volume received for Dissolved tests			✓	15.
All containers have been checked for preservation.	✓			16.
All containers needing preservation are found to be in compliance with EPA recommendation.	✓			PH<2
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed BLM / Date/time of preservation / Lot # of added preservative
Headspace in VOA Vials (>6mm):			✓	17.
Trip Blank Present:			✓	18.
Trip Blank Custody Seals Present			✓	
Rad Aqueous Samples Screened > 0.5 mrem/hr		✓		Initial when completed: BLM Date: 11-27-18

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-7 16Feb2018)

Surface Water Samples (WS-1 and WS-2)

GEOCHEMICAL TESTING
Environmental and Energy Analysis

2005 N. Center Ave.
Somerset, PA 15501

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

Friday, December 21, 2018

John Shimshock
GENON - CONEMAUGH STATION CCR
CONEMAUGH STATION
PO BOX K
NEW FLORENCE, PA 15944

RE: Conemaugh CCR App IV Order No.: G1811841

Dear John Shimshock:

Geochemical Testing received 2 sample(s) on 11/14/2018 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

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306PA DEP

CLIENT: GENON - CONEMAUGH STATION CCR
Project: Conemaugh CCR App IV
Lab Order: G1811841

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

The radiological analysis (Radium 226 by EPA 903.1; Radium 228 by EPA 904.0) was subcontracted to Pace Analytical (PADEP 65-00282). A copy of the subcontractor's laboratory report is enclosed with this Analytical Report.

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

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	WS-1
Lab Order:	G1811841		Ash Disposal Site
Project:	Conemaugh CCR App IV	**Sampled By:**	Aptim
Lab ID:	G1811841-001	**Collection Date:**	11/14/2018 10:45:00 A
Matrix:	AQUEOUS	**Received Date:**	11/14/2018 5:15:27 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC NON-METALS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	< 0.1	0.1		mg/L	1	11/15/18 10:15 AM	11/15/18 8:43 PM
INORGANIC METALS		Analyst: **LXM**				**EPA 200.2**	**EPA 200.8**
Antimony	< 0.001	0.001		mg/L	1	11/19/18 12:05 PM	11/20/18 10:58 AM
Arsenic	< 0.001	0.001		mg/L	1	11/19/18 12:05 PM	11/20/18 10:58 AM
Lead	< 0.001	0.001		mg/L	1	11/19/18 12:05 PM	11/20/18 10:58 AM
Selenium	< 0.001	0.001		mg/L	1	11/19/18 12:05 PM	11/20/18 10:58 AM
Thallium	< 0.0002	0.0002		mg/L	1	11/19/18 12:05 PM	11/20/18 10:58 AM
INORGANIC METALS		Analyst: **GXI**				**SM 3112 B**	**SM 3112 B**
Mercury	< 0.0002	0.0002		mg/L	1	11/16/18 9:20 AM	11/16/18 1:48 PM
INORGANIC METALS		Analyst: **JEK**				**EPA 200.2**	**EPA 200.7**
Barium	0.03	0.01		mg/L	1	11/19/18 12:05 PM	11/20/18 5:08 PM
Beryllium	< 0.001	0.001		mg/L	1	11/19/18 12:05 PM	11/20/18 5:08 PM
Cadmium	< 0.002	0.002		mg/L	1	11/19/18 12:05 PM	11/20/18 5:08 PM
Chromium	< 0.01	0.01		mg/L	1	11/19/18 12:05 PM	11/20/18 5:08 PM
Cobalt	< 0.005	0.005		mg/L	1	11/19/18 12:05 PM	11/20/18 5:08 PM
Lithium	< 0.01	0.01		mg/L	1	11/19/18 12:05 PM	11/20/18 5:08 PM
Molybdenum	< 0.02	0.02		mg/L	1	11/19/18 12:05 PM	11/20/18 5:08 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1**
Radium 226	0.336+-0.350	0.494		pCi/L	1		12/11/18 8:59 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0**
Radium 228	0.0474+-0.371	0.853		pCi/L	1		12/10/18 11:41 AM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Dec-18*

CLIENT:	GENON - CONEMAUGH STATION CCR	**Client Sample ID:**	WS-2
Lab Order:	G1811841		Ash Disposal Site
Project:	Conemaugh CCR App IV	**Sampled By:**	Aptim
Lab ID:	G1811841-002	**Collection Date:**	11/14/2018 1:10:00 PM
Matrix:	AQUEOUS	**Received Date:**	11/14/2018 5:15:27 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC NON-METALS		Analyst: **MBG**				**EPA 300.0**	**EPA 300.0**
Fluoride	< 0.1	0.1		mg/L	1	11/15/18 10:15 AM	11/15/18 9:01 PM
INORGANIC METALS		Analyst: **LXM**				**EPA 200.2**	**EPA 200.8**
Antimony	< 0.001	0.001		mg/L	1	11/19/18 12:05 PM	11/20/18 11:07 AM
Arsenic	< 0.001	0.001		mg/L	1	11/19/18 12:05 PM	11/20/18 11:07 AM
Lead	< 0.001	0.001		mg/L	1	11/19/18 12:05 PM	11/20/18 11:07 AM
Selenium	< 0.001	0.001		mg/L	1	11/19/18 12:05 PM	11/20/18 11:07 AM
Thallium	< 0.0002	0.0002		mg/L	1	11/19/18 12:05 PM	11/20/18 11:07 AM
INORGANIC METALS		Analyst: **GXI**				**SM 3112 B**	**SM 3112 B**
Mercury	< 0.0002	0.0002		mg/L	1	11/16/18 9:20 AM	11/16/18 1:50 PM
INORGANIC METALS		Analyst: **JEK**				**EPA 200.2**	**EPA 200.7**
Barium	0.03	0.01		mg/L	1	11/19/18 12:05 PM	11/20/18 5:12 PM
Beryllium	< 0.001	0.001		mg/L	1	11/19/18 12:05 PM	11/20/18 5:12 PM
Cadmium	< 0.002	0.002		mg/L	1	11/19/18 12:05 PM	11/20/18 5:12 PM
Chromium	< 0.01	0.01		mg/L	1	11/19/18 12:05 PM	11/20/18 5:12 PM
Cobalt	< 0.005	0.005		mg/L	1	11/19/18 12:05 PM	11/20/18 5:12 PM
Lithium	< 0.01	0.01		mg/L	1	11/19/18 12:05 PM	11/20/18 5:12 PM
Molybdenum	< 0.02	0.02		mg/L	1	11/19/18 12:05 PM	11/20/18 5:12 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1**
Radium 226	0.134+-0.306	0.493		pCi/L	1		12/11/18 8:59 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0**
Radium 228	0.662+-0.431	0.816		pCi/L	1		12/10/18 11:41 AM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Shuttle/Cooler ID#:

CHAIN OF CUSTODY

Geochemical Testing

Form F-5002, 12.16

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client:	GENON	**Contact (Company):**	APTIM	**Phone:**	(412) 380 4272
Address:	CONEMAUGH	e-mail:		Fax: ( )	
City:	NEW FLORENCE **State:** PA **Zip:**	**Sampled by:**	PATTI ANDERSON and	**State Sampled:**	PA
WO#:	G18118411	Project:	EVAN SCHLEGEL	PO/Quote#:	

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other		

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
**NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG								
WS-1	001	SW	11/14/18	1045	G	SEE BOTTLES	Field Filtered: Y / N 0	4
WS-2	062	SW	11/14/18	1310	G	SEE BOTTLES	Field Filtered: Y / N 0	4
							Field Filtered: Y / N	
							Field Filtered: Y / N	
							Field Filtered: Y / N	
							Field Filtered: Y / N	
							Field Filtered: Y / N	
							Field Filtered: Y / N	

Note Deficiencies Here:

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Patricia M Gaddie APTIM	11/14/18	1400	Jesse Smith	11/14/18	17:15

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: Yes or No | Cooler Temp (°C) on receipt: 5

Sample Receiving (1st Review): TM | Client Support (2nd Review):

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

December 12, 2018

Ms. Leslie Nemeth
Geochemical Testing
2005 N. Center Avenue
Somerset, PA 15501

RE: Project: G1811841
Pace Project No.: 30272256

Dear Ms. Nemeth:
Enclosed are the analytical results for sample(s) received by the laboratory on November 20, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
724-850-5615
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: G1811841
Pace Project No.: 30272256

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: G1811841
Pace Project No.: 30272256

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30272256001	**G1811841-001**	Water	11/14/18 10:45	11/20/18 11:00
30272256002	**G1811841-002**	Water	11/14/18 13:10	11/20/18 11:00

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Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: G1811841
Pace Project No.: 30272256

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30272256001	**G1811841-001**	EPA 903.1	MK1	1
		EPA 904.0	JLW	1
30272256002	**G1811841-002**	EPA 903.1	MK1	1
		EPA 904.0	JLW	1

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Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811841
Pace Project No.: 30272256

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Geochemical Testing
Date: December 12, 2018

General Information:
2 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G1811841
Pace Project No.: 30272256

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Geochemical Testing
Date: December 12, 2018

General Information:
2 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G1811841
Pace Project No.: 30272256

Sample: G1811841-001 **Lab ID: 30272256001** Collected: 11/14/18 10:45 Received: 11/20/18 11:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.336 ± 0.350 (0.494) C:NA T:91%**	pCi/L	12/11/18 20:59	13982-63-3	
Radium-228	EPA 904.0	**0.0474 ± 0.371 (0.853) C:81% T:75%**	pCi/L	12/10/18 11:41	15262-20-1	

Sample: G1811841-002 **Lab ID: 30272256002** Collected: 11/14/18 13:10 Received: 11/20/18 11:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.134 ± 0.306 (0.493) C:NA T:89%**	pCi/L	12/11/18 20:59	13982-63-3	
Radium-228	EPA 904.0	**0.662 ± 0.431 (0.816) C:79% T:75%**	pCi/L	12/10/18 11:41	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811841
Pace Project No.: 30272256

QC Batch: 321886 | Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 | Analysis Description: 903.1 Radium-226
Associated Lab Samples: 30272256001, 30272256002

METHOD BLANK: 1569415 | Matrix: Water
Associated Lab Samples: 30272256001, 30272256002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.298 ± 0.463 (0.802) C:NA T:85%	pCi/L	12/11/18 20:44	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G1811841
Pace Project No.: 30272256

QC Batch: 321887 | Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 | Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30272256001, 30272256002

METHOD BLANK: 1569416 | Matrix: Water
Associated Lab Samples: 30272256001, 30272256002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	-0.220 ± 0.311 (0.763) C:84% T:83%	pCi/L	12/10/18 11:40	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: G1811841
Pace Project No.: 30272256

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 04.13

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: Geochemical Testing	**Contact (Company):** Leslie Nemeth	**Phone:** (814) 443-1671
Address: 2005 North Center Avenue	e-mail: lnemeth@geo-ces.com	Fax: (814) 445-6729
City: Somerset **State:** PA **Zip:** 15501	**Sampled by:** Client	**Preservatives by** __Sampler__GT
WO#:	Project:	PO/Quote#: P2018-8940

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other	Containers Supplied by: ☐ Client ☐ GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers	
NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG									
G1811841-001		nHZ / HZ G	11/14/2018	10:45	G	Radium 226, 228	Field Filtered: Y / N HNO3	2	001
		nHZ / HZ					Field Filtered: Y / N		
G1811841-002		nHZ / HZ G	11/14/2018	1:10	G	Radium 226, 228	Field Filtered: Y / N HNO3	2	002
		nHZ / HZ					Field Filtered: Y / N		
		nHZ / HZ					Field Filtered: Y / N		
		nHZ / HZ					Field Filtered: Y / N		
		nHZ / HZ					Field Filtered: Y / N		
		nHZ / HZ					Field Filtered: Y / N		

WO# : 30272256

30272256

Note Deficiencies Here: PA

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Leslie Nemeth	11/15/2018	8:00:00	Ben Mauntin	11-20-18	1100

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ___Yes or ✓No | Cooler Temp (°C) on receipt: N/A

Sample Receiving (1st Review):_____ | Client Support (2nd Review):_____

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: Geochem Project #: 30272256

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label ET
LIMS Login ET

Tracking #: 1Z 544 00703 4854 4524

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Thermometer Used N/A Type of Ice: Wet Blue None

Cooler Temperature Observed Temp N/A °C Correction Factor: — °C Final Temp: — °C

Temp should be above freezing to 6°C

pH paper Lot# 10D2981 Date and Initials of person examining contents: BLM 11-20-18

Comments:	Yes	No	N/A	
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓			2.
Chain of Custody Relinquished:	✓			3.
Sampler Name & Signature on COC:		✓		4.
Sample Labels match COC: -Includes date/time/ID Matrix: WT	✓			5.
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):		✓		7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used:	✓			10.
-Pace Containers Used:		✓		
Containers Intact:	✓			11.
Orthophosphate field filtered			✓	12.
Hex Cr Aqueous Compliance/NPDES sample field filtered			✓	13.
Organic Samples checked for dechlorination:			✓	14.
Filtered volume received for Dissolved tests			✓	15.
All containers have been checked for preservation.	✓			16. pH<2
All containers needing preservation are found to be in compliance with EPA recommendation.	✓			
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed: BLM Date/time of preservation: Lot # of added preservative:
Headspace in VOA Vials (>6mm):			✓	17.
Trip Blank Present:			✓	18.
Trip Blank Custody Seals Present			✓	
Rad Aqueous Samples Screened > 0.5 mrem/hr		✓		Initial when completed: BLM Date: 11-20-18

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

ATTACHMENT 4E

Groundwater Monitoring and Corrective Action Annual Report
Calendar Year 2019

CCR COMPLIANCE
GROUNDWATER MONITORING AND CORRECTIVE ACTION
ANNUAL REPORT
ASH FILTER PONDS AND ASH/REFUSE DISPOSAL SITE

Prepared for:

Keystone-Conemaugh Projects, LLC
Conemaugh Generating Station
New Florence, Pennsylvania

Prepared by:

Aptim Environmental & Infrastructure, LLC
Pittsburgh, Pennsylvania

January 2020

Table of Contents

List of Tables

List of Figures

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.

Keystone-Conemaugh Projects, LLC – Conemaugh Generating Station, is an electric generating station located in New Florence, Pennsylvania. The Station operates two coal-fired boilers each with a steam turbine-driven electric generator that provides electricity to the regional electric grid. 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 Conemaugh Ash/Refuse Disposal Site and four Ash Filter Ponds (Ponds "A," "B," "C," and "D") used for the management of bottom ash. 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. Additionally, in accordance with the provisions of §257.91(d) of the Rule, the groundwater monitoring system for the Ash Filter Ponds has been designated to provide coverage in the context of a multiunit system encompassing all four ponds collectively.

In summary, this third Annual Report has been prepared to comply with the requirements of §257.90(e), addressing each of the 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 Ash Filter Ponds

2.1 Groundwater Monitoring Network

The CCR groundwater monitoring system for the Ash Filter Ponds is comprised of five wells, including Wells MW-1B and MW-2 (upgradient), and Wells MW-3, MW-4, and MW-23 (downgradient). All five wells communicate with the alluvium, which is the uppermost aquifer. The locations of the groundwater monitoring wells are shown on Figure 1, along with depiction of the generalized groundwater flow direction in the area of the ponds. 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 Summary of Previously-Reported Monitoring Activities

In accordance with the Detection Monitoring requirements under §257.94(b) for existing CCR surface impoundments, a minimum of eight independent samples from each background and downgradient well were collected and analyzed for the constituents listed in Appendices III and IV of the Rule prior to October 17, 2017. The results from these samples, which were collected during the period from December 2015 through July 2017, were presented in the first Annual Report issued in January 2018. In addition, a ninth round of samples was collected (October 1-4, 2017) and analyzed for Appendix III constituents only. The results from these samples served as the initial point of comparison to determine if concentrations in any of the downgradient wells were at levels representing a statistically significant increase (SSI) over the background concentrations established in the upgradient well(s).

During January 2018, the results from the October 1-4, 2017 Detection Monitoring event were reviewed, and subsequent determination made that one downgradient well (MW-4) showed an Appendix III constituent (sulfate) at levels representing an SSI above corresponding background concentrations. Accordingly, and per the provisions of §257.94(e)(2), efforts were undertaken to conduct an Alternate Source Demonstration in an attempt to identify a potential source other than the Ash Filter Ponds which was responsible for the observed SSI. This Alternate Source Demonstration (April 2018) was ultimately successful and determined that incidental gypsum deposition in the area of Well MW-4 was causing the elevated sulfate readings in the localized groundwater. As a result, the Ash Filter Ponds were deemed to remain in the CCR Detection Monitoring Program, and were additionally sampled in May 2018 and October 2018 with continuing observations of SSIs only for sulfate in Well MW-4. These results, along with the detailed findings and conclusions from the Alternate Source Demonstration, were presented in the second Annual Report issued in January 2019.

2.3 2019 Data Collection

The Ash Filter Ponds remained in the CCR Detection Monitoring Program during the 2019 reporting period, and were subjected to sampling for Appendix III constituents as part of monitoring events conducted in April, July, and October 2019 (the required monitoring frequency "shall be at least semiannual" for the Appendix III constituents). As shown in Table 1, the results from each of the 2019 events again consistently showed SSIs for sulfate in downgradient Well MW-4. For the October 2019 event, a SSI for calcium was also observed in Well MW-4. Recognizing that the principal components of gypsum are calcium and sulfate, this SSI can be logically and defensibly linked to the gypsum handling operations, which continue to serve as the identified alternate source for this well. Related discussions regarding elevated calcium in Well MW-4 are, in fact, contained in the above-noted April 2018 Alternate Source Demonstration, offering affirmation that the ponds are not contributing to the observations at this well location. In addition, each of the other downgradient wells (MW-3 and MW-23) continue to show all Appendix III constituent concentrations at levels below the calculated background values. Consequently, based on review of the collective 2019 analytical data and continued relevance/applicability of the previously completed Alternate Source Demonstration, the Ash Filter Ponds will remain in the CCR Detection Monitoring Program in calendar year 2020.

2.4 2019 Monitoring Program Transitions

During 2019, there were no transitions between monitoring programs, with the Ash Filter Ponds remaining in the CCR Detection Monitoring Program.

2.5 2019 Corrective Actions

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

2.6 2020 Projected Activities

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

3.0 Ash Disposal Site

3.1 Groundwater Monitoring Network

The CCR groundwater monitoring system for the Ash Disposal Site is comprised of four wells, including Well MW-31 (upgradient) and Wells MW-9, MW-10, and MW-11 (downgradient). Monitoring Wells MW-9 and MW-11 communicate with the shallow unconfined groundwater in bedrock and Monitoring Wells MW-10 and MW-31 communicate with shallow groundwater across the soil/bedrock interface. Hence, all four wells monitor the uppermost aquifer in the area of the Ash Disposal Site. The locations of the groundwater monitoring wells are shown on Figure 2, along with depiction of the generalized groundwater flow direction in the area of the disposal site. 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 Summary of Previously-Reported Monitoring Activities

In accordance with the Detection Monitoring requirements under §257.94(b) for existing CCR landfills, a minimum of eight independent samples from each background and downgradient well were collected and analyzed for the constituents listed in Appendices III and IV of the Rule prior to October 17, 2017. The results from these samples, which were collected during the period from December 2015 through July 2017, were presented in the first Annual Report issued in January 2018. In addition, a ninth round of samples was collected (October 2-3, 2017) and analyzed for Appendix III constituents only. The results from these samples served as the initial point of comparison to determine if concentrations in any of the downgradient wells were at levels representing an SSI over the background concentrations established in the upgradient well(s).

During January 2018, the results from the October 2017 Detection Monitoring event were reviewed, and subsequent determination made that all three downgradient wells showed several Appendix III constituents at levels representing an SSI above corresponding background concentrations. Accordingly, the Ash Disposal Site was transitioned into the CCR Assessment Monitoring Program, and an initial round of samples covering all Appendix IV constituents was collected in March 2018 per §257.95(b). From these results, the detected Appendix IV constituents were carried forward and analyzed during continued Assessment Monitoring events conducted in May 2018 and October 2018. As was observed, none of the Appendix IV constituents from any of the 2018 sampling events were measured at concentrations representing a statistically significant level (SSL) above the corresponding site-specific groundwater protection standards. All analytical results from the 2018 Assessment Monitoring were presented in the second Annual Report issued in January 2019.

It is additionally noted that the May 2018 Assessment Monitoring event yielded an erroneous result for Radium-226/228 in downgradient Well MW-9. The initially reported value (103.6 pCi/L) was generated via an incorrect laboratory analytical method. Following this determination, a new sample (for Radium analysis only) was collected from MW-9 in July 2018 and reanalyzed using the correct analytical method. The revised result (0.32 pCi/L) from the July 2018 sampling aligns with the historical values detected in this well, and correspondingly remains below background and the groundwater protection standard.

3.3 2019 Data Collection

Following its transition in early-2018, the Ash Disposal Site continued in the CCR Assessment Monitoring Program during the 2019 reporting period. Accordingly, samples were collected and analyzed for Appendix III and Appendix IV constituents as required, during the April, July and October 2019 monitoring events (similar to the monitoring frequency for the Appendix III constituents, the required monitoring frequency is "on at least a semiannual basis" for the Appendix IV constituents following completion of the initial sampling event for the Assessment Monitoring Program). Results from the 2019 sampling events are summarized in Tables 3 and 4, covering Appendix III and Appendix IV, respectively. As shown in Table 4, none of the Appendix IV constituents from the 2019 sampling events were measured at concentrations representing a SSL above the corresponding groundwater protection standards. Detected concentrations of at least one Appendix IV constituent (total barium) as well as several Appendix III constituents; however, do remain above calculated background, and thus providing the basis for continued Assessment Monitoring into 2020.

3.4 2019 Monitoring Program Transitions

During 2019, there were no transitions between monitoring programs, with the Ash Disposal Site remaining in the CCR Assessment Monitoring Program.

3.5 2019 Corrective Actions

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

3.6 2020 Projected Activities

As noted, it is anticipated that Assessment Monitoring activities will continue for the Ash Disposal Site during 2020, with continued review of Appendix III/Appendix IV constituent concentrations and comparison against calculated background and established groundwater protection standards.

Tables

Table 1
Conemaugh Generating Station
Ash Filter Ponds--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						
			0.58	376	1560	0.20	6975	788	4.59-7.42
MW-1B (Upgradient)	17-Dec-15	1070.99	0.29	333	1540	< 0.1	3620	544	5.49
	27-Jan-16	1071.19	0.31	288	1280	< 0.1	3180	583	5.87
	20-Apr-16	1071.69	0.28	170	652	< 0.5	2410	729	6.09
	19-Jul-16	1071.69	0.36	208	1310	0.1	2760	575	5.79
	11-Oct-16	1072.99	0.46	192	1010	0.2	2640	438	6.56
	17-Jan-17	1072.54	0.43	198	1030	< 0.1	2650	427	5.87
	24-Apr-17	1072.69	0.37	166	988	< 0.1	2470	548	5.27
	20-Jul-17	1072.04	0.39	345	1560	< 0.1	3740	388	5.00
	1-Oct-17	1070.84	0.36	430	2040	< 0.1	4930	427	5.68
	22-May-18	1074.94	0.39	120	640	< 0.1	1680	364	5.91
	18-Oct-18	1074.69	0.89	53	288	3.1	1340	543	7.56
	17-Apr-19	1073.69	0.47	122	467	0.3	1300	369	6.00
	18-Jul-19	1073.79	0.44	155	638	< 0.1	1630	303	5.60
	3-Oct-19	1072.49	0.45	190	848	< 0.1	1930	300	5.33
MW-2 (Upgradient)	11-Oct-16	1072.72	0.30	191	251	< 0.1	1200	348	6.28
	16-Nov-16	1072.42	0.31	176	94	0.1	868	416	6.95
	21-Dec-16	1073.02	0.41	176	101	0.2	1050	519	7.03
	25-Jan-17	1073.72	0.21	137	68	0.2	726	316	6.93
	21-Mar-17	1073.82	0.33	158	75	0.1	828	387	6.40
	25-Apr-17	1072.92	0.29	136	69	< 0.1	792	373	6.28
	13-Jun-17	1073.02	0.30	150	60	< 0.1	768	369	6.15
	27-Jul-17	1072.57	0.28	133	67	< 0.1	684	310	6.45
	4-Oct-17	1071.17	0.32	138	58	< 0.1	768	330	6.80
	29-May-18	1075.57	0.10	98	22	0.4	606	185	7.10
	23-Oct-18	1075.37	0.18	105	21	0.4	550	192	6.97
	15-Apr-19	1074.12	0.15	99	21	0.4	508	169	7.13
	30-Jul-19	1074.47	0.15	101	19	0.3	572	194	6.80
	9-Oct-19	1072.62	0.26	116	54	0.1	564	304	6.19
MW-3 (Downgradient)	16-Dec-15	1065.24	< 0.05	123	363	< 0.1	882	227	5.74
	26-Jan-16	1065.89	< 0.05	132	392	< 0.1	970	250	5.94
	25-Apr-16	1066.14	< 0.05	203	505	< 0.1	1460	288	6.52
	25-Jul-16	1064.99	< 0.05	115	343	< 0.1	972	225	5.72
	24-Oct-16	1066.19	< 0.05	123	304	< 0.1	902	211	6.01
	17-Jan-17	1066.94	< 0.05	113	370	< 0.1	976	245	5.95
	25-Apr-17	1067.09	< 0.05	181	552	< 0.1	1740	314	5.57
	25-Jul-17	1065.99	< 0.05	151	389	< 0.1	1270	256	5.47
	1-Oct-17	1064.89	< 0.05	135	387	< 0.1	1140	255	6.30
	23-May-18	1067.79	< 0.05	175	455	< 0.1	1330	276	6.07
	23-Oct-18	1068.29	< 0.05	152	440	< 0.1	1150	293	5.75
	22-Apr-19	1067.09	< 0.05	181	553	< 0.1	1440	353	5.97
	30-Jul-19	1067.59	< 0.05	170	497	< 0.1	1720	291	5.66
	21-Oct-19	1066.29	< 0.05	143	432	< 0.1	1110	261	5.54
MW-4 (Downgradient)	21-Dec-15	1069.53	0.15	301	643	< 0.1	2470	874	5.77
	4-Feb-16	1069.73	0.13	316	654	< 0.1	2580	870	5.83
	26-Apr-16	1070.08	0.13	426	932	< 0.1	3390	965	6.19
	25-Jul-16	1068.98	0.12	346	874	< 0.1	3120	1090	5.82
	26-Oct-16	1070.08	0.17	310	670	< 0.1	2530	865	6.27
	30-Jan-17	1070.88	0.15	301	736	< 0.1	2740	895	6.12
	26-Apr-17	1070.93	0.14	392	863	< 0.1	3310	996	6.68
	27-Jul-17	1070.23	0.19	403	977	< 0.1	3350	1170	5.63
	4-Oct-17	1068.83	0.14	335	814	< 0.2	3200	1050	6.02
	29-May-18	1070.53	0.13	345	842	< 0.1	3280	1010	5.96
	24-Oct-18	1071.93	0.14	290	589	< 0.1	2550	927	5.99
	22-Apr-19	1070.88	0.10	316	800	< 0.1	2470	892	5.98
	31-Jul-19	1071.03	0.12	292	650	< 0.1	2430	854	5.62
	21-Oct-19	1070.33	0.16	401	831	< 0.1	3030	1150	5.80
MW-23 (Downgradient)	20-Dec-15	1068.03	< 0.05	182	388	< 0.1	1580	653	5.59
	2-Feb-16	1069.08	< 0.05	176	344	< 0.1	1520	576	5.98
	25-Apr-16	1069.38	< 0.05	175	329	< 0.1	1540	557	5.16
	21-Jul-16	1067.93	0.34	173	371	< 0.1	1600	591	5.63
	24-Oct-16	1068.83	< 0.05	173	327	< 0.1	1540	509	6.14
	18-Jan-17	1070.13	0.11	165	368	< 0.1	1550	543	5.79
	24-Apr-17	1069.68	< 0.05	164	383	< 0.1	1520	558	5.21
	24-Jul-17	1069.18	< 0.05	183	378	< 0.1	1530	532	5.15
	1-Oct-17	1067.98	< 0.05	172	313	< 0.1	1520	575	6.25
	22-May-18	1071.18	< 0.05	181	347	< 0.1	1460	507	5.63
	22-Oct-18	1071.13	< 0.05	165	355	< 0.1	1450	538	5.70
	17-Apr-19	1070.28	< 0.05	153	346	< 0.1	1320	527	5.52
	18-Jul-19	1070.73	< 0.05	164	309	< 0.1	1330	469	5.54
	9-Oct-19	1068.48	< 0.05	143	350	< 0.1	1320	534	5.69

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 July 2017) of groundwater sampling data for Wells MW-1B and MW-2.

Table 2
Conemaugh Generating Station
Ash Filter Ponds--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	0.001	0.04	0.001	0.005	0.01	0.013	0.2	0.001	0.03	0.0002	0.02	0.001	0.0002	4.24
		Groundwater Protection Standard														
		MCL	MCL	MCL	MCL	MCL	MCL	RSL	MCL	RSL	RSL	MCL	RSL	MCL	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
MW-1B (Upgradient)	17-Dec-15	< 0.001	< 0.001	0.04	< 0.001	0.005	< 0.01	0.012	< 0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	4.24
	27-Jan-16	< 0.001	< 0.001	0.03	< 0.001	0.005	< 0.01	< 0.005	< 0.1	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	0.29
	20-Apr-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.72
	19-Jul-16	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	0.006	0.1	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	1.31
	11-Oct-16	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	< 0.005	0.2	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	0.78
	17-Jan-17	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	0.005	< 0.1	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	0.24
	24-Apr-17	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	0.005	< 0.1	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.77
	20-Jul-17	< 0.001	< 0.001	0.03	< 0.001	0.005	< 0.01	0.013	< 0.1	< 0.001	0.02	< 0.0002	< 0.02	< 0.001	< 0.0002	1.03
MW-2 (Upgradient)	11-Oct-16	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.69
	16-Nov-16	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.44
	21-Dec-16	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.2	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.43
	25-Jan-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	0.2	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.88
	21-Mar-17	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.09
	25-Apr-17	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.35
	13-Jun-17	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	0.001	< 0.0002	0.80
	27-Jul-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.14
MW-3 (Downgradient)	16-Dec-15	< 0.001	< 0.001	0.04	< 0.001	< 0.002	< 0.01	0.009	< 0.1	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.44
	26-Jan-16	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.011	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.86
	25-Apr-16	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.014	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.60
	25-Jul-16	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.009	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.46
	24-Oct-16	< 0.001	< 0.001	0.04	< 0.001	< 0.002	< 0.01	0.012	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.34
	17-Jan-17	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.008	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.28
	25-Apr-17	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.013	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.45
	25-Jul-17	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	0.010	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.33
MW-4 (Downgradient)	21-Dec-15	< 0.001	< 0.001	0.01	< 0.001	0.002	< 0.01	0.039	< 0.1	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.20
	4-Feb-16	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.038	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.47
	26-Apr-16	< 0.001	< 0.001	0.02	< 0.001	0.003	< 0.01	0.039	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.15
	25-Jul-16	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.035	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.43
	26-Oct-16	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.037	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.72
	30-Jan-17	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.034	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.09
	26-Apr-17	< 0.001	< 0.001	0.01	< 0.001	0.004	< 0.01	0.041	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.73
	27-Jul-17	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.039	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.24
MW-23 (Downgradient)	20-Dec-15	< 0.001	< 0.001	0.01	< 0.001	0.002	< 0.01	0.114	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	6.87
	2-Feb-16	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	0.106	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.03
	25-Apr-16	< 0.001	0.001	0.01	< 0.001	0.002	< 0.01	0.123	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.56
	21-Jul-16	< 0.001	< 0.001	0.01	< 0.001	0.003	< 0.01	0.114	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.65
	24-Oct-16	< 0.001	0.001	0.02	< 0.001	< 0.002	< 0.01	0.099	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.12
	18-Jan-17	< 0.001	< 0.001	0.02	< 0.001	0.002	< 0.01	0.100	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.66
	24-Apr-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	0.097	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.40
	24-Jul-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	0.095	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.21

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 July 2017) of groundwater sampling data for Wells MW-1B and MW-2.
3. 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
Conemaugh Generating Station
Ash Disposal Site--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						
			0.05	8.86	1	0.1	96.2	4	4.07-6.81
MW-31 (Upgradient)	20-Dec-15	1435.54	< 0.05	6.2	1	< 0.1	50	4	6.15
	1-Feb-16	1438.04	< 0.05	7.1	1	< 0.1	34	4	6.42
	20-Apr-16	1439.54	< 0.05	7.8	< 1	< 0.1	44	4	6.45
	20-Jul-16	1435.89	< 0.05	6.3	1	< 0.1	58	4	6.24
	25-Oct-16	1436.24	< 0.05	6.7	1	< 0.1	70	4	5.82
	19-Jan-17	1438.74	< 0.05	6.4	1	< 0.1	64	3	6.19
	12-Apr-17	1439.74	< 0.05	6.2	1	< 0.1	52	4	5.75
	25-Jul-17	1437.24	< 0.05	7.4	1	< 0.1	72	4	5.62
	3-Oct-17	1434.49	< 0.05	6.6	1	< 0.1	32	4	6.36
	24-May-18	1441.64	< 0.05	6.2	1	< 0.1	58	4	6.29
	22-Oct-18	1439.94	< 0.05	84.9	1	< 0.1	40	4	6.17
	18-Apr-19	1440.19	< 0.05	6.0	1	< 0.1	32	4	6.01
	25-Jul-19	1438.14	< 0.05	5.7	1	< 0.1	54	4	5.74
	2-Oct-19	1435.54	< 0.05	6.3	1	< 0.1	44	4	5.36
MW-9 (Downgradient)	17-Dec-15	1100.47	< 0.05	102	83	0.1	426	72	7.08
	28-Jan-16	1100.57	0.09	102	97	0.1	424	63	7.20
	21-Apr-16	1099.77	< 0.05	96	81	0.1	398	65	7.38
	20-Jul-16	1098.97	0.05	99	93	< 0.1	466	62	7.57
	16-Nov-16	1099.82	< 0.05	104	94	< 0.1	466	55	7.05
	23-Jan-17	1100.77	< 0.05	96	92	< 0.1	406	65	7.27
	12-Apr-17	1099.47	< 0.05	96	96	< 0.1	446	77	6.74
	24-Jul-17	1099.82	< 0.05	104	98	< 0.1	456	79	6.60
	2-Oct-17	1099.67	< 0.05	94	92	< 0.1	430	75	7.41
	23-May-18	1100.17	< 0.05	104	112	< 0.1	456	84	7.29
	17-Oct-18	1100.32	< 0.05	102	109	< 0.1	472	67	7.09
	23-Apr-19	1100.07	0.31	106	118	0.1	472	73	7.12
	23-Jul-19	1099.97	< 0.05	107	120	0.1	520	72	7.15
	8-Oct-19	1099.02	< 0.05	116	116	< 0.1	500	72	7.35
MW-10 (Downgradient)	16-Dec-15	1103.26	< 0.05	106	90	0.1	444	97	7.71
	1-Feb-16	1103.36	< 0.05	102	100	0.1	416	107	7.56
	19-Apr-16	1103.06	< 0.05	102	95	0.1	454	99	7.45
	25-Jul-16	1102.16	< 0.05	100	91	0.1	476	114	7.25
	25-Oct-16	1102.16	< 0.05	117	84	0.1	522	113	7.50
	25-Jan-17	1103.86	< 0.05	94	105	< 0.1	482	110	7.21
	13-Apr-17	1102.86	< 0.05	97	99	< 0.1	460	97	6.77
	26-Jul-17	1102.66	0.05	108	94	< 0.1	508	127	6.75
	3-Oct-17	1102.61	< 0.05	111	91	0.1	490	130	7.38
	29-May-18	1104.76	< 0.05	99	99	0.1	492	106	7.14
	17-Oct-18	1103.66	< 0.05	98	89	0.1	456	106	7.10
	18-Apr-19	1103.46	< 0.05	85	103	< 0.1	388	103	7.06
	25-Jul-19	1102.86	< 0.05	108	94	0.1	476	120	7.07
	8-Oct-19	1102.06	< 0.05	110	84	< 0.1	470	123	7.35
MW-11 (Downgradient)	21-Dec-15	1102.68	0.08	180	55	0.1	814	223	6.77
	27-Jan-16	1103.38	0.09	169	48	< 0.1	776	191	7.02
	21-Apr-16	1102.63	0.07	161	46	< 0.1	754	170	7.31
	21-Jul-16	1101.68	0.14	156	52	< 0.1	754	208	7.37
	20-Oct-16	1101.93	0.09	166	48	0.1	754	199	6.97
	23-Jan-17	1103.63	< 0.05	164	51	0.1	770	207	6.98
	13-Apr-17	1103.28	0.07	170	49	< 0.1	774	183	6.65
	26-Jul-17	1102.33	0.10	150	60	< 0.1	700	182	6.35
	2-Oct-17	1102.48	0.07	151	61	0.1	732	210	7.20
	24-May-18	1103.08	< 0.05	139	54	0.1	736	192	7.02
	18-Oct-18	1102.93	0.07	169	60	0.1	750	194	6.94
	23-Apr-19	1102.88	0.37	159	58	0.2	758	213	6.58
	23-Jul-19	1102.73	0.06	153	59	0.1	714	185	6.73
	8-Oct-19	1101.78	0.08	165	60	< 0.1	700	181	6.74

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 July 2017) of groundwater sampling data for Well MW-31.

Table 4
Conemaugh Generating Station
Ash Disposal Site--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	0.001	0.02	0.001	0.002	0.01	0.005	0.1	0.001	0.01	0.0002	0.02	0.001	0.0002	1.89
		Groundwater Protection Standard														
		MCL	MCL	MCL	MCL	MCL	MCL	RSL	MCL	RSL	RSL	MCL	RSL	MCL	MCL	MCL
		0.006	0.01	2	0.004	0.005	0.1	0.006	4.0	0.15	0.04	0.002	0.10	0.05	0.002	5
MW-31 (Upgradient)	20-Dec-15	< 0.001	< 0.001	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	14.1
	1-Feb-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.08
	20-Apr-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.75
	20-Jul-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.77
	25-Oct-16	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.42
	19-Jan-17	< 0.001	< 0.001	0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.03
	12-Apr-17	< 0.001	< 0.001	< 0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.51
	25-Jul-17	< 0.001	< 0.001	< 0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	-0.05
	28-Mar-18	< 0.001	< 0.001	< 0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.63
	24-May-18	Not Analyzed	Not Analyzed	< 0.01	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.40
	22-Oct-18	Not Analyzed	Not Analyzed	0.01	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.71
	18-Apr-19	< 0.001	< 0.001	< 0.01	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.30
	25-Jul-19	Not Analyzed	Not Analyzed	0.01	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.88
	2-Oct-19	Not Analyzed	Not Analyzed	0.01	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	-0.50
MW-9 (Downgradient)	17-Dec-15	< 0.001	< 0.001	0.17	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	3.66
	28-Jan-16	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.18
	21-Apr-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	3.90
	20-Jul-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	-0.05
	16-Nov-16	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.78
	23-Jan-17	< 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	0.70
	12-Apr-17	< 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	0.03
	24-Jul-17	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.74
	28-Mar-18	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.37
	23-May-18	Not Analyzed	Not Analyzed	0.04	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.32
	17-Oct-18	Not Analyzed	Not Analyzed	0.05	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.67
	23-Apr-19	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.92
	23-Jul-19	Not Analyzed	Not Analyzed	0.06	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	1.60
	8-Oct-19	Not Analyzed	Not Analyzed	0.06	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.54
MW-10 (Downgradient)	16-Dec-15	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	-0.04
	1-Feb-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.25
	19-Apr-16	< 0.001	< 0.001	0.10	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.68
	25-Jul-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.55
	25-Oct-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.62
	25-Jan-17	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.29
	13-Apr-17	< 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	0.34
	26-Jul-17	< 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	1.05
	29-Mar-18	< 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	0.29
	29-May-18	Not Analyzed	Not Analyzed	0.03	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.33
	17-Oct-18	Not Analyzed	Not Analyzed	0.04	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.48
	18-Apr-19	< 0.001	< 0.001	0.03	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.79
	25-Jul-19	Not Analyzed	Not Analyzed	0.03	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.05
	8-Oct-19	Not Analyzed	Not Analyzed	0.04	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	1.15
MW-11 (Downgradient)	21-Dec-15	< 0.001	< 0.001	0.07	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	2.21
	27-Jan-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.33
	21-Apr-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	3.18
	21-Jul-16	< 0.001	< 0.001	0.08	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.70
	20-Oct-16	< 0.001	< 0.001	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.93
	23-Jan-17	< 0.001	< 0.001	0.07	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.48
	13-Apr-17	< 0.001	< 0.001	0.07	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.46
	26-Jul-17	< 0.001	< 0.001	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.80
	29-Mar-18	< 0.001	< 0.001	0.08	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.78
	24-May-18	Not Analyzed	Not Analyzed	0.07	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.83
	18-Oct-18	Not Analyzed	Not Analyzed	0.07	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	1.20
	23-Apr-19	< 0.001	< 0.001	0.08	< 0.001	< 0.002	< 0.01	< 0.005	0.2	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.84
	23-Jul-19	Not Analyzed	Not Analyzed	0.07	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.57
	8-Oct-19	Not Analyzed	Not Analyzed	0.07	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.1	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.45

= Value determined as a statistical outlier and excluded from background calculations.
= Result from July 17, 2018 re-sampling; prior result from May 23, 2018 sampling (103.6 pCi/L) was associated with use of incorrect analytical Method (gamma spec Method 901.1).

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 July 2017) of groundwater sampling data for Well MW-31.
3. 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

LEGEND:

MW-3 (1066.29) — CCR GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION MEASURED BETWEEN OCTOBER 3 AND 21, 2019.

GROUNDWATER FLOW DIRECTION

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

SCALE

0 100 200 FEET

APTIM

500 Penn Center Boulevard,
Suite 1000
Pittsburgh, Pennsylvania 15235

FIGURE 1
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH FILTER PONDS
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	1/2/20	--	E. Schlegel	--	--	631003459-B1

File: O:\PROJECT\631003459_Conemaugh\631003459-B1.dwg
Plot Date/Time: Jan 02, 2020 – 11:21am
Plotted By: Greg.Jones
Xref: Image

LEGEND:

MW-9 (1099.02) — CCR GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION MEASURED BETWEEN OCTOBER 2 AND 8, 2019.

GROUNDWATER FLOW DIRECTION

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

APTIM

500 Penn Center Boulevard,
Suite 1000
Pittsburgh, Pennsylvania 15235

FIGURE 2
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH/REFUSE DISPOSAL SITE
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	1/2/20	--	E. Schlegel	--	--	631003459-B2

File: O:\PROJECT\631003459_Conemaugh\631003459-B2.dwg
Plot Date/Time: Jan 02, 2020 – 11:27am
Plotted By: Greg.Jones
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Image

ATTACHMENT 4F

Preliminary Groundwater Monitoring and Statistical Analyses
Calendar Year 2020

Statistical Analysis for 2020 Groundwater Monitoring Results

The May 2020 groundwater monitoring data for the downgradient wells has been subjected to a direct comparison against the calculated upper prediction limits for background. This comparison indicates elevated sulfate concentrations above background for Well MW-4, consistent with prior observations and as addressed in the Alternate Source Demonstration that still remains relevant.

Samples for the second semi-annual sampling effort were collected in the fourth quarter of 2020. The analytical results are being reviewed as of the time of this submittal.

Conemaugh Generating Station
Ash Filter Ponds
CCR Appendix III Constituents
Detection Monitoring (May 2020)

Monitoring Well	Date Sampled	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						
		0.58	376	1560	0.20	6975	788	4.59-7.42
MW-1B (Upgradient)	17-Dec-15	0.29	333	1540	< 0.1	3620	544	5.49
	27-Jan-16	0.31	288	1280	< 0.1	3180	583	5.87
	20-Apr-16	0.28	170	652	< 0.5	2410	729	6.09
	19-Jul-16	0.36	208	1310	0.1	2760	575	5.79
	11-Oct-16	0.46	192	1010	0.2	2640	438	6.56
	17-Jan-17	0.43	198	1030	< 0.1	2650	427	5.87
	24-Apr-17	0.37	166	988	< 0.1	2470	548	5.27
	20-Jul-17	0.39	345	1560	< 0.1	3740	388	5.00
	1-Oct-17	0.36	430	2040	< 0.1	4930	427	5.68
	22-May-18	0.39	120	640	< 0.1	1680	364	5.91
	18-Oct-18	0.89	53	288	3.1	1340	543	7.56
	17-Apr-19	0.47	122	467	0.3	1300	369	6.00
	18-Jul-19	0.44	155	638	< 0.1	1630	303	5.60
	3-Oct-19	0.45	190	848	< 0.1	1930	300	5.33
	15-May-20	0.42	218	1170	< 0.1	2510	353	5.41
MW-2 (Upgradient)	11-Oct-16	0.30	191	251	< 0.1	1200	348	6.28
	16-Nov-16	0.31	176	94	0.1	868	416	6.95
	21-Dec-16	0.41	176	101	0.2	1050	519	7.03
	25-Jan-17	0.21	137	68	0.2	726	316	6.93
	21-Mar-17	0.33	158	75	0.1	828	387	6.40
	25-Apr-17	0.29	136	69	< 0.1	792	373	6.28
	13-Jun-17	0.30	150	60	< 0.1	768	369	6.15
	27-Jul-17	0.28	133	67	< 0.1	684	310	6.45
	4-Oct-17	0.32	138	58	< 0.1	768	330	6.80
	29-May-18	0.10	98	22	0.4	606	185	7.10
	23-Oct-18	0.18	105	21	0.4	550	192	6.97
	15-Apr-19	0.15	99	21	0.4	508	169	7.13
	30-Jul-19	0.15	101	19	0.3	572	194	6.80
	9-Oct-19	0.26	116	54	0.1	564	304	6.19
	15-May-20	0.16	104	18	0.3	534	224	6.27
MW-3 (Downgradient)	16-Dec-15	< 0.05	123	363	< 0.1	882	227	5.74
	26-Jan-16	< 0.05	132	392	< 0.1	970	250	5.94
	25-Apr-16	< 0.05	203	505	< 0.1	1460	288	6.52
	25-Jul-16	< 0.05	115	343	< 0.1	972	225	5.72
	24-Oct-16	< 0.05	123	304	< 0.1	902	211	6.01
	17-Jan-17	< 0.05	113	370	< 0.1	976	245	5.95
	25-Apr-17	< 0.05	181	552	< 0.1	1740	314	5.57
	25-Jul-17	< 0.05	151	389	< 0.1	1270	256	5.47
	1-Oct-17	< 0.05	135	387	< 0.1	1140	255	6.30
	23-May-18	< 0.05	175	455	< 0.1	1330	276	6.07
	23-Oct-18	< 0.05	152	440	< 0.1	1150	293	5.75
	22-Apr-19	< 0.05	181	553	< 0.1	1440	353	5.97
	30-Jul-19	< 0.05	170	497	< 0.1	1720	291	5.66
	21-Oct-19	< 0.05	143	432	< 0.1	1110	261	5.54
	13-May-20	< 0.05	155	464	< 0.1	1320	354	5.98
MW-4 (Downgradient)	21-Dec-15	0.15	301	643	< 0.1	2470	874	5.77
	4-Feb-16	0.13	316	654	< 0.1	2580	870	5.83
	26-Apr-16	0.13	426	932	< 0.1	3390	965	6.19
	25-Jul-16	0.12	346	874	< 0.1	3120	1090	5.82
	26-Oct-16	0.17	310	670	< 0.1	2530	865	6.27
	30-Jan-17	0.15	301	736	< 0.1	2740	895	6.12
	26-Apr-17	0.14	392	863	< 0.1	3310	996	6.68
	27-Jul-17	0.19	403	977	< 0.1	3350	1170	5.63
	4-Oct-17	0.14	335	814	< 0.2	3200	1050	6.02
	29-May-18	0.13	345	842	< 0.1	3280	1010	5.96
	24-Oct-18	0.14	290	589	< 0.1	2550	927	5.99
	22-Apr-19	0.10	316	800	< 0.1	2470	892	5.98
	31-Jul-19	0.12	292	650	< 0.1	2430	854	5.62
	21-Oct-19	0.16	401	831	< 0.1	3030	1150	5.80
	13-May-20	0.12	306	644	< 0.1	2480	987	6.46
MW-23 (Downgradient)	20-Dec-15	< 0.05	182	388	< 0.1	1580	653	5.59
	2-Feb-16	< 0.05	176	344	< 0.1	1520	576	5.98
	25-Apr-16	< 0.05	175	329	< 0.1	1540	557	5.16
	21-Jul-16	0.34	173	371	< 0.1	1600	591	5.63
	24-Oct-16	< 0.05	173	327	< 0.1	1540	509	6.14
	18-Jan-17	0.11	165	368	< 0.1	1550	543	5.79
	24-Apr-17	< 0.05	164	383	< 0.1	1520	558	5.21
	24-Jul-17	< 0.05	183	378	< 0.1	1530	532	5.15
	1-Oct-17	< 0.05	172	313	< 0.1	1520	575	6.25
	22-May-18	< 0.05	181	347	< 0.1	1460	507	5.63
	22-Oct-18	< 0.05	165	355	< 0.1	1450	538	5.70
	17-Apr-19	< 0.05	153	346	< 0.1	1320	527	5.52
	18-Jul-19	< 0.05	164	309	< 0.1	1330	469	5.54
	9-Oct-19	< 0.05	143	350	< 0.1	1320	534	5.69
	13-May-20	0.05	139	363	< 0.1	1260	491	5.74

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 July 2017) of groundwater sampling data for Wells MW-1B and MW-2

This table was provided by APTIM Environmental & Infrastructure, LLC in November 2020 to include the first round of CCR Rule sampling completed in 2020.

ATTACHMENT 4G

Cobalt Characterization and Associated Groundwater Evaluation
Summary of Findings, December 2020

[redacted]

Prepared for:

Keystone-Conemaugh Projects, LLC
Conemaugh Generating Station
New Florence, Pennsylvania

Prepared by:

Aptim Environmental & Infrastructure, LLC
Pittsburgh, Pennsylvania

December 2020

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List of Acronyms & Abbreviations

AFP	Ash Filter Pond
APTIM	Aptim Environmental & Infrastructure, LLC
ASD	Alternate Source Demonstration
Bgs	below ground surface
CCR	Coal Combustion Residuals
CME	CME Engineering
GWPS	Groundwater Protection Standard
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
ppm	parts per million
Rule	Disposal of Coal Combustion Residuals (CCR) from Electric Utilities final rule
SPLP	Synthetic Precipitation Leaching Procedure
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
Station	Conemaugh Generating Station
USGS	United States Geological Survey

1.0 Introduction

As requested by Keystone-Conemaugh Projects, LLC, Aptim Environmental & Infrastructure, LLC (APTIM) developed and implemented a site investigation at the Conemaugh Generating Station (Station) to evaluate groundwater quality aspects in the areas proximate and downgradient to the existing Ash Filter Ponds (AFPs). These aspects were focused specifically on cobalt in the context of the four AFPs (Ponds "A," "B," "C," and "D") being a consolidated Coal Combustion Residuals (CCR) unit subject to the groundwater monitoring requirements outlined in the CCR Rule (Rule). This focus was further driven by the Station's anticipated submittal of an Application Package under the recently established Part B provisions of the Rule (which become effective on December 14, 2020), applicable portions of which are codified in 40 CFR §257.71(d).

In accordance with the Rule, groundwater monitoring at the AFPs has been ongoing since late 2015, beginning with the required collection of eight rounds of background data per the Detection Monitoring obligations outlined in §257.94. The background datasets comprise all CCR Appendix III and IV constituents and encompass two upgradient wells (Wells MW-1B and MW-2) and three downgradient wells (Wells MW-3, MW-4, and MW-23), which form the CCR groundwater monitoring network (see attached Figure 1). Data from these initial eight rounds were utilized to calculate an upper prediction limit (using Sanitas™ statistical software) for each of the Appendix III constituents. Subsequent monitoring and comparison against these values revealed sulfate in downgradient Well MW-4 at levels representing a statistically significant increase (SSI) over background. Per §257.94(e)(2), a successful Alternate Source Demonstration (ASD) was completed (APTIM, April 2018), which identified incidental surface spillage/deposition of gypsum (from truck-based hauling) to be the cause of the elevated sulfate concentrations in Well MW-4. To date, sulfate in Well MW-4 persists as the sole SSI observed, and with continued applicability of the ASD, the AFPs have appropriately remained in Detection Monitoring.

Considering the Station's intent to submit a Part B Application Package, and recognition that cobalt (a CCR Appendix IV constituent) had been detected in groundwater during initial background monitoring at measurable levels in each of the three downgradient wells, APTIM's current investigation objectives were structured to examine potential lines of evidence to either identify or negate the AFPs as a possible reason for the elevated levels. These lines of evidence were centered around the surface water and solid residuals (i.e., bottom ash) in the AFPs, the localized groundwater quality (in the five CCR wells and other existing well locations), and composition of the local/regional soils. The following sections of this report provide a condensed summary of the data/information gathered from September-October 2020 field activities and laboratory analyses used to evaluate these lines of evidence, along with preliminary conclusions drawn from the findings.

2.0 Ash Filter Ponds Surface Water and Solid Residuals

2.1 Surface Water Analysis

Under direction from APTIM and per the approved scope of work for the investigation, surface water samples were collected by CME Engineering (CME) from each of the four AFPs and submitted to Geochemical Testing (Somerset, PA) for laboratory analyses. The results from the samples (collected on September 23, 2020) are summarized in the attached Table 1 providing data for all CCR Appendix III and IV constituents, along with select other elements (aluminum, iron, and manganese) and various cations/anions. Copies of the laboratory reports are provided in Appendix A. With regard to cobalt, it is clear from the data that this constituent was not detected in any of the surface water samples collected from the AFPs (all values reported as < 0.005 milligrams per liter [mg/L]). Beyond cobalt, however, it is noted that several other CCR Appendix IV constituents were detected, including antimony, arsenic, lead, lithium, selenium and thallium. These two combined observations hold particular significance when comparisons are made to the results for these same constituents in the downgradient monitoring wells (further discussed in Section 3.0).

2.2 Solid Residuals Analysis

In conjunction with the surface water sampling, CME also collected samples of the solid residual materials from each of the AFPs. These materials represent accumulated fine bottom ash that has settled out from the sluicing transport water. The samples were submitted to Geochemical Testing for analysis of total metals (including cobalt), and then further subjected to testing via the Synthetic Precipitation Leaching Procedure (SPLP) to understand the potential ability of cobalt to leach from the ash matrix. Copies of the laboratory reports are provided in Appendix B. As shown in the attached Table 2, total cobalt was measured in each of the bottom ash samples at concentrations ranging from 6.0 to 33.3 milligrams per kilogram (mg/kg), or equivalently expressed as parts per million (ppm). When the solid materials were subjected to the SPLP testing, the results consistently indicated non-detect levels of cobalt in the leachate extract providing acknowledgement of this constituent being tightly bound to the ash matrix. These SPLP results further support and substantiate the observed absence of cobalt in the surface water samples noted in Section 2.1.

2.3 Line of Evidence Findings

In view of the information presented above and contained in Tables 1 and 2, the lack of cobalt in the surface water of the AFPs and its further propensity to remain bound in the ash matrix clearly suggest that detected levels of cobalt in the downgradient CCR Monitoring Wells MW-3, MW-4, and MW-23 are not linked to the AFPs. Conversely, the presence of certain CCR Appendix IV constituents in the surface water and their corresponding absence in the downgradient wells offers

further evidence of an incomplete migration pathway. This is particularly the case for lithium, which is quite often considered a tracer in some applications due to its stable isotope ratio and relative mobility. Concentrations of this constituent are on average 80-fold higher in the surface water of the AFPs than the non-detect levels (< 0.01 mg/L) in each of the downgradient wells.

3.0 CCR Wells and Other Locations Groundwater

3.1 CCR Wells

Again under the direction of APTIM, groundwater samples were collected by CME from each of the five wells that comprise the CCR Monitoring Network for the AFPs, and submitted to Geochemical Testing for laboratory analyses. The results from the samples (collected on September 23, 2020) are summarized in the attached Table 1 (alongside the surface water data for the AFPs), and represent the same list of parameters evaluated for the AFPs. Copies of the laboratory reports are provided in Appendix C. With regard to cobalt, it was reported in upgradient Well MW-1B at a concentration just above the detection limit (0.005 mg/L), and also in each of the downgradient wells at concentrations ranging from 0.010 to 0.053 mg/L. When reviewed against the data generated from the initial eight rounds of background sampling (December 2015 – July 2017), this pattern of detections and the relative concentrations remain consistent, with downgradient Well MW-23 exhibiting the highest cobalt levels.

Although the AFPs have never progressed to CCR Assessment Monitoring (based on the successful ASD for sulfate), for purposes of the current study the data from the background sampling was input to the Sanitas™ software and a corresponding CCR Groundwater Protection Standard (GWPS) was generated. The input and abbreviated output files from the Sanitas application are provided in Appendix D, and show a calculated GWPS for cobalt of 0.013 mg/L. If a comparison were done and applicable, the September 2020 cobalt results would be considered to represent a statistically significant level (SSL) above the GWPS in downgradient Wells MW-4 and MW-23. Notwithstanding, the absence of cobalt in the AFPs surface water invariably implies that there must be another reason for the levels of cobalt observed in the groundwater. Moreover, and as previously highlighted in Section 2.1, the presence of several other CCR Appendix IV constituents in the AFPs surface water but absence in the groundwater additionally points to an unlikely migration pathway. These constituents notably include antimony, arsenic, lead, lithium, selenium, and thallium, with lithium again cited as a potentially useful tracer in certain applications due to its stable isotope ratio and relative mobility in aqueous environments.

3.2 Other Existing Well Locations

To help illustrate the levels of cobalt in the groundwater, Figure 2 has been prepared to show measured concentrations (from the September 2020 sampling) in the CCR monitoring wells along with historical concentrations reported from other existing onsite wells. Examination of this figure yields several noted observations from a more holistic perspective. Out of the total number of 34 wells (including five CCR wells plus 29 other existing wells) for which cobalt data is available, there are 23 locations where cobalt was detected in the groundwater. This includes four of the five CCR wells, plus 19 other wells spread across various portions of the Station property. The highest

concentrations appear to be clustered in an area east/southeast of the AFPs and also spanning northward along the right-descending riverbank between existing Wells SH-9 and SH-23. The majority of these well locations, including other more interior-based wells with measured cobalt concentrations (Wells SH-1, SH-16, SH-17, and SH-21) are recognizably outside the generally identified downgradient groundwater flow paths from the AFPs.

In addition to showing the cobalt groundwater concentrations, this figure also serves as a precursor to the discussion provided in Section 4.0, with identification of 13 soil boring locations (designated as SB-1 thru SB-13) which were investigated during the September 2020 activities. These borings were intended to provide information regarding the possible presence of naturally occurring cobalt in the soils, and were placed in locations proximate to existing groundwater wells, including the five CCR monitoring wells.

3.3 Line of Evidence Findings

Similar to the surface water discussion in Section 2.3, the identified presence/absence of certain constituents in groundwater offers meaningful insight regarding a possible pathway and contributions from the AFPs to groundwater. Despite measurable levels of cobalt in the downgradient CCR wells (at levels that could represent an SSL, if applicable), the fact remains that cobalt was not detected in any of the AFP surface water samples or found to leach from ash solids stored in the ponds. The complete absence of other noted CCR Appendix IV constituents (particularly lithium) from the downgradient wells, and their consistent presence in each of the AFPs is also suggestive of an incomplete migration pathway. On a broader scale, the incidence of cobalt in groundwater extends to monitoring wells outside the immediate area (and any potential influence) of the AFPs. Of the 34 wells (5 CCR wells plus 29 others) shown on Figure 2 with available data, 23 of the wells have measurable levels of cobalt. Outside of the CCR wells, a significant portion of the other existing onsite wells have cobalt concentrations on par with the CCR wells and in some cases are even higher. A small area east of the AFPs shows cobalt concentrations in groundwater to be two to three-fold greater than those measured in CCR Well MW-23, which has the highest cobalt concentration of the three downgradient wells. Collectively, these findings and observations continue to support the mounting evidence that the AFP water is not the cause of cobalt in the groundwater.

4.0 Local/Regional Soils Composition

4.1 Local Soils

To gather information and data to examine the final line of evidence regarding cobalt in soils, APTIM personnel conducted a soil boring program in parallel with the other surface water and groundwater sampling activities completed by CME. Boring locations (in areas proximate to existing monitoring wells) were selected following a site reconnaissance on September 16, 2020, with actual field work commencing on September 21, 2020. Over the course of three days and concluding on September 23, 2020, a total of thirteen soil borings (designated as SB-1 thru SB-13) were advanced down to depths which reached into the saturated zone (groundwater-bearing zone) at each location. Based primarily on visual screening of the soil materials, samples were collected at each location to provide at least one from the vadose zone (unsaturated) and one from the saturated zone. Additional samples were collected if unusual or anomalous materials were encountered, such as coal fragments, uniquely colored soils, or recognizable minerals (e.g., pyrite). Boring logs were prepared to document the materials retrieved at each location and are provided in Appendix E.

Collected samples were submitted to RJ Lee Group, Inc. (Monroeville, PA) and analyzed for total metals, including cobalt along with aluminum, iron, and manganese. The results from the analyses are summarized in the attached Table 3, which in turn, was used to develop the attached Figure 3 that shows the soil boring locations and the cobalt concentrations measured at each sample depth. Table 3 also incorporates brief excerpts from the logs that relate to the approximate sampling horizons at each boring location. Copies of the laboratory reports are provided in Appendix F.

From review of Table 3 and Figure 3, it is seen that cobalt was detected at every boring location and within every sample collected, irrespective of the depth horizon and with no obvious depth-dependent pattern. Cobalt concentrations in the individual soil samples ranged from 9.9 to 59.1 mg/kg, with the highest reading measured at location SB-12 (furthest upriver location) at a depth of 18-20 feet below ground surface (bgs). As it is known that cobalt tends to be higher in shale-based rocks, the frequently noted presence of shale and shale fragments at this location could be tied to the elevated cobalt concentration. Soil borings SB-1, SB-2, and SB-3, which were located near each of the three existing downgradient CCR monitoring wells (see Figure 3), showed average cobalt concentrations of 20.9, 19.6, and 20.3 mg/kg, respectively.

When attempts are made to potentially correlate the cobalt soil concentrations to the cobalt groundwater concentrations, it becomes apparent that there is not a simple linear/direct relationship that associates higher groundwater concentrations with higher soil concentrations. In the case of cobalt, there are numerous variables that contribute to its behavior and predicted/observed localized mobility and partitioning into the groundwater. Some of these factors include soil and

groundwater pH, oxidation-reduction potential and the presence of dissolved organic matter in groundwater, interactions/substitution into certain minerals, and retention by oxide and hydroxide compounds of iron and manganese, to name a few. At a very high level, and recognizing that the behavior of cobalt under weathered conditions follows that of iron and manganese, it is perhaps not coincidental that some of the highest cobalt concentrations in groundwater were found in wells that also have some of the highest manganese concentrations. This would encompass Wells SH-9, SH-10, and SH-12, (previously referenced as a cluster east of the AFPs), and would also include downgradient CCR Well MW-23, which has cobalt and manganese concentrations generally on par with Well SH-9.

In any event, identification of the particular mechanisms contributing to the varying cobalt groundwater concentrations observed in the monitoring wells would require considerable effort, including potential additional laboratory examination using sequential extraction procedures to speciate the cobalt in the soils. Nonetheless, quantification of these mechanisms would not alter the current observations, which affirm that cobalt is widespread and naturally occurring source in the local soils, and thus a principal contributing factor to the detected groundwater concentrations.

4.2 Regional Soils

Building on the supposition that naturally occurring cobalt in the soils is responsible for the concentrations being found in the groundwater, a search of available literature and online publications was conducted. This review identified a significant amount of information from the United States Geological Survey (USGS), including documents that summarize and graphically depict naturally occurring cobalt concentrations in soils across the country. The attached Figure 4 shows a nationwide illustration of near-surface (within the top several feet) naturally occurring cobalt concentrations in soils based upon sampling performed by USGS. The darker red and orange colorations indicate the highest cobalt concentrations, as represented by a predominant region of the northwest and also in the Ohio River Valley and portions of Appalachia. Upon closer examination, the attached Figure 5 provides a magnified view of the area local to the Station, using New Florence, PA as the central reference point. As shown, the Station (New Florence) lies within an area regionally characterized as being in the top 30-40 percent in terms of naturally occurring cobalt concentrations in soil. From the data presented in Table 3, the vast majority of the samples (although collected at generally deeper depth horizons than the USGS samples) actually fall within the 80th-100th percentile ranges cited by the USGS (shown on the legends on Figures 4 and 5).

4.3 Line of Evidence Findings

The widespread and consistent presence of cobalt in the samples analyzed and the convincing support documentation from USGS both serve to fully support the position that soils concentrations are naturally occurring. Mobility and detection of dissolved cobalt at the different well locations hinges on numerous variables along with geochemical and lithological conditions,

and thus localized variations in these conditions will dictate the behavior of cobalt in the subsurface aqueous environment. This line of evidence further corroborates the determination that the AFPs are not responsible for cobalt in the groundwater in the subject CCR monitoring wells nor at other locations.

5.0 Conclusions

The findings as presented herein bring together the information generated to examine the three lines of evidence initially laid out as part of the current study. These findings have yielded key elements, including the absence of cobalt in the AFP surface water; the absence of other noted Appendix IV constituents (which were detected in the AFP surface water) from the downgradient CCR monitoring wells; and the ubiquitous presence of naturally occurring cobalt in the local soils. When viewed individually, the findings provide supporting aspects to the overall objectives of the study and when considered collectively, they provide a very compelling narrative that very convincingly suggests that the native soil concentrations and not the AFPs are the responsible cause for the cobalt in the groundwater.

6.0 References

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Smith, David B., Cannon, William F., Woodruff, Laurel G., Solano, Federico, and Ellefsen, Karl J. 2017. "Geochemical and Mineralogical Maps, with Interpretation, for Soils of the Conterminous United States." U.S. Department of the Interior—U.S. Geological Survey. Scientific Investigations Report 2017-5118.

Tables

Table 1
Ash Filter Ponds and CCR Wells – Water Analyses
Conemaugh Generating Station

Parameter	Units	MW-1B (Upgradient)	MW-2 (Upgradient)	MW-3 (Downgradient)	MW-4 (Downgradient)	MW-23 (Downgradient)	MW-23 DUP (Downgradient)	Ash Filter Pond A	Ash Filter Pond B	Ash Filter Pond C	Ash Filter Pond D
		9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020	9/23/2020
Field Readings:											
Groundwater Elevation	ft MSL	1073.94	1074.07	1071.06	1071.85	1070.54	1070.54	N/A	N/A	N/A	N/A
Specific Conductance	µmhos/cm	3650	1330	1720	3120	2020	2020	2770	2750	2730	2810
Dissolved Oxygen	mg/L	0.00	6.91	0.00	0.00	ND @ 0.1	ND @ 0.1	4.60	2.51	8.95	0.86
Temperature	^{0}C	15.7	16.2	19.7	19.2	20.2	20.2	24.0	23.4	23.2	23.3
Turbidity	NTU	0.60	ND @ 0.1	ND @ 0.1	ND @ 0.1	17.8	17.8	24.5	26.2	41.3	46.8
pH	S.U.	5.48	6.43	5.78	5.92	5.57	5.57	6.98	7.68	7.78	8.02
CCR Appendix III:											
Total Boron	mg/L	0.40	0.33	ND @ 0.05	0.10	0.05	0.07	5.86	5.21	5.60	5.93
Total Calcium	mg/L	154	137	131	209	127	119	453	409	442	456
Total Chloride	mg/L	830	171	419	461	321	321	126	121	120	120
Total Fluoride	mg/L	ND @ 0.1	0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	0.2	0.2	0.2	0.2
Total Dissolved Solids	mg/L	1940	846	1210	1700	1190	1210	2340	2250	2190	2340
Sulfate	mg/L	413	348	236	680	462	465	1500	1430	1430	1430
pH	S.U.	5.48	6.43	5.78	5.92	5.57	5.57	6.98	7.68	7.78	8.02
CCR Appendix IV:											
Total Antimony	mg/L	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	0.0015	0.0016	0.0017	0.0013
Total Arsenic	mg/L	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	0.021	0.033	0.045	0.025
Total Barium	mg/L	0.02	0.01	0.04	0.01	0.01	0.01	0.05	0.06	0.06	0.06
Total Beryllium	mg/L	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001
Total Cadmium	mg/L	0.002	ND @ 0.002	ND @ 0.002	ND @ 0.002	ND @ 0.002	ND @ 0.002	ND @ 0.002	0.002	0.002	ND @ 0.002
Total Chromium	mg/L	ND @ 0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01
Total Cobalt	mg/L	0.005	ND @ 0.005	0.010	0.020	0.053	0.050	ND @ 0.005	ND @ 0.005	ND @ 0.005	ND @ 0.005
Total Fluoride	mg/L	ND @ 0.1	0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	0.2	0.2	0.2	0.2
Total Lead	mg/L	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	0.0016	0.0029	0.0095	0.0021
Total Lithium	mg/L	0.02	ND @ 0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01	0.89	0.82	0.84	0.89
Total Mercury	mg/L	ND @ 0.0002	ND @ 0.0002	ND @ 0.0002	ND @ 0.0002	ND @ 0.0002	ND @ 0.0002	ND @ 0.0002	ND @ 0.0002	ND @ 0.0002	ND @ 0.0002
Total Molybdenum	S.U.	ND @ 0.02	ND @ 0.02	ND @ 0.02	ND @ 0.02	ND @ 0.02	ND @ 0.02	ND @ 0.02	ND @ 0.02	ND @ 0.02	ND @ 0.02
Total Selenium	mg/L	0.0018	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	ND @ 0.001	0.0014	0.0018	0.0020	0.0018
Total Thallium	mg/L	ND @ 0.0002	ND @ 0.0002	ND @ 0.0002	ND @ 0.0002	ND @ 0.0002	ND @ 0.0002	0.0016	0.0032	0.0030	0.0022
Total Radium 226+228	pCi/L	0.29	-0.59	1.44	0.22	0.93	0.41	1.02	0.36	0.61	-0.14
Supplemental Metals:											
Total Aluminum	mg/L	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	0.2	0.2	0.4	0.4
Dissolved Aluminum	mg/L	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1
Total Cobalt	mg/L	0.005	ND @ 0.005	0.010	0.020	0.053	0.050	ND @ 0.005	ND @ 0.005	ND @ 0.005	ND @ 0.005
Dissolved Cobalt	mg/L	ND @ 0.005	ND @ 0.005	0.010	0.020	0.048	0.050	ND @ 0.005	ND @ 0.005	ND @ 0.005	ND @ 0.005
Total Iron	mg/L	0.07	ND @ 0.05	0.48	0.14	11.8	10.8	0.63	0.31	0.60	0.79
Dissolved Iron	mg/L	ND @ 0.05	ND @ 0.05	0.47	0.10	10.3	11.0	ND @ 0.05	ND @ 0.05	ND @ 0.05	ND @ 0.05
Total Manganese	mg/L	2.89	1.54	3.80	4.64	6.70	6.26	0.24	0.22	0.24	0.22
Dissolved Manganese	mg/L	2.64	1.53	4.06	4.95	6.11	6.45	0.23	0.23	0.24	0.20
Anions:											
Alkalinity to pH 4.5	mg/L $CaC0_3$	14	98	44	53	44	44	25	23	25	26
Chloride	mg/L	830	171	419	461	321	321	126	121	120	120
Fluoride	mg/L	ND @ 0.1	0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	0.2	0.2	0.2	0.2
Sulfate	mg/L	413	348	236	680	462	465	1500	1430	1430	1430
Cations:											
Aluminum	mg/L	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	0.2	0.2	0.4	0.4
Barium	mg/L	0.02	0.01	0.04	0.01	0.01	0.01	0.05	0.06	0.06	0.06
Boron	mg/L	0.40	0.33	ND @ 0.05	0.10	0.05	0.07	5.86	5.21	5.60	5.93
Calcium	mg/L	154	137	131	209	127	119	453	409	442	456
Iron	mg/L	0.07	ND @ 0.05	0.48	0.14	11.8	10.8	0.63	0.31	0.60	0.79
Lithium	mg/L	0.02	ND @ 0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01	ND @ 0.01	0.89	0.82	0.84	0.89
Magnesium	mg/L	27.1	39.7	61.7	52.0	48.4	45.3	65.2	59.1	64.5	65.9
Manganese	mg/L	2.89	1.54	3.80	4.64	6.70	6.26	0.24	0.22	0.24	0.22
Potassium	mg/L	13.6	3.4	2.1	3.5	2.3	2.2	30.4	27.9	29.5	30.9
Sodium	mg/L	439	67.6	111	236	172	158	87.3	79.4	81.7	84.8

N/A = Not applicable.
ND = Not detected at or above the indicated reporting limit.

Table 2
Ash Filter Ponds – Solid Residuals Analyses
Conemaugh Generating Station

Parameter	Units	Ash Ponds Solids – Total Metals and SPLP Metals Analyses			
		Ash Filter Pond A	Ash Filter Pond B	Ash Filter Pond C	Ash Filter Pond D
		9/23/2020	9/23/2020	9/23/2020	9/23/2020
Total Metals:					
Aluminum	mg/kg	12,700	8,000	6,610	6,540
Cobalt	mg/kg	33.3	25.5	6.0	11.3
Iron	mg/kg	57,200	45,200	27,800	45,600
Manganese	mg/kg	1,170	1,270	65	227
SPLP Metals:					
Aluminum	mg/L	0.5	0.4	0.1	0.3
Cobalt	mg/L	ND @ 0.005	ND @ 0.005	ND @ 0.005	ND @ 0.005
Iron	mg/L	0.34	ND @ 0.05	ND @ 0.05	0.08
Manganese	mg/L	0.05	ND @ 0.01	ND @ 0.01	ND @ 0.01

ND = Not detected at or above the indicated reporting limit.

Table 3
Soil Boring Analytical Results
Conemaugh Generating Station

Soil Boring Location & Depth (ft bgs)	Soil Depth Zone (Vadose or Saturated)	Date Collected	Soil Borings – Total Metals Analyses				Notes (from boring logs)
			Aluminum (mg/kg)	Cobalt (mg/kg)	Iron (mg/kg)	Manganese (mg/kg)	
SB-1							
5 - 7	Vadose	9/21/2020	51,100	34.0	48,600	1,250	Orangish-gray Clay, mottled, silt and sand, moist
7 - 8	Vadose	9/21/2020	69,200	17.5	55,500	380	Dark black CLAY seam, moist
18 - 20	Saturated	9/21/2020	32,500	11.3	60,200	295	Dark brown to organish-brown SAND, wet
SB-2							
6 - 8	Vadose	9/21/2020	54,200	21.4	46,600	801	Dark brown SILT with some clay, moist
13 - 13.5	Vadose	9/21/2020	47,500	14.8	38,800	425	Dark black COAL lens
18 - 20	Saturated	9/21/2020	65,900	22.7	43,600	537	Weathered SANDSTONE boulder, iron-stained, wet
SB-3							
6 - 8	Vadose	9/22/2020	36,000	26.5	35,900	169	Dark brown sandy CLAY, mottled orange, dry
9 - 10	Vadose	9/22/2020	65,500	24.4	47,000	1,080	Dark brown/black sandy CLAY, organic matter, damp
18 - 20	Saturated	9/22/2020	37,300	9.9	33,700	183	Orangish to dark brown SAND, some silt, wet
SB-4/SB-4R							
5 - 7	Vadose	9/22/2020	52,600	15.2	33,100	632	Dark brown CLAY, black staining, coal fragments, dry
8 - 10	Vadose	9/22/2020	52,200	17.1	36,000	429	Light brown/orangish-red sandy CLAY, dry
18 - 20	Saturated	9/23/2020	43,100	23.6	48,000	515	Orangish-brown/red SAND, large coal fragments, wet
SB-5							
5 - 6	Vadose	9/22/2020	56,300	11.4	28,300	227	Orangish-brown SAND, some clay, coal fragments, damp
12.5 - 14.5	Saturated	9/22/2020	38,500	17.5	41,700	524	Tan/light-brown SAND, quartz pebbles, wet
SB-6							
4 - 5	Vadose	9/22/2020	106,000	29.5	58,000	1,610	Orangish-brown sandy CLAY, coal fragments, dry
6 - 8	Vadose	9/22/2020	102,000	28.0	55,000	1,300	Same as above, with increasing coal fragments, moist
12 - 14	Saturated	9/22/2020	52,700	28.0	61,500	2,470	Dark orangish-brown clayey SAND, pebbles, wet
SB-7							
6 - 8	Vadose	9/22/2020	55,200	26.7	52,000	1,600	Dark brown clayey SAND, trace coal at 7.3 ft, wet
12 - 14	Saturated	9/22/2020	37,500	15.4	38,400	381	Grades brown silty CLAY to dark brown SAND, wet
SB-8							
8 - 10	Vadose	9/23/2020	54,400	18.1	39,300	831	Dark gray/black clayey SILT, trace coal fragments, moist
13 - 15	Vadose	9/23/2020	76,100	10.1	28,100	82	Same as above, with larger coal fragments, moist
22 - 24	Saturated	9/23/2020	49,400	21.5	81,600	569	Dark brown/black SAND; sandstone fragments, wet
SB-9							
4 - 5	Vadose	9/23/2020	86,500	28.1	51,000	903	Orangish-brown silty CLAY, some sand, coal fragments, damp
8 - 10	Vadose	9/23/2020	57,900	29.3	72,400	858	Orangish-brown clayey SAND, trace coal fragments, damp
18 - 20	Saturated	9/23/2020	62,300	23.7	83,800	341	Dark orangish-brown SAND; coal fragments, wet
SB-10							
5 - 5.5	Vadose	9/23/2020	82,300	24.8	67,500	411	Black SAND, some coal fragments, moist
10 - 12	Vadose	9/23/2020	67,100	28.2	79,400	1,770	Orangish-brown clayey SILT, coal from 10.5-11.0 ft, dry-moist
18 - 20	Saturated	9/23/2020	58,900	24.9	80,900	853	Dark brown SAND, sandstone fragments and pebbles, wet
SB-11							
4 - 5	Vadose	9/23/2020	63,300	26.5	42,100	1,270	Dark brown silty CLAY grading to more sand, trace coal fragments, damp
10 - 13	Saturated	9/23/2020	59,000	24.8	65,900	1,440	Dark brown/orangish-red SAND, some coal and sandstone, wet
SB-12							
8 - 10	Vadose	9/23/2020	103,000	29.2	65,100	1,740	Tan/brown sandy SILT, trace coal, clay/gravel and shale fragments, dry
18 - 20	Vadose	9/23/2020	73,200	59.1	40,100	417	Orangish-brown CLAY, coal at 14.2 ft, silt/shale fragments, moist
23 - 24	Saturated	9/23/2020	82,800	32.1	58,200	205	Bright orangish-red clayey SILT; sand and weathered shale, moist-wet
SB-13							
6 - 8	Vadose	9/23/2020	57,700	18.2	40,100	858	Orangish-brown/dark brown silty CLAY; coal fragments, dry
12 - 14	Saturated	9/23/2020	32,600	12.0	24,300	192	Dark brown clayey SAND, wet

Figures

LEGEND:

MW-3 (1071.06) CCR GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION MEASURED ON SEPTEMBER 23, 2020

GROUNDWATER GENERALIZED FLOW DIRECTION

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

SCALE

0 100 200 FEET

APTIM

500 Penn Center Boulevard,
Suite 1000
Pittsburgh, Pennsylvania 15235

FIGURE 1
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH FILTER PONDS
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	DESIGNED BY	DATE	OFFICE
631016449-B1	D. Shott	D. Shott	E. Schlegel	--	12/2/20	Pittsburgh, PA

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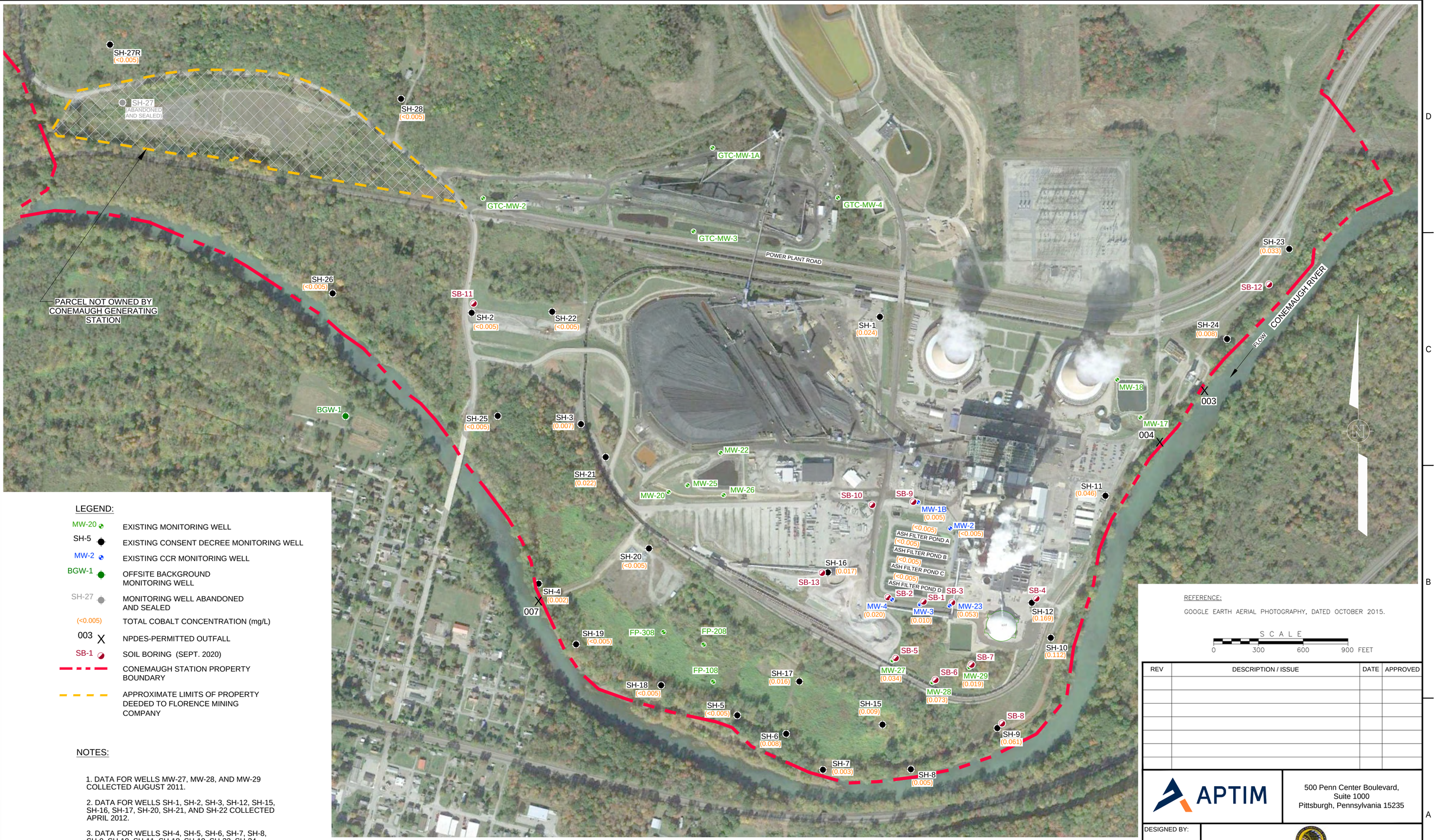
Plot Date/Time: Dec 03, 2020 – 10:55am Xref:
Plotted By: Evan.Schlegel Image

DRAWING NUMBER 631016449-E9

VERIFY SCALE 0 1"



LEGEND:

MW-20	EXISTING MONITORING WELL
SH-5	EXISTING CONSENT DECREE MONITORING WELL
MW-2	EXISTING CCR MONITORING WELL
BGW-1	OFFSITE BACKGROUND MONITORING WELL
SH-27	MONITORING WELL ABANDONED AND SEALED
(<0.005)	TOTAL COBALT CONCENTRATION (mg/L)
003 X	NPDES-PERMITTED OUTFALL
SB-1	SOIL BORING (SEPT. 2020)
	CONEMAUGH STATION PROPERTY BOUNDARY
	APPROXIMATE LIMITS OF PROPERTY DEEDED TO FLORENCE MINING COMPANY

NOTES:

1. DATA FOR WELLS MW-27, MW-28, AND MW-29 COLLECTED AUGUST 2011.
2. DATA FOR WELLS SH-1, SH-2, SH-3, SH-12, SH-15, SH-16, SH-17, SH-20, SH-21, AND SH-22 COLLECTED APRIL 2012.
3. DATA FOR WELLS SH-4, SH-5, SH-6, SH-7, SH-8, SH-9, SH-10, SH-11, SH-18, SH-19, SH-23, SH-24, SH-25, SH-26, SH-27R, AND SH-28 COLLECTED OCTOBER 2017.
4. DATA FOR WELLS MW-1B, MW-2, MW-3, MW-4, AND MW-23 COLLECTED SEPTEMBER 2020.
5. DATA FOR ASH FILTER PONDS SURFACE WATER COLLECTED SEPTEMBER 2020.

REFERENCE:

GOOGLE EARTH AERIAL PHOTOGRAPHY, DATED OCTOBER 2015.

SCALE

0 300 600 900 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

APTIM

500 Penn Center Boulevard,
Suite 1000
Pittsburgh, Pennsylvania 15235

DESIGNED BY: --

DRAWN BY: E. Schlegel

CHECKED BY: D. Shott

APPROVED BY: D. Shott

FIGURE 2
TOTAL COBALT GROUNDWATER CONCENTRATIONS
GROUNDWATER INVESTIGATION
CONEMAUGH GENERATING STATION
WEST WHEATFIELD TOWNSHIP, INDIANA COUNTY, PENNSYLVANIA

DATE:	SCALE:	DRAWING NO.	SHEET NO.
12/2/20	AS SHOWN	631016449-E9	--

File: O:\PROJECT\110870\Conemaugh\GW INVESTIGATION\631016449\631016449-E9.dwg
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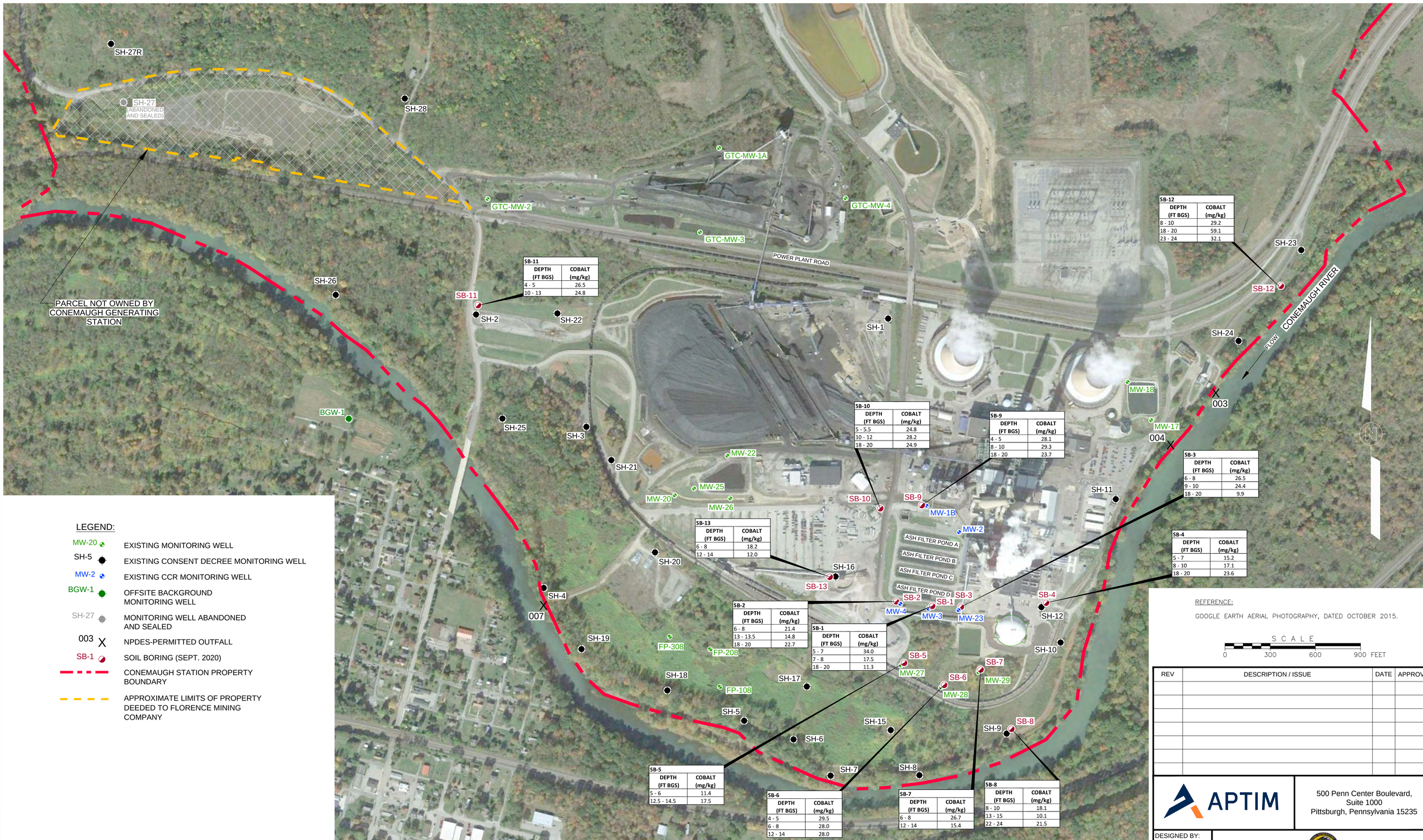
DRAWING NUMBER 631016449-E10



SB-11	
DEPTH (FT BGS)	COBALT (mg/kg)
4 - 5	26.5
10 - 13	24.8

SB-12	
DEPTH (FT BGS)	COBALT (mg/kg)
8 - 10	29.2
18 - 20	59.1
23 - 24	32.1

SB-10	
DEPTH (FT BGS)	COBALT (mg/kg)
5 - 5.5	24.8
10 - 12	28.2
18 - 20	24.9

SB-9	
DEPTH (FT BGS)	COBALT (mg/kg)
4 - 5	28.1
8 - 10	29.3
18 - 20	23.7

SB-3	
DEPTH (FT BGS)	COBALT (mg/kg)
6 - 8	26.5
9 - 10	24.4
18 - 20	9.9

SB-4	
DEPTH (FT BGS)	COBALT (mg/kg)
5 - 7	15.2
8 - 10	17.1
18 - 20	23.6

SB-13	
DEPTH (FT BGS)	COBALT (mg/kg)
6 - 8	18.2
12 - 14	12.0

SB-2	
DEPTH (FT BGS)	COBALT (mg/kg)
6 - 8	21.4
13 - 13.5	14.8
18 - 20	22.7

SB-1	
DEPTH (FT BGS)	COBALT (mg/kg)
5 - 7	34.0
7 - 8	17.5
18 - 20	11.3

SB-5	
DEPTH (FT BGS)	COBALT (mg/kg)
5 - 6	11.4
12.5 - 14.5	17.5

SB-6	
DEPTH (FT BGS)	COBALT (mg/kg)
4 - 5	29.5
6 - 8	28.0
12 - 14	28.0

SB-7	
DEPTH (FT BGS)	COBALT (mg/kg)
6 - 8	26.7
12 - 14	15.4

SB-8	
DEPTH (FT BGS)	COBALT (mg/kg)
8 - 10	18.1
13 - 15	10.1
22 - 24	21.5

LEGEND:

- MW-20 — EXISTING MONITORING WELL
- SH-5 — EXISTING CONSENT DECREE MONITORING WELL
- MW-2 — EXISTING CCR MONITORING WELL
- BGW-1 — OFFSITE BACKGROUND MONITORING WELL
- SH-27 — MONITORING WELL ABANDONED AND SEALED
- 003 X — NPDES-PERMITTED OUTFALL
- SB-1 — SOIL BORING (SEPT. 2020)
- CONEMAUGH STATION PROPERTY BOUNDARY
- APPROXIMATE LIMITS OF PROPERTY DEEDED TO FLORENCE MINING COMPANY

NOTES:

1. SOIL BORINGS EVALUATED SEPTEMBER 2020.
2. GREATEST BORING DEPTH REPRESENTS SATURATED ZONE AT EACH LOCATION.

REFERENCE:

GOOGLE EARTH AERIAL PHOTOGRAPHY, DATED OCTOBER 2015.

SCALE

0 300 600 900 FEET

VERIFY SCALE 0 1"

REV	DESCRIPTION / ISSUE	DATE	APPROVED

APTIM

500 Penn Center Boulevard, Suite 1000
Pittsburgh, Pennsylvania 15235

DESIGNED BY: --

DRAWN BY: E. Schlegel

CHECKED BY: D. Shott

APPROVED BY: D. Shott

FIGURE 3
SOIL BORING ANALYTICAL-COBALT
GROUNDWATER INVESTIGATION
CONEMAUGH GENERATING STATION
WEST WHEATFIELD TOWNSHIP, INDIANA COUNTY, PENNSYLVANIA

DATE:	SCALE:	DRAWING NO.	SHEET NO.
12/2/20	AS SHOWN	631016449-E10	--

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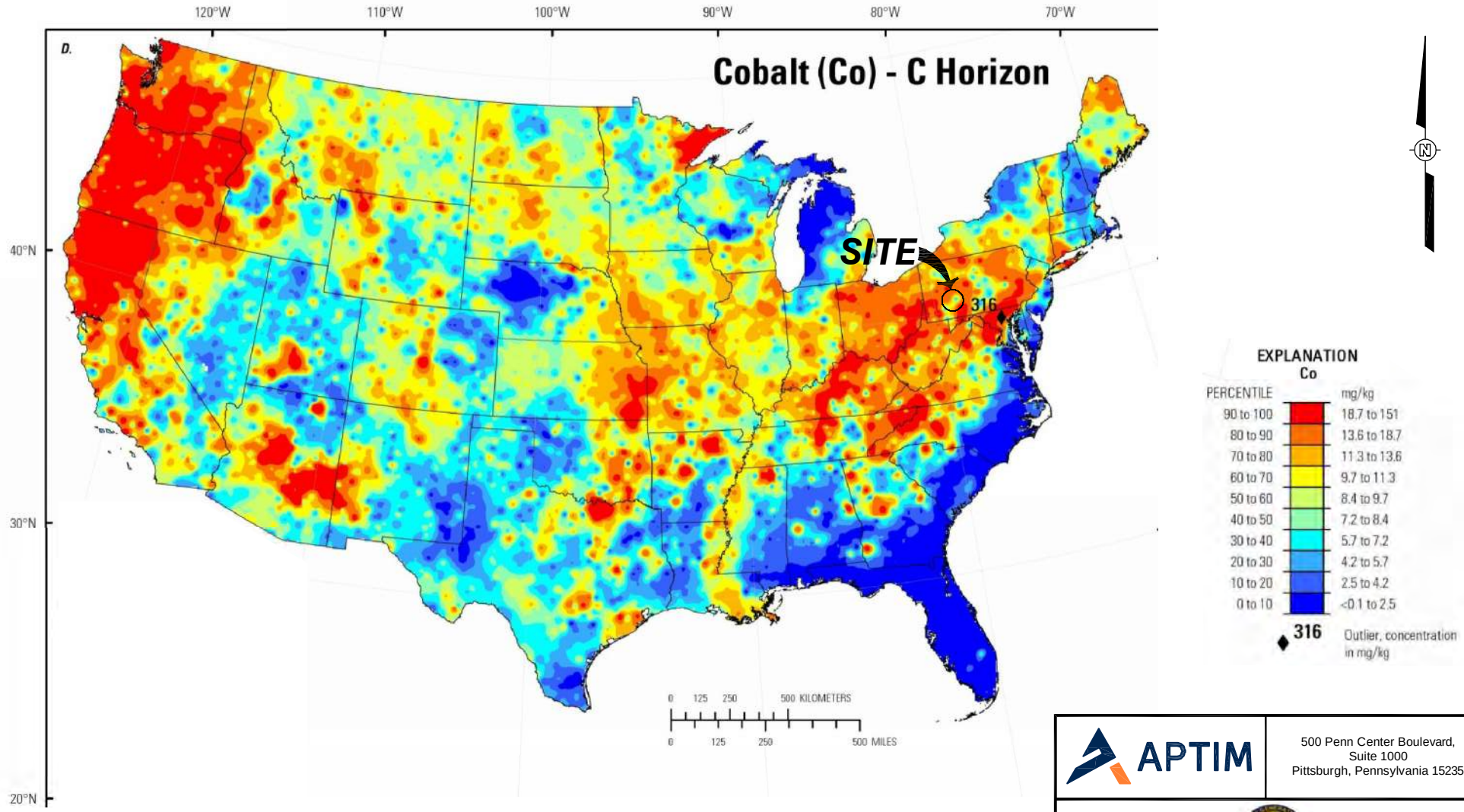
Plotted By: Evan.Schlegel Image

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER	631016449-A1
Pittsburgh, PA	12/3/20	--	E. Schlegel	D. Shott	D. Shott		



REFERENCE:

U.S.G.S. GEOCHEMICAL AND MINERALOGICAL MAPS FOR SOILS OF THE CONTERMINOUS UNITES STATES, OPEN FILE REPORT 2014 – 1082.

APTIM

500 Penn Center Boulevard,
Suite 1000
Pittsburgh, Pennsylvania 15235

FIGURE 4
NATURALLY OCCURRING COBALT IN SOILS NATIONWIDE

CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

File: O:\PROJECT\110870\Conemaugh\GW INVESTIGATION\631016449\631016449-A2.dwg
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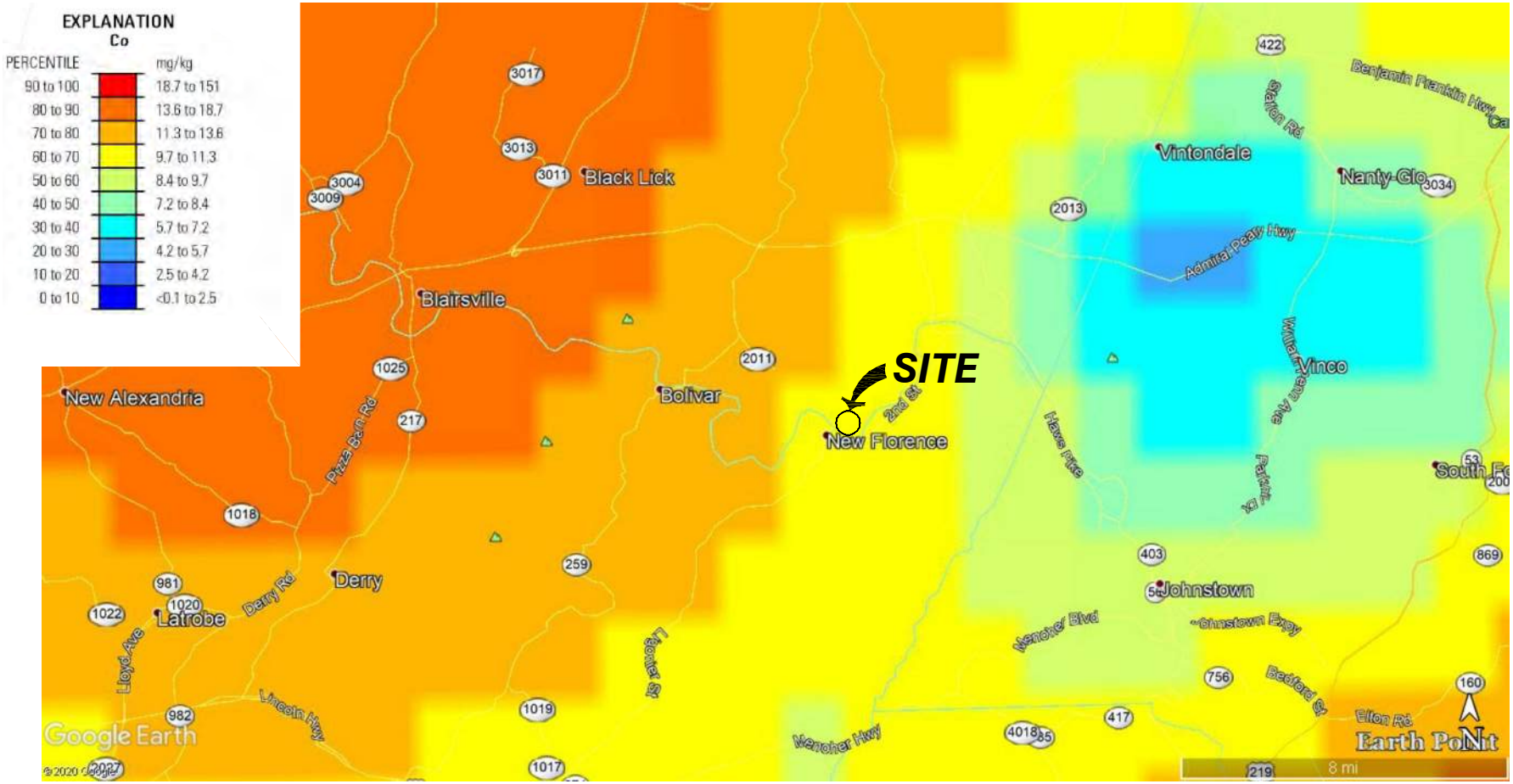
Plotted By: Evan.Schlegel Image

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	12/3/20	--	E. Schlegel	D. Shott	D. Shott	631016449-A2



APPROXIMATE SCALE

0 4 8 MILES

APTIM

500 Penn Center Boulevard,
Suite 1000
Pittsburgh, Pennsylvania 15235

REFERENCE:

U.S.G.S. GEOCHEMICAL AND MINERALOGICAL MAPS FOR SOILS OF THE CONTERMINOUS UNITES STATES, OPEN FILE REPORT 2014 – 1082.

FIGURE 5
NATURALLY OCCURRING COBALT IN SOILS
LOCAL

CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

Appendix A

Laboratory Analytical Reports—Ash Filter Ponds Surface Water

GEOCHEMICAL TESTING
Environmental and Energy Analysis

2005 N. Center Ave.
Somerset, PA 15501

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

Wednesday, October 21, 2020

John Shimshock
CONEMAUGH OPERATING, LLC
CONEMAUGH STATION
PO BOX K
NEW FLORENCE, PA 15944

RE: Conemaugh CCR 3rd Qtr 2020 Order No.: G2009E08

Dear John Shimshock:

Geochemical Testing received 4 sample(s) on 9/23/2020 for the analyses presented in the following report.

There were no problems with sample receipt protocols and analyses met the TNI/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

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306PA DEP

CLIENT: CONEMAUGH OPERATING, LLC
Project: Conemaugh CCR 3rd Qtr 2020
Lab Order: G2009E08

CASE NARRATIVE

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

The radiological analysis (Radium 226 by EPA 903.1; Radium 228 by EPA 904.0 was subcontracted to Pace Analytical (PA DEP 65-00282). A copy of the subcontractor's laboratory report is enclosed with this Analytical Report.

Legend:

H - Method Hold Time exceeded and is not compliant with 40CFR136 Table II.
U - The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit.
B - Analyte detected in the associated Method Blank
Q1 - See case narrative ND - Not Detected
MCL - Contaminant Limit J - Indicates an estimated value.
Q - Qualifier QL -Quantitation Limit DF - Dilution Factor
S - Surrogate Recovery outside accepted recovery limits
T - Sample received above required temperature and is not compliant with 40CFR136 Table II.
T1 - Sample received above required temperature
MDA - Minimum Detectable Activity.
** - Value exceeds Action Limit
TICs - Tentatively Identified Compounds.
E - Value above quantitation range

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Ash Pond A
Lab Order:	G2009E08		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E08-001	**Collection Date:**	9/23/2020 10:52:00 AM
Matrix:	WASTE WATER	**Received Date:**	9/23/2020 6:36:42 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**FIELD**
Depth To Water	2.18			Ft			09/23/20 10:52 AM
Dissolved Oxygen	4.60			mg/L			09/23/20 10:52 AM
Flow	NA			GPM			09/23/20 10:52 AM
Oxidation Reduction Potential	118			mV			09/23/20 10:52 AM
pH (Field)	6.98			S.U.			09/23/20 10:52 AM
Sample Depth	NA			Ft			09/23/20 10:52 AM
Specific Conductance (Field)	2770			µmhos/cm			09/23/20 10:52 AM
Temperature (Field)	23.98			deg C			09/23/20 10:52 AM
Turbidity (Field)	24.5			NTU			09/23/20 10:52 AM
Volume Purged	NA			Gallons			09/23/20 10:52 AM
Well Volume Purged	NA			Well Volumes			09/23/20 10:52 AM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	7.63		H	S.U.	1		09/24/20 4:55 PM
INORGANIC NON-METALS		Analyst:	**LRR**			**SM 2540C**	**SM 2540 C**
Total dissolved solids	2340	20		mg/L	1	09/24/20 5:00 PM	09/24/20 5:26 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	25	10		mg/L CaCO3	1		09/24/20 4:55 PM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	126	1.0		mg/L	1	09/24/20 11:30 AM	09/24/20 12:53 PM
Fluoride	0.2	0.1		mg/L	1	09/24/20 11:30 AM	09/24/20 12:53 PM
Sulfate	1500	2.0		mg/L	1	09/24/20 11:30 AM	09/24/20 12:53 PM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Cobalt, dissolved	< 0.005	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 1:48 PM
INORGANIC METALS		Analyst:	**LXM**			**SM 3112 B**	**SM 3112 B**
Mercury	< 0.20	0.20		µg/L	1	09/25/20 6:35 AM	09/28/20 11:23 AM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Aluminum	0.2	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Barium	0.05	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Beryllium	< 0.001	0.001		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Boron	5.86	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Cadmium	< 0.002	0.002		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Calcium	453	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Chromium	< 0.01	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Cobalt	< 0.005	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Iron	0.63	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Ash Pond A
Lab Order:	G2009E08		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E08-001	**Collection Date:**	9/23/2020 10:52:00 AM
Matrix:	WASTE WATER	**Received Date:**	9/23/2020 6:36:42 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC METALS		Analyst: **GMG**				**EPA 200.2**	**EPA 200.7**
Lithium	0.89	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Magnesium	65.2	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Manganese	0.24	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Molybdenum	< 0.02	0.02		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Potassium	30.4	0.5		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
Sodium	87.3	0.2		mg/L	1	09/25/20 10:35 AM	09/28/20 1:30 PM
INORGANIC METALS		Analyst: **RLR**				**EPA 200.2**	**EPA 200.8**
Antimony	1.5	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:01 PM
Arsenic	21.0	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:01 PM
Lead	1.6	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:01 PM
Selenium	1.4	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:01 PM
Thallium	1.6	0.2		µg/L	1	09/25/20 10:35 AM	09/28/20 2:01 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1**
Radium 226	0.214+-0.3694	0.702		pCi/L	1		10/14/20 12:06 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0**
Radium 228	0.810+-0.639	1.29		pCi/L	1		10/13/20 11:40 AM

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Ash Pond B
Lab Order:	G2009E08		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E08-002	**Collection Date:**	9/23/2020 11:51:00 AM
Matrix:	WASTE WATER	**Received Date:**	9/23/2020 6:36:42 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**FIELD**
Depth To Water	2.14			Ft			09/23/20 11:51 AM
Dissolved Oxygen	2.51			mg/L			09/23/20 11:51 AM
Flow	NA			GPM			09/23/20 11:51 AM
Oxidation Reduction Potential	142			mV			09/23/20 11:51 AM
pH (Field)	7.68			S.U.			09/23/20 11:51 AM
Sample Depth	NA			Ft			09/23/20 11:51 AM
Specific Conductance (Field)	2750			µmhos/cm			09/23/20 11:51 AM
Temperature (Field)	23.43			deg C			09/23/20 11:51 AM
Turbidity (Field)	26.2			NTU			09/23/20 11:51 AM
Volume Purged	NA			Gallons			09/23/20 11:51 AM
Well Volume Purged	NA			Well Volumes			09/23/20 11:51 AM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	7.62		H	S.U.	1		09/24/20 4:58 PM
INORGANIC NON-METALS		Analyst:	**LRR**			**SM 2540C**	**SM 2540 C**
Total dissolved solids	2250	20		mg/L	1	09/24/20 5:00 PM	09/24/20 5:26 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	23	10		mg/L CaCO3	1		09/24/20 4:58 PM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	121	1.0		mg/L	1	09/24/20 11:30 AM	09/24/20 1:05 PM
Fluoride	0.2	0.1		mg/L	1	09/24/20 11:30 AM	09/24/20 1:05 PM
Sulfate	1430	2.0		mg/L	1	09/24/20 11:30 AM	09/24/20 1:05 PM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Cobalt, dissolved	< 0.005	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 2:01 PM
INORGANIC METALS		Analyst:	**LXM**			**SM 3112 B**	**SM 3112 B**
Mercury	< 0.20	0.20		µg/L	1	09/25/20 6:35 AM	09/28/20 11:24 AM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Aluminum	0.2	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Barium	0.06	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Beryllium	< 0.001	0.001		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Boron	5.21	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Cadmium	0.002	0.002		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Calcium	409	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Chromium	< 0.01	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Cobalt	< 0.005	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Iron	0.31	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM

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Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Ash Pond B
Lab Order:	G2009E08		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E08-002	**Collection Date:**	9/23/2020 11:51:00 AM
Matrix:	WASTE WATER	**Received Date:**	9/23/2020 6:36:42 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC METALS		Analyst: **GMG**				**EPA 200.2**	**EPA 200.7**
Lithium	0.82	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Magnesium	59.1	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Manganese	0.22	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Molybdenum	< 0.02	0.02		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Potassium	27.9	0.5		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
Sodium	79.4	0.2		mg/L	1	09/25/20 10:35 AM	09/28/20 1:57 PM
INORGANIC METALS		Analyst: **RLR**				**EPA 200.2**	**EPA 200.8**
Antimony	1.6	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:11 PM
Arsenic	33.0	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:11 PM
Lead	2.9	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:11 PM
Selenium	1.8	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:11 PM
Thallium	3.2	0.2		µg/L	1	09/25/20 10:35 AM	09/29/20 1:36 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1**
Radium 226	0.125+-0.346	0.671		pCi/L	1		10/14/20 12:27 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0**
Radium 228	0.235+-0.532	1.18		pCi/L	1		10/13/20 11:40 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Ash Pond C
Lab Order:	G2009E08		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E08-003	**Collection Date:**	9/23/2020 12:02:00 PM
Matrix:	WASTE WATER	**Received Date:**	9/23/2020 6:36:42 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**FIELD**
Depth To Water	1.40			Ft			09/23/20 12:02 PM
Dissolved Oxygen	8.95			mg/L			09/23/20 12:02 PM
Flow	NA			GPM			09/23/20 12:02 PM
Oxidation Reduction Potential	151			mV			09/23/20 12:02 PM
pH (Field)	7.78			S.U.			09/23/20 12:02 PM
Sample Depth	NA			Ft			09/23/20 12:02 PM
Specific Conductance (Field)	2730			µmhos/cm			09/23/20 12:02 PM
Temperature (Field)	23.16			deg C			09/23/20 12:02 PM
Turbidity (Field)	41.3			NTU			09/23/20 12:02 PM
Volume Purged	NA			Gallons			09/23/20 12:02 PM
Well Volume Purged	NA			Well Volumes			09/23/20 12:02 PM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	7.63		H	S.U.	1		09/25/20 8:36 AM
INORGANIC NON-METALS		Analyst:	**LRR**			**SM 2540C**	**SM 2540 C**
Total dissolved solids	2190	20		mg/L	1	09/24/20 5:00 PM	09/24/20 5:26 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	25	10		mg/L CaCO3	1		09/25/20 8:36 AM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	120	1.0		mg/L	1	09/24/20 11:30 AM	09/24/20 1:16 PM
Fluoride	0.2	0.1		mg/L	1	09/24/20 11:30 AM	09/24/20 1:16 PM
Sulfate	1430	2.0		mg/L	1	09/24/20 11:30 AM	09/24/20 1:16 PM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Cobalt, dissolved	< 0.005	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 2:16 PM
INORGANIC METALS		Analyst:	**LXM**			**SM 3112 B**	**SM 3112 B**
Mercury	< 0.20	0.20		µg/L	1	09/25/20 6:35 AM	09/28/20 11:30 AM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Aluminum	0.4	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM
Barium	0.06	0.01		mg/L	1	09/25/20 10:35 AM	09/29/20 3:51 PM
Beryllium	< 0.001	0.001		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM
Boron	5.60	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM
Cadmium	0.002	0.002		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM
Calcium	442	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM
Chromium	< 0.01	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM
Cobalt	< 0.005	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM
Iron	0.60	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Ash Pond C
Lab Order:	G2009E08		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E08-003	**Collection Date:**	9/23/2020 12:02:00 PM
Matrix:	WASTE WATER	**Received Date:**	9/23/2020 6:36:42 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC METALS		Analyst: **GMG**				**EPA 200.2**	**EPA 200.7**
Lithium	0.84	0.01		mg/L	1	09/25/20 10:35 AM	09/29/20 3:51 PM
Magnesium	64.5	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM
Manganese	0.24	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM
Molybdenum	< 0.02	0.02		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM
Potassium	29.5	0.5		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM
Sodium	81.7	0.2		mg/L	1	09/25/20 10:35 AM	09/28/20 2:15 PM
INORGANIC METALS		Analyst: **RLR**				**EPA 200.2**	**EPA 200.8**
Antimony	1.7	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:20 PM
Arsenic	44.7	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:20 PM
Lead	9.5	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:20 PM
Selenium	2.0	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:20 PM
Thallium	3.0	0.2		µg/L	1	09/25/20 10:35 AM	09/28/20 2:20 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1**
Radium 226	0.261+-0.405	0.702		pCi/L	1		10/14/20 12:27 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0**
Radium 228	0.345+-0.582	1.27		pCi/L	1		10/13/20 11:40 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Ash Pond D
Lab Order:	G2009E08		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E08-004	**Collection Date:**	9/23/2020 12:20:00 PM
Matrix:	WASTE WATER	**Received Date:**	9/23/2020 6:36:42 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**FIELD**
Depth To Water	8.90			Ft			09/23/20 12:20 PM
Dissolved Oxygen	0.86			mg/L			09/23/20 12:20 PM
Flow	NA			GPM			09/23/20 12:20 PM
Oxidation Reduction Potential	168			mV			09/23/20 12:20 PM
pH (Field)	8.02			S.U.			09/23/20 12:20 PM
Sample Depth	NA			Ft			09/23/20 12:20 PM
Specific Conductance (Field)	2810			µmhos/cm			09/23/20 12:20 PM
Temperature (Field)	23.27			deg C			09/23/20 12:20 PM
Turbidity (Field)	46.8			NTU			09/23/20 12:20 PM
Volume Purged	NA			Gallons			09/23/20 12:20 PM
Well Volume Purged	NA			Well Volumes			09/23/20 12:20 PM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	7.77		H	S.U.	1		09/25/20 8:40 AM
INORGANIC NON-METALS		Analyst:	**LRR**			**SM 2540C**	**SM 2540 C**
Total dissolved solids	2340	20		mg/L	1	09/24/20 5:00 PM	09/24/20 5:26 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	26	10		mg/L CaCO3	1		09/25/20 8:40 AM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	120	1.0		mg/L	1	09/24/20 11:30 AM	09/24/20 1:28 PM
Fluoride	0.2	0.1		mg/L	1	09/24/20 11:30 AM	09/24/20 1:28 PM
Sulfate	1430	2.0		mg/L	1	09/24/20 11:30 AM	09/24/20 1:28 PM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Cobalt, dissolved	< 0.005	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 2:18 PM
INORGANIC METALS		Analyst:	**LXM**			**SM 3112 B**	**SM 3112 B**
Mercury	< 0.20	0.20		µg/L	1	09/25/20 6:35 AM	09/28/20 11:32 AM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Aluminum	0.4	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Barium	0.06	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Beryllium	< 0.001	0.001		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Boron	5.93	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Cadmium	< 0.002	0.002		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Calcium	456	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Chromium	< 0.01	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Cobalt	< 0.005	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Iron	0.79	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Ash Pond D
Lab Order:	G2009E08		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E08-004	**Collection Date:**	9/23/2020 12:20:00 PM
Matrix:	WASTE WATER	**Received Date:**	9/23/2020 6:36:42 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC METALS		Analyst: **GMG**				**EPA 200.2**	**EPA 200.7**
Lithium	0.89	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Magnesium	65.9	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Manganese	0.22	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Molybdenum	< 0.02	0.02		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Potassium	30.9	0.5		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
Sodium	84.8	0.2		mg/L	1	09/25/20 10:35 AM	09/28/20 2:19 PM
INORGANIC METALS		Analyst: **RLR**				**EPA 200.2**	**EPA 200.8**
Antimony	1.3	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:31 PM
Arsenic	25.1	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:31 PM
Lead	2.1	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:31 PM
Selenium	1.8	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 2:31 PM
Thallium	2.2	0.2		µg/L	1	09/25/20 10:35 AM	09/28/20 2:31 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1**
Radium 226	-0.207+-0.249	0.678		pCi/L	1		10/14/20 12:27 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0**
Radium 228	0.0646+-0.603	1.37		pCi/L	1		10/13/20 11:40 AM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

October 14, 2020

Ms. Leslie Nemeth
Geochemical Testing
2005 N. Center Avenue
Somerset, PA 15501

RE: Project: G2009E08
Pace Project No.: 30384559

Dear Ms. Nemeth:

Enclosed are the analytical results for sample(s) received by the laboratory on September 29, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Megan A. Rager

Megan A. Rager
megan.rager@pacelabs.com
(724)850-5600
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: G2009E08
Pace Project No.: 30384559

Pace Analytical Services Pennsylvania
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: G2009E08
Pace Project No.: 30384559

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30384559001	**G2009E08-001**	Water	09/23/20 10:52	09/29/20 09:30
30384559002	**G2009E08-002**	Water	09/23/20 11:51	09/29/20 09:30
30384559003	**G2009E08-003**	Water	09/23/20 12:02	09/29/20 09:30
30384559004	**G2009E08-004**	Water	09/23/20 12:20	09/29/20 09:30

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: G2009E08
Pace Project No.: 30384559

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30384559001	**G2009E08-001**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30384559002	**G2009E08-002**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30384559003	**G2009E08-003**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30384559004	**G2009E08-004**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA

PASI-PA = Pace Analytical Services - Greensburg

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G2009E08
Pace Project No.: 30384559

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Geochemical Testing
Date: October 14, 2020

General Information:
4 samples were analyzed for EPA 903.1 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G2009E08
Pace Project No.: 30384559

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Geochemical Testing
Date: October 14, 2020

General Information:
4 samples were analyzed for EPA 904.0 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G2009E08
Pace Project No.: 30384559

Sample: G2009E08-001 **Lab ID: 30384559001** Collected: 09/23/20 10:52 Received: 09/29/20 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.214 ± 0.394 (0.702) C:NA T:92%**	pCi/L	10/14/20 12:06	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.810 ± 0.639 (1.29) C:57% T:86%**	pCi/L	10/13/20 11:40	15262-20-1	

Sample: G2009E08-002 **Lab ID: 30384559002** Collected: 09/23/20 11:51 Received: 09/29/20 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.125 ± 0.346 (0.671) C:NA T:92%**	pCi/L	10/14/20 12:27	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.235 ± 0.532 (1.18) C:59% T:86%**	pCi/L	10/13/20 11:40	15262-20-1	

Sample: G2009E08-003 **Lab ID: 30384559003** Collected: 09/23/20 12:02 Received: 09/29/20 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.261 ± 0.405 (0.702) C:NA T:84%**	pCi/L	10/14/20 12:27	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.345 ± 0.582 (1.27) C:58% T:86%**	pCi/L	10/13/20 11:40	15262-20-1	

Sample: G2009E08-004 **Lab ID: 30384559004** Collected: 09/23/20 12:20 Received: 09/29/20 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.207 ± 0.249 (0.678) C:NA T:94%**	pCi/L	10/14/20 12:27	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.0646 ± 0.603 (1.37) C:61% T:77%**	pCi/L	10/13/20 11:40	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G2009E08
Pace Project No.: 30384559

QC Batch: 416318
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30384559001, 30384559002, 30384559003, 30384559004

METHOD BLANK: 2012841
Matrix: Water
Associated Lab Samples: 30384559001, 30384559002, 30384559003, 30384559004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.000 ± 0.277 (0.586) C:NA T:88%	pCi/L	10/14/20 11:42	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: G2009E08
Pace Project No.: 30384559

QC Batch: 416319 | Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 | Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30384559001, 30384559002, 30384559003, 30384559004

METHOD BLANK: 2012842 | Matrix: Water
Associated Lab Samples: 30384559001, 30384559002, 30384559003, 30384559004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.197 ± 0.397 (0.877) C:65% T:74%	pCi/L	10/13/20 11:52	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: G2009E08
Pace Project No.: 30384559

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Shuttle/Cooler ID#:	**CHAIN OF CUSTODY**	Geochemical Testing

Form F-5002, 04.13

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: Geochemical Testing	**Contact (Company):** Leslie Nemeth	**Phone:** (814) 443-1671
Address: 2005 North Center Avenue	e-mail: lnemeth@geo-ces.com	Fax: (814) 445-6729
City: Somerset **State:** PA **Zip:** 15501	**Sampled by:** Client	**Preservatives by** __Sampler__GT
WO#:	Project:	PO/Quote#: P2020-10420

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	**G** Grab	**C** Composite	**D** Distribution/DW	**R** Raw/DW	**S** Special/DW	**O** Other	Containers Supplied by: ☐ Client ☐ GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers	
***NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG*									
G2009E08-001		nHZ / HZ GW	9/23/2020	10:52	G	Radium 226, 228	Field Filtered: Y / N HNO3	2	001
G2009E08-002		nHZ / HZ GW	9/23/2020	11:51	G	Radium 226, 228	Field Filtered: Y / N HNO3	2	002
G2009E08-003		nHZ / HZ GW	9/23/2020	12:02	G	Radium 226, 228	Field Filtered: Y / N HNO3	2	003
G2009E08-004		nHZ / HZ GW	9/23/2020	12:20	G	Radium 226, 228	Field Filtered: Y / N HNO3	2	004
		nHZ / HZ					Field Filtered: Y / N		
		nHZ / HZ					Field Filtered: Y / N		
		nHZ / HZ					Field Filtered: Y / N		
		nHZ / HZ					Field Filtered: Y / N		

WO# : 30384559

30384559

Note Deficiencies Here: PA CCR samples

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Leslie Nemeth	9/24/2020	9:00:00	[illegible]	9/24/20	09:30

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ___Yes or ✓ No

Cooler Temp (°C) on receipt: N/A

Sample Receiving (1st Review):_____

Client Support (2nd Review):_____

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: Geochemical

Project # 3038455 9

Courier: ☐ Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label RJM
LIMS Login RJM

Tracking #: 12 544 007 03 5560 4204

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals Intact: ☐ yes ☑ no

Thermometer Used N/A Type of ice: Wet Blue None

Cooler Temperature Observed Temp — °C Correction Factor: — °C Final Temp: — °C

Temp should be above freezing to 6°C

pH paper Lot# 1020401

Date and initials of person examining contents: RJM 9/29/20

Comments:	Yes	No	N/A		
Chain of Custody Present:	✓			1.	
Chain of Custody Filled Out:	✓			2.	
Chain of Custody Relinquished:	✓			3.	
Sampler Name & Signature on COC:		✓		4.	No name or signature
Sample Labels match COC: -Includes date/time/ID Matrix: WT	✓			5.	
Samples Arrived within Hold Time:	✓			6.	
Short Hold Time Analysis (<72hr remaining):		✓		7.	
Rush Turn Around Time Requested:		✓		8.	
Sufficient Volume:	✓			9.	
Correct Containers Used:	✓			10.	
-Pace Containers Used:		✓			
Containers Intact:	✓			11.	
Orthophosphate field filtered			✓	12.	
Hex Cr Aqueous sample field filtered			✓	13.	
Organic Samples checked for dechlorination:			✓	14.	
Filtered volume received for Dissolved tests			✓	15.	
All containers have been checked for preservation. exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, Non-aqueous matrix	✓			16.	pH<2
All containers meet method preservation requirements.	✓			Initial when completed RJM	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):			✓	17.	
Trip Blank Present:			✓	18.	
Trip Blank Custody Seals Present			✓		
Rad Samples Screened < 0.5 mrem/hr	✓			Initial when completed: RJM	Date: 9/29/20

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

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 30, 2020

John Shimshock
CONEMAUGH OPERATING, LLC
CONEMAUGH STATION
PO BOX K
NEW FLORENCE, PA 15944

RE: Surface Water Impoundments Order No.: G2009E03

Dear John Shimshock:

Geochemical Testing received 4 sample(s) on 9/23/2020 for the analyses presented in the following report.

There were no problems with sample receipt protocols and analyses met the TNI/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

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306PA DEP

Geochemical Testing

Date: *30-Sep-20*

CLIENT: CONEMAUGH OPERATING, LLC
Project: Surface Water Impoundments
Lab Order: G2009E03

CASE NARRATIVE

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

Legend:

H - Method Hold Time exceeded and is not compliant with 40CFR136 Table II.
U - The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit.
B - Analyte detected in the associated Method Blank
Q1 - See case narrative ND - Not Detected
MCL - Contaminant Limit J - Indicates an estimated value.
Q - Qualifier QL -Quantitation Limit DF - Dilution Factor

S - Surrogate Recovery outside accepted recovery limits
T - Sample received above required temperature and is not compliant with 40CFR136 Table II.
T1 - Sample received above required temperature
MDA - Minimum Detectable Activity.
** - Value exceeds Action Limit
TICs - Tentatively Identified Compounds.
E - Value above quantitation range

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *30-Sep-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Pond A
Lab Order:	G2009E03		
Project:	Surface Water Impoundments	**Sampled By:**	Conemaugh
Lab ID:	G2009E03-001	**Collection Date:**	9/23/2020 10:52:00 AM
Matrix:	SURFACE WATER	**Received Date:**	9/23/2020 6:04:13 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC NON METALS		Analyst:	**LRR**				**SM 4500-CO2D**
Bicarbonate	24	10		mg/L CaCO3	1		09/24/20 4:11 PM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	7.62		H	S.U.	1		09/24/20 4:11 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	24	10		mg/L CaCO3	1		09/24/20 4:11 PM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	122	1.0		mg/L	1	09/24/20 10:35 AM	09/24/20 6:26 PM
Sulfate	1470	2.0		mg/L	1	09/24/20 10:35 AM	09/24/20 6:26 PM
INORGANIC METALS		Analyst:	**MEG**			**EPA 200.2**	**EPA 200.7**
Aluminum, dissolved	0.1	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 5:39 PM
Cobalt, dissolved	< 0.005	0.005		mg/L	1	09/24/20 11:50 AM	09/25/20 5:39 PM
Iron, dissolved	< 0.05	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 5:39 PM
Manganese, dissolved	0.23	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 5:39 PM
INORGANIC METALS		Analyst:	**MEG**			**EPA 200.2**	**EPA 200.7**
Aluminum	0.2	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 5:37 PM
Cobalt	< 0.005	0.005		mg/L	1	09/24/20 11:50 AM	09/25/20 5:37 PM
Iron	0.65	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 5:37 PM
Magnesium	69.1	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 5:37 PM
Manganese	0.26	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 5:37 PM
Potassium	29.7	0.5		mg/L	1	09/24/20 11:50 AM	09/25/20 5:37 PM
Sodium	86.5	0.2		mg/L	1	09/24/20 11:50 AM	09/25/20 5:37 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *30-Sep-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Pond B
Lab Order:	G2009E03		
Project:	Surface Water Impoundments	**Sampled By:**	Conemaugh
Lab ID:	G2009E03-002	**Collection Date:**	9/23/2020 11:51:00 AM
Matrix:	SURFACE WATER	**Received Date:**	9/23/2020 6:04:13 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC NON METALS		Analyst:	**LRR**				**SM 4500-CO2D**
Bicarbonate	23	10		mg/L CaCO3	1		09/24/20 4:17 PM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	7.61		H	S.U.	1		09/24/20 4:17 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	23	10		mg/L CaCO3	1		09/24/20 4:17 PM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	120	1.0		mg/L	1	09/24/20 11:30 AM	09/24/20 11:53 AM
Sulfate	1440	2.0		mg/L	1	09/24/20 11:30 AM	09/24/20 11:53 AM
INORGANIC METALS		Analyst:	**MEG**			**EPA 200.2**	**EPA 200.7**
Aluminum, dissolved	< 0.1	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 5:42 PM
Cobalt, dissolved	< 0.005	0.005		mg/L	1	09/24/20 11:50 AM	09/25/20 5:42 PM
Iron, dissolved	< 0.05	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 5:42 PM
Manganese, dissolved	0.23	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 5:42 PM
INORGANIC METALS		Analyst:	**MEG**			**EPA 200.2**	**EPA 200.7**
Aluminum	0.2	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 5:40 PM
Cobalt	< 0.005	0.005		mg/L	1	09/24/20 11:50 AM	09/25/20 5:40 PM
Iron	0.33	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 5:40 PM
Magnesium	61.4	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 5:40 PM
Manganese	0.23	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 5:40 PM
Potassium	26.2	0.5		mg/L	1	09/24/20 11:50 AM	09/25/20 5:40 PM
Sodium	76.1	0.2		mg/L	1	09/24/20 11:50 AM	09/25/20 5:40 PM

Laboratory Results

Geochemical Testing

Date: *30-Sep-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Pond C
Lab Order:	G2009E03		
Project:	Surface Water Impoundments	**Sampled By:**	Conemaugh
Lab ID:	G2009E03-003	**Collection Date:**	9/23/2020 12:02:00 PM
Matrix:	SURFACE WATER	**Received Date:**	9/23/2020 6:04:13 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC NON METALS		Analyst:	**LRR**				**SM 4500-CO2D**
Bicarbonate	23	10		mg/L CaCO3	1		09/24/20 4:21 PM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	7.59		H	S.U.	1		09/24/20 4:21 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	23	10		mg/L CaCO3	1		09/24/20 4:21 PM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	120	1.0		mg/L	1	09/24/20 11:30 AM	09/24/20 12:29 PM
Sulfate	1430	2.0		mg/L	1	09/24/20 11:30 AM	09/24/20 12:29 PM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Aluminum, dissolved	< 0.1	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:37 PM
Cobalt, dissolved	< 0.005	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 1:37 PM
Iron, dissolved	< 0.05	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:37 PM
Manganese, dissolved	0.24	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:37 PM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Aluminum	0.3	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:29 PM
Cobalt	< 0.005	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 1:29 PM
Iron	0.54	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:29 PM
Magnesium	60.3	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:29 PM
Manganese	0.23	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:29 PM
Potassium	27.7	0.5		mg/L	1	09/25/20 10:35 AM	09/28/20 1:29 PM
Sodium	80.4	0.2		mg/L	1	09/25/20 10:35 AM	09/28/20 1:29 PM

Laboratory Results

Geochemical Testing

Date: *30-Sep-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Pond D
Lab Order:	G2009E03		
Project:	Surface Water Impoundments	**Sampled By:**	Conemaugh
Lab ID:	G2009E03-004	**Collection Date:**	9/23/2020 12:20:00 PM
Matrix:	SURFACE WATER	**Received Date:**	9/23/2020 6:04:13 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC NON METALS		Analyst:	**LRR**				**SM 4500-CO2D**
Bicarbonate	25	10		mg/L CaCO3	1		09/24/20 4:25 PM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	7.75		H	S.U.	1		09/24/20 4:25 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	25	10		mg/L CaCO3	1		09/24/20 4:25 PM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	120	1.0		mg/L	1	09/24/20 11:30 AM	09/24/20 12:41 PM
Sulfate	1450	2.0		mg/L	1	09/24/20 11:30 AM	09/24/20 12:41 PM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Aluminum, dissolved	< 0.1	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:40 PM
Cobalt, dissolved	< 0.005	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 1:40 PM
Iron, dissolved	< 0.05	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:40 PM
Manganese, dissolved	0.20	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:40 PM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Aluminum	0.4	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:38 PM
Cobalt	< 0.005	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 1:38 PM
Iron	0.88	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:38 PM
Magnesium	65.4	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:38 PM
Manganese	0.22	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:38 PM
Potassium	31.4	0.5		mg/L	1	09/25/20 10:35 AM	09/28/20 1:38 PM
Sodium	87.5	0.2		mg/L	1	09/25/20 10:35 AM	09/28/20 1:38 PM

Appendix B

Laboratory Analytical Reports—Ash Filter Ponds Solid Residuals

GEOCHEMICAL TESTING
Environmental and Energy Analysis

2005 N. Center Ave.
Somerset, PA 15501

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

Tuesday, October 20, 2020

John Shimshock
CONEMAUGH OPERATING, LLC
CONEMAUGH STATION
PO BOX K
NEW FLORENCE, PA 15944

RE: Conemaugh CCR 3rd Qtr 2020 Order No.: G2009D99

Dear John Shimshock:

Geochemical Testing received 4 sample(s) on 9/23/2020 for the analyses presented in the following report.

There were no problems with sample receipt protocols and analyses met the TNI/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

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306PA DEP

CLIENT: CONEMAUGH OPERATING, LLC
Project: Conemaugh CCR 3rd Qtr 2020
Lab Order: G2009D99

CASE NARRATIVE

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

Legend:

H - Method Hold Time exceeded and is not compliant with 40CFR136 Table II.
U - The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit.
B - Analyte detected in the associated Method Blank
Q1 - See case narrative ND - Not Detected
MCL - Contaminant Limit J - Indicates an estimated value.
Q - Qualifier QL -Quantitation Limit DF - Dilution Factor
S - Surrogate Recovery outside accepted recovery limits
T - Sample received above required temperature and is not compliant with 40CFR136 Table II.
T1 - Sample received above required temperature
MDA - Minimum Detectable Activity.
** - Value exceeds Action Limit
TICs - Tentatively Identified Compounds.
E - Value above quantitation range

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *20-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Pond A
Lab Order:	G2009D99		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	Conemaugh
Lab ID:	G2009D99-001	**Collection Date:**	9/23/2020 11:02:00 AM
Matrix:	SOLID	**Received Date:**	9/23/2020 5:28:47 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**Field**
Depth To Water	2.18			Ft			09/23/20 11:02 AM
Dissolved Oxygen	4.60			mg/L			09/23/20 11:02 AM
Flow	NA			GPM			09/23/20 11:02 AM
Oxidation Reduction Potential	118			mV			09/23/20 11:02 AM
pH (Field)	6.98			S.U.			09/23/20 11:02 AM
Sample Depth	NA			Ft			09/23/20 11:02 AM
Specific Conductance (Field)	2770			µmhos/cm			09/23/20 11:02 AM
Temperature (Field)	23.98			deg C			09/23/20 11:02 AM
Turbidity (Field)	24.5			NTU			09/23/20 11:02 AM
Volume Purged	NA			Gallons			09/23/20 11:02 AM
Well Volume Purged	NA			Well Volumes			09/23/20 11:02 AM
TOTAL METALS		Analyst:	**GMG**			**EPA 3050**	**EPA 6010 D**
Aluminum	12700	20.0		mg/Kg-dry	1	09/29/20 9:45 AM	09/29/20 12:06 PM
Cobalt	33.3	0.5		mg/Kg-dry	1	09/29/20 9:45 AM	09/29/20 12:06 PM
Iron	57200	100		mg/Kg-dry	10	09/29/20 9:45 AM	09/30/20 6:55 AM
Manganese	1170	1.0		mg/Kg-dry	1	09/29/20 9:45 AM	09/29/20 12:06 PM
SPLP FLUID #1		Analyst:	**DMM**				**EPA 1312**
Final pH Metals	2.20			S.U.	1		09/24/20 10:30 AM
SPLP METALS FLUID #1		Analyst:	**MEG**			**EPA 3010 A**	**EPA 6010 D**
Aluminum	0.5	0.1		mg/L	1	09/25/20 9:10 AM	09/28/20 7:09 AM
Cobalt	< 0.005	0.005		mg/L	1	09/25/20 9:10 AM	09/28/20 7:09 AM
Iron	0.34	0.05		mg/L	1	09/25/20 9:10 AM	09/28/20 7:09 AM
Manganese	0.05	0.01		mg/L	1	09/25/20 9:10 AM	09/28/20 7:09 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *20-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Pond B
Lab Order:	G2009D99		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	Conemaugh
Lab ID:	G2009D99-002	**Collection Date:**	9/23/2020 12:43:00 PM
Matrix:	SOLID	**Received Date:**	9/23/2020 5:28:47 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**Field**
Depth To Water	2.14			Ft			09/23/20 12:43 PM
Dissolved Oxygen	2.51			mg/L			09/23/20 12:43 PM
Flow	NA			GPM			09/23/20 12:43 PM
Oxidation Reduction Potential	142			mV			09/23/20 12:43 PM
pH (Field)	7.68			S.U.			09/23/20 12:43 PM
Sample Depth	NA			Ft			09/23/20 12:43 PM
Specific Conductance (Field)	2750			µmhos/cm			09/23/20 12:43 PM
Temperature (Field)	23.43			deg C			09/23/20 12:43 PM
Turbidity (Field)	26.2			NTU			09/23/20 12:43 PM
Volume Purged	NA			Gallons			09/23/20 12:43 PM
Well Volume Purged	NA			Well Volumes			09/23/20 12:43 PM
TOTAL METALS		Analyst:	**GMG**			**EPA 3050**	**EPA 6010 D**
Aluminum	8000	20.0		mg/Kg-dry	1	09/29/20 9:45 AM	09/29/20 11:57 AM
Cobalt	25.5	0.5		mg/Kg-dry	1	09/29/20 9:45 AM	09/29/20 11:57 AM
Iron	45200	100		mg/Kg-dry	10	09/29/20 9:45 AM	09/30/20 6:54 AM
Manganese	1270	1.0		mg/Kg-dry	1	09/29/20 9:45 AM	09/29/20 11:57 AM
SPLP FLUID #1		Analyst:	**DMM**				**EPA 1312**
Final pH Metals	2.43			S.U.	1		09/24/20 10:30 AM
SPLP METALS FLUID #1		Analyst:	**MEG**			**EPA 3010 A**	**EPA 6010 D**
Aluminum	0.4	0.1		mg/L	1	09/25/20 9:10 AM	09/28/20 7:11 AM
Cobalt	< 0.005	0.005		mg/L	1	09/25/20 9:10 AM	09/28/20 7:11 AM
Iron	< 0.05	0.05		mg/L	1	09/25/20 9:10 AM	09/28/20 7:11 AM
Manganese	< 0.01	0.01		mg/L	1	09/25/20 9:10 AM	09/28/20 7:11 AM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *20-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Pond C
Lab Order:	G2009D99		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	Conemaugh
Lab ID:	G2009D99-003	**Collection Date:**	9/23/2020 12:41:00 PM
Matrix:	SOLID	**Received Date:**	9/23/2020 5:28:47 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**Field**
Depth To Water	1.40			Ft			09/23/20 12:41 PM
Dissolved Oxygen	8.95			mg/L			09/23/20 12:41 PM
Flow	NA			GPM			09/23/20 12:41 PM
Oxidation Reduction Potential	151			mV			09/23/20 12:41 PM
pH (Field)	7.78			S.U.			09/23/20 12:41 PM
Sample Depth	NA			Ft			09/23/20 12:41 PM
Specific Conductance (Field)	2730			µmhos/cm			09/23/20 12:41 PM
Temperature (Field)	23.16			deg C			09/23/20 12:41 PM
Turbidity (Field)	41.3			NTU			09/23/20 12:41 PM
Volume Purged	NA			Gallons			09/23/20 12:41 PM
Well Volume Purged	NA			Well Volumes			09/23/20 12:41 PM
TOTAL METALS		Analyst:	**GMG**			**EPA 3050**	**EPA 6010 D**
Aluminum	6610	20.0		mg/Kg-dry	1	09/29/20 9:45 AM	09/29/20 12:12 PM
Cobalt	6.0	0.5		mg/Kg-dry	1	09/29/20 9:45 AM	09/29/20 12:12 PM
Iron	27800	100		mg/Kg-dry	10	09/29/20 9:45 AM	09/30/20 7:02 AM
Manganese	64.6	1.0		mg/Kg-dry	1	09/29/20 9:45 AM	09/29/20 12:12 PM
SPLP FLUID #1		Analyst:	**DMM**				**EPA 1312**
Final pH Metals	6.90			S.U.	1		09/24/20 10:30 AM
SPLP METALS FLUID #1		Analyst:	**MEG**			**EPA 3010 A**	**EPA 6010 D**
Aluminum	0.1	0.1		mg/L	1	09/25/20 9:10 AM	09/28/20 7:21 AM
Cobalt	< 0.005	0.005		mg/L	1	09/25/20 9:10 AM	09/28/20 7:21 AM
Iron	< 0.05	0.05		mg/L	1	09/25/20 9:10 AM	09/28/20 7:21 AM
Manganese	< 0.01	0.01		mg/L	1	09/25/20 9:10 AM	09/28/20 7:21 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *20-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	Pond D
Lab Order:	G2009D99		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	Conemaugh
Lab ID:	G2009D99-004	**Collection Date:**	9/23/2020 12:38:00 PM
Matrix:	SOLID	**Received Date:**	9/23/2020 5:28:47 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**Field**
Depth To Water	8.90			Ft			09/23/20 12:38 PM
Dissolved Oxygen	0.86			mg/L			09/23/20 12:38 PM
Flow	NA			GPM			09/23/20 12:38 PM
Oxidation Reduction Potential	168			mV			09/23/20 12:38 PM
pH (Field)	8.02			S.U.			09/23/20 12:38 PM
Sample Depth	NA			Ft			09/23/20 12:38 PM
Specific Conductance (Field)	2810			µmhos/cm			09/23/20 12:38 PM
Temperature (Field)	23.27			deg C			09/23/20 12:38 PM
Turbidity (Field)	46.8			NTU			09/23/20 12:38 PM
Volume Purged	NA			Gallons			09/23/20 12:38 PM
Well Volume Purged	NA			Well Volumes			09/23/20 12:38 PM
TOTAL METALS		Analyst:	**GMG**			**EPA 3050**	**EPA 6010 D**
Aluminum	6540	20.0		mg/Kg-dry	1	09/29/20 9:45 AM	09/29/20 12:14 PM
Cobalt	11.3	0.5		mg/Kg-dry	1	09/29/20 9:45 AM	09/29/20 12:14 PM
Iron	45600	100		mg/Kg-dry	10	09/29/20 9:45 AM	09/30/20 7:03 AM
Manganese	227	1.0		mg/Kg-dry	1	09/29/20 9:45 AM	09/29/20 12:14 PM
SPLP FLUID #1		Analyst:	**DMM**				**EPA 1312**
Final pH Metals	2.72			S.U.	1		09/24/20 10:30 AM
SPLP METALS FLUID #1		Analyst:	**MEG**			**EPA 3010 A**	**EPA 6010 D**
Aluminum	0.3	0.1		mg/L	1	09/25/20 9:10 AM	09/28/20 7:24 AM
Cobalt	< 0.005	0.005		mg/L	1	09/25/20 9:10 AM	09/28/20 7:24 AM
Iron	0.08	0.05		mg/L	1	09/25/20 9:10 AM	09/28/20 7:24 AM
Manganese	< 0.01	0.01		mg/L	1	09/25/20 9:10 AM	09/28/20 7:24 AM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Appendix C

Laboratory Analytical Reports—CCR Monitoring Wells Groundwater

GEOCHEMICAL TESTING
Environmental and Energy Analysis

2005 N. Center Ave.
Somerset, PA 15501

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

Wednesday, October 21, 2020

John Shimshock
CONEMAUGH OPERATING, LLC
CONEMAUGH STATION
PO BOX K
NEW FLORENCE, PA 15944

RE: Conemaugh CCR 3rd Qtr 2020 Order No.: G2009E00

Dear John Shimshock:

Geochemical Testing received 6 sample(s) on 9/23/2020 for the analyses presented in the following report.

There were no problems with sample receipt protocols and analyses met the TNI/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

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306PA DEP

CLIENT: CONEMAUGH OPERATING, LLC
Project: Conemaugh CCR 3rd Qtr 2020
Lab Order: G2009E00

CASE NARRATIVE

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

The radiological analysis (Radium 226 by EPA 903.1; Radium 228 by EPA 904.0 was subcontracted to Pace Analytical (PA DEP 65-00282). A copy of the subcontractor's laboratory report is enclosed with this Analytical Report.

Legend:

H - Method Hold Time exceeded and is not compliant with 40CFR136 Table II.
U - The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit.
B - Analyte detected in the associated Method Blank
Q1 - See case narrative ND - Not Detected
MCL - Contaminant Limit J - Indicates an estimated value.
Q - Qualifier QL -Quantitation Limit DF - Dilution Factor
S - Surrogate Recovery outside accepted recovery limits
T - Sample received above required temperature and is not compliant with 40CFR136 Table II.
T1 - Sample received above required temperature
MDA - Minimum Detectable Activity.
** - Value exceeds Action Limit
TICs - Tentatively Identified Compounds.
E - Value above quantitation range

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	MW-1B
Lab Order:	G2009E00		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E00-001	**Collection Date:**	9/23/2020 9:24:00 AM
Matrix:	GROUNDWATER	**Received Date:**	9/23/2020 5:41:19 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**FIELD**
Depth To Water	15.76			Ft			09/23/20 9:24 AM
Dissolved Oxygen	0.00			mg/L			09/23/20 9:24 AM
Flow	0.11			GPM			09/23/20 9:24 AM
pH (Field)	5.48			S.U.			09/23/20 9:24 AM
Sample Depth	41.0			Ft			09/23/20 9:24 AM
Specific Conductance (Field)	3650			µmhos/cm			09/23/20 9:24 AM
Temperature (Field)	15.69			deg C			09/23/20 9:24 AM
Turbidity (Field)	0.60			NTU			09/23/20 9:24 AM
Volume Purged	8.5			Gallons			09/23/20 9:24 AM
Well Volume Purged	0.44			Well Volume			09/23/20 9:24 AM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	5.95		H	S.U.	1		09/24/20 3:42 PM
INORGANIC NON-METALS		Analyst:	**LRR**			**SM 2540C**	**SM 2540 C**
Total dissolved solids	1940	20		mg/L	1	09/24/20 5:00 PM	09/24/20 5:26 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	14	10		mg/L CaCO3	1		09/24/20 3:42 PM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	830	1.0		mg/L	1	09/24/20 10:35 AM	09/24/20 3:08 PM
Fluoride	< 0.1	0.1		mg/L	1	09/24/20 10:35 AM	09/24/20 3:08 PM
Sulfate	413	2.0		mg/L	1	09/24/20 10:35 AM	09/24/20 3:08 PM
INORGANIC METALS		Analyst:	**MEG**			**EPA 200.2**	**EPA 200.7**
Aluminum, dissolved	< 0.1	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:23 PM
Cobalt, dissolved	< 0.005	0.005		mg/L	1	09/24/20 11:50 AM	09/25/20 4:23 PM
Iron, dissolved	< 0.05	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 4:23 PM
Manganese, dissolved	2.64	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:23 PM
INORGANIC METALS		Analyst:	**LXM**			**SM 3112 B**	**SM 3112 B**
Mercury	< 0.20	0.20		µg/L	1	09/25/20 6:35 AM	09/28/20 10:53 AM
INORGANIC METALS		Analyst:	**MEG**			**EPA 200.2**	**EPA 200.7**
Aluminum	< 0.1	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Barium	0.02	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Beryllium	< 0.001	0.001		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Boron	0.40	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Cadmium	0.002	0.002		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Calcium	154	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Chromium	< 0.01	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	MW-1B
Lab Order:	G2009E00		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E00-001	**Collection Date:**	9/23/2020 9:24:00 AM
Matrix:	GROUNDWATER	**Received Date:**	9/23/2020 5:41:19 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC METALS		Analyst: **MEG**				**EPA 200.2**	**EPA 200.7**
Cobalt	0.005	0.005		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Iron	0.07	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Lithium	0.02	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Magnesium	27.1	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Manganese	2.89	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Molybdenum	< 0.02	0.02		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Potassium	13.6	0.5		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
Sodium	439	0.2		mg/L	1	09/24/20 11:50 AM	09/25/20 4:21 PM
INORGANIC METALS		Analyst: **JEK**				**EPA 200.2**	**EPA 200.8**
Antimony	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 12:59 PM
Arsenic	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 12:59 PM
Lead	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 12:59 PM
Selenium	1.8	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 12:59 PM
Thallium	< 0.2	0.2		µg/L	1	09/24/20 11:50 AM	09/25/20 12:59 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1**
Radium 226	0.0671+-0.436	0.880		pCi/L	1		10/13/20 4:37 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0**
Radium 228	0.226+-0.388	0.847		pCi/L	1		10/13/20 11:08 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	MW-2
Lab Order:	G2009E00		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E00-002	**Collection Date:**	9/23/2020 11:14:00 AM
Matrix:	GROUNDWATER	**Received Date:**	9/23/2020 5:41:19 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**FIELD**
Depth To Water	17.50			Ft			09/23/20 11:14 AM
Dissolved Oxygen	6.91			mg/L			09/23/20 11:14 AM
Flow	0.09			GPM			09/23/20 11:14 AM
pH (Field)	6.43			S.U.			09/23/20 11:14 AM
Sample Depth	25.0			Ft			09/23/20 11:14 AM
Specific Conductance (Field)	1330			µmhos/cm			09/23/20 11:14 AM
Temperature (Field)	16.22			deg C			09/23/20 11:14 AM
Turbidity (Field)	< 0.10			NTU			09/23/20 11:14 AM
Volume Purged	7.5			Gallons			09/23/20 11:14 AM
Well Volume Purged	0.59			Well Volume			09/23/20 11:14 AM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	6.78		H	S.U.	1		09/24/20 3:45 PM
INORGANIC NON-METALS		Analyst:	**LRR**			**SM 2540C**	**SM 2540 C**
Total dissolved solids	846	20		mg/L	1	09/24/20 5:00 PM	09/24/20 5:26 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	98	10		mg/L CaCO3	1		09/24/20 3:45 PM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	171	1.0		mg/L	1	09/24/20 10:35 AM	09/24/20 4:02 PM
Fluoride	0.1	0.1		mg/L	1	09/24/20 10:35 AM	09/24/20 4:02 PM
Sulfate	348	2.0		mg/L	1	09/24/20 10:35 AM	09/24/20 4:02 PM
INORGANIC METALS		Analyst:	**MEG**			**EPA 200.2**	**EPA 200.7**
Aluminum, dissolved	< 0.1	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:26 PM
Cobalt, dissolved	< 0.005	0.005		mg/L	1	09/24/20 11:50 AM	09/25/20 4:26 PM
Iron, dissolved	< 0.05	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 4:26 PM
Manganese, dissolved	1.53	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:26 PM
INORGANIC METALS		Analyst:	**LXM**			**SM 3112 B**	**SM 3112 B**
Mercury	< 0.20	0.20		µg/L	1	09/25/20 6:35 AM	09/28/20 10:55 AM
INORGANIC METALS		Analyst:	**MEG**			**EPA 200.2**	**EPA 200.7**
Aluminum	< 0.1	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Barium	0.01	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Beryllium	< 0.001	0.001		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Boron	0.33	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Cadmium	< 0.002	0.002		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Calcium	137	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Chromium	< 0.01	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	MW-2
Lab Order:	G2009E00		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E00-002	**Collection Date:**	9/23/2020 11:14:00 AM
Matrix:	GROUNDWATER	**Received Date:**	9/23/2020 5:41:19 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC METALS		Analyst: **MEG**				**EPA 200.2**	**EPA 200.7**
Cobalt	< 0.005	0.005		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Iron	< 0.05	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Lithium	< 0.01	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Magnesium	39.7	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Manganese	1.54	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Molybdenum	< 0.02	0.02		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Potassium	3.4	0.5		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
Sodium	67.6	0.2		mg/L	1	09/24/20 11:50 AM	09/25/20 4:25 PM
INORGANIC METALS		Analyst: **JEK**				**EPA 200.2**	**EPA 200.8**
Antimony	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 1:02 PM
Arsenic	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 1:02 PM
Lead	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 1:02 PM
Selenium	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 1:02 PM
Thallium	< 0.2	0.2		µg/L	1	09/24/20 11:50 AM	09/25/20 1:02 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1**
Radium 226	-0.132+-0.408	0.928		pCi/L	1		10/13/20 4:37 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0**
Radium 228	-0.459+-0.438	1.09		pCi/L	1		10/13/20 11:08 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	MW-3
Lab Order:	G2009E00		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E00-003	**Collection Date:**	9/23/2020 1:59:00 PM
Matrix:	GROUNDWATER	**Received Date:**	9/23/2020 5:41:19 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**FIELD**
Depth To Water	12.58			Ft			09/23/20 1:59 PM
Dissolved Oxygen	0.00			mg/L			09/23/20 1:59 PM
Flow	0.07			GPM			09/23/20 1:59 PM
pH (Field)	5.78			S.U.			09/23/20 1:59 PM
Sample Depth	24.0			Ft			09/23/20 1:59 PM
Specific Conductance (Field)	1720			µmhos/cm			09/23/20 1:59 PM
Temperature (Field)	19.66			deg C			09/23/20 1:59 PM
Turbidity (Field)	< 0.10			NTU			09/23/20 1:59 PM
Volume Purged	4.0			Gallons			09/23/20 1:59 PM
Well Volume Purged	1.5			Well Volume			09/23/20 1:59 PM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	6.16		H	S.U.	1		09/24/20 3:52 PM
INORGANIC NON-METALS		Analyst:	**LRR**			**SM 2540C**	**SM 2540 C**
Total dissolved solids	1210	20		mg/L	1	09/24/20 5:00 PM	09/24/20 5:26 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	44	10		mg/L CaCO3	1		09/24/20 3:52 PM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	419	1.0		mg/L	1	09/24/20 10:35 AM	09/24/20 4:20 PM
Fluoride	< 0.1	0.1		mg/L	1	09/24/20 10:35 AM	09/24/20 4:20 PM
Sulfate	236	2.0		mg/L	1	09/24/20 10:35 AM	09/24/20 4:20 PM
INORGANIC METALS		Analyst:	**MEG**			**EPA 200.2**	**EPA 200.7**
Aluminum, dissolved	< 0.1	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:30 PM
Cobalt, dissolved	0.010	0.005		mg/L	1	09/24/20 11:50 AM	09/25/20 4:30 PM
Iron, dissolved	0.47	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 4:30 PM
Manganese, dissolved	4.06	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:30 PM
INORGANIC METALS		Analyst:	**LXM**			**SM 3112 B**	**SM 3112 B**
Mercury	< 0.20	0.20		µg/L	1	09/25/20 6:35 AM	09/28/20 10:56 AM
INORGANIC METALS		Analyst:	**MEG**			**EPA 200.2**	**EPA 200.7**
Aluminum	< 0.1	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Barium	0.04	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Beryllium	< 0.001	0.001		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Boron	< 0.05	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Cadmium	< 0.002	0.002		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Calcium	131	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Chromium	< 0.01	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	MW-3
Lab Order:	G2009E00		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E00-003	**Collection Date:**	9/23/2020 1:59:00 PM
Matrix:	GROUNDWATER	**Received Date:**	9/23/2020 5:41:19 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC METALS		Analyst: **MEG**				**EPA 200.2**	**EPA 200.7**
Cobalt	0.010	0.005		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Iron	0.48	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Lithium	< 0.01	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Magnesium	61.7	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Manganese	3.80	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Molybdenum	< 0.02	0.02		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Potassium	2.1	0.5		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
Sodium	111	0.2		mg/L	1	09/24/20 11:50 AM	09/25/20 4:28 PM
INORGANIC METALS		Analyst: **JEK**				**EPA 200.2**	**EPA 200.8**
Antimony	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 1:04 PM
Arsenic	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 1:04 PM
Lead	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 1:04 PM
Selenium	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 1:04 PM
Thallium	< 0.2	0.2		µg/L	1	09/24/20 11:50 AM	09/25/20 1:04 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1**
Radium 226	0.227+-0.353	0.611		pCi/L	1		10/14/20 12:06 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0**
Radium 228	1.21+-0.637	1.14		pCi/L	1		10/13/20 11:51 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	MW-4
Lab Order:	G2009E00		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E00-004	**Collection Date:**	9/23/2020 12:25:00 PM
Matrix:	GROUNDWATER	**Received Date:**	9/23/2020 5:41:19 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**FIELD**
Depth To Water	8.30			Ft			09/23/20 12:25 PM
Dissolved Oxygen	0.00			mg/L			09/23/20 12:25 PM
Flow	0.08			GPM			09/23/20 12:25 PM
pH (Field)	5.92			S.U.			09/23/20 12:25 PM
Sample Depth	22.4			Ft			09/23/20 12:25 PM
Specific Conductance (Field)	3120			µmhos/cm			09/23/20 12:25 PM
Temperature (Field)	19.22			deg C			09/23/20 12:25 PM
Turbidity (Field)	< 0.10			NTU			09/23/20 12:25 PM
Volume Purged	3.5			Gallons			09/23/20 12:25 PM
Well Volume Purged	0.92			Well Volume			09/23/20 12:25 PM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	6.25		H	S.U.	1		09/24/20 3:56 PM
INORGANIC NON-METALS		Analyst:	**LRR**			**SM 2540C**	**SM 2540 C**
Total dissolved solids	1700	20		mg/L	1	09/24/20 5:00 PM	09/24/20 5:26 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	53	10		mg/L CaCO3	1		09/24/20 3:56 PM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	461	1.0		mg/L	1	09/24/20 10:35 AM	09/24/20 4:56 PM
Fluoride	< 0.1	0.1		mg/L	1	09/24/20 10:35 AM	09/24/20 4:56 PM
Sulfate	680	2.0		mg/L	1	09/24/20 10:35 AM	09/24/20 4:56 PM
INORGANIC METALS		Analyst:	**MEG**			**EPA 200.2**	**EPA 200.7**
Aluminum, dissolved	< 0.1	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:31 PM
Cobalt, dissolved	0.020	0.005		mg/L	1	09/24/20 11:50 AM	09/25/20 4:31 PM
Iron, dissolved	0.10	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 4:31 PM
Manganese, dissolved	4.95	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:31 PM
INORGANIC METALS		Analyst:	**LXM**			**SM 3112 B**	**SM 3112 B**
Mercury	< 0.20	0.20		µg/L	1	09/25/20 6:35 AM	09/28/20 10:58 AM
INORGANIC METALS		Analyst:	**MEG**			**EPA 200.2**	**EPA 200.7**
Aluminum	< 0.1	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Barium	0.01	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Beryllium	< 0.001	0.001		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Boron	0.10	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Cadmium	< 0.002	0.002		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Calcium	209	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Chromium	< 0.01	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	MW-4
Lab Order:	G2009E00		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E00-004	**Collection Date:**	9/23/2020 12:25:00 PM
Matrix:	GROUNDWATER	**Received Date:**	9/23/2020 5:41:19 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC METALS		Analyst: **MEG**				**EPA 200.2**	**EPA 200.7**
Cobalt	0.020	0.005		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Iron	0.14	0.05		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Lithium	< 0.01	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Magnesium	52.0	0.1		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Manganese	4.64	0.01		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Molybdenum	< 0.02	0.02		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Potassium	3.5	0.5		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
Sodium	236	0.2		mg/L	1	09/24/20 11:50 AM	09/25/20 4:33 PM
INORGANIC METALS		Analyst: **JEK**				**EPA 200.2**	**EPA 200.8**
Antimony	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 1:06 PM
Arsenic	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 1:06 PM
Lead	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 1:06 PM
Selenium	< 1.0	1.0		µg/L	1	09/24/20 11:50 AM	09/25/20 1:06 PM
Thallium	< 0.2	0.2		µg/L	1	09/24/20 11:50 AM	09/25/20 1:06 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1**
Radium 226	-0.0566+-0.400	0.849		pCi/L	1		10/14/20 12:06 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0**
Radium 228	0.278+-0.504	1.10		pCi/L	1		10/13/20 11:51 AM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	MW-23
Lab Order:	G2009E00		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E00-005	**Collection Date:**	9/23/2020 2:25:00 PM
Matrix:	GROUNDWATER	**Received Date:**	9/23/2020 5:41:19 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**FIELD**
Depth To Water	15.92			Ft			09/23/20 2:25 PM
Dissolved Oxygen	< 0.10			mg/L			09/23/20 2:25 PM
Flow	0.14			GPM			09/23/20 2:25 PM
pH (Field)	5.57			S.U.			09/23/20 2:25 PM
Sample Depth	30.4			Ft			09/23/20 2:25 PM
Specific Conductance (Field)	2020			µmhos/cm			09/23/20 2:25 PM
Temperature (Field)	20.22			deg C			09/23/20 2:25 PM
Turbidity (Field)	17.8			NTU			09/23/20 2:25 PM
Volume Purged	8.5			Gallons			09/23/20 2:25 PM
Well Volume Purged	0.81			Well Volume			09/23/20 2:25 PM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	6.07		H	S.U.	1		09/24/20 4:01 PM
INORGANIC NON-METALS		Analyst:	**LRR**			**SM 2540C**	**SM 2540 C**
Total dissolved solids	1190	20		mg/L	1	09/24/20 5:00 PM	09/24/20 5:26 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	44	10		mg/L CaCO3	1		09/24/20 4:01 PM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	321	1.0		mg/L	1	09/24/20 10:35 AM	09/24/20 5:14 PM
Fluoride	< 0.1	0.1		mg/L	1	09/24/20 10:35 AM	09/24/20 5:14 PM
Sulfate	462	2.0		mg/L	1	09/24/20 10:35 AM	09/24/20 5:14 PM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Aluminum, dissolved	< 0.1	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:27 PM
Cobalt, dissolved	0.048	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 1:27 PM
Iron, dissolved	10.3	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:27 PM
Manganese, dissolved	6.11	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:27 PM
INORGANIC METALS		Analyst:	**LXM**			**SM 3112 B**	**SM 3112 B**
Mercury	< 0.20	0.20		µg/L	1	09/25/20 6:35 AM	09/28/20 11:12 AM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Aluminum	< 0.1	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Barium	0.01	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Beryllium	< 0.001	0.001		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Boron	0.05	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Cadmium	< 0.002	0.002		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Calcium	127	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Chromium	< 0.01	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	MW-23
Lab Order:	G2009E00		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E00-005	**Collection Date:**	9/23/2020 2:25:00 PM
Matrix:	GROUNDWATER	**Received Date:**	9/23/2020 5:41:19 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC METALS		Analyst: **GMG**				**EPA 200.2**	**EPA 200.7**
Cobalt	0.053	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Iron	11.8	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Lithium	< 0.01	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Magnesium	48.4	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Manganese	6.70	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Molybdenum	< 0.02	0.02		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Potassium	2.3	0.5		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
Sodium	172	0.2		mg/L	1	09/25/20 10:35 AM	09/28/20 1:07 PM
INORGANIC METALS		Analyst: **RLR**				**EPA 200.2**	**EPA 200.8**
Antimony	< 1.0	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 1:43 PM
Arsenic	< 1.0	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 1:43 PM
Lead	< 1.0	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 1:43 PM
Selenium	< 1.0	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 1:43 PM
Thallium	< 0.2	0.2		µg/L	1	09/25/20 10:35 AM	09/28/20 1:43 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1**
Radium 226	0.116+-0.395	0.761		pCi/L	1		10/14/20 12:06 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0**
Radium 228	0.818+-0.676	1.37		pCi/L	1		10/13/20 11:51 AM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	MW-23 DUP
Lab Order:	G2009E00		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E00-006	**Collection Date:**	9/23/2020 2:25:00 PM
Matrix:	GROUNDWATER	**Received Date:**	9/23/2020 5:41:19 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
FIELD PARAMETERS		Analyst:					**FIELD**
Depth To Water	15.92			Ft			09/23/20 2:25 PM
Dissolved Oxygen	< 0.10			mg/L			09/23/20 2:25 PM
Flow	0.14			GPM			09/23/20 2:25 PM
pH (Field)	5.57			S.U.			09/23/20 2:25 PM
Sample Depth	30.4			Ft			09/23/20 2:25 PM
Specific Conductance (Field)	2020			µmhos/cm			09/23/20 2:25 PM
Temperature (Field)	20.22			deg C			09/23/20 2:25 PM
Turbidity (Field)	17.8			NTU			09/23/20 2:25 PM
Volume Purged	8.5			Gallons			09/23/20 2:25 PM
Well Volume Purged	0.81			Well Volume			09/23/20 2:25 PM
PH BY SM 4500 H+B		Analyst:	**LRR**				**SM 4500-H+ B**
Lab pH	6.09		H	S.U.	1		09/24/20 4:06 PM
INORGANIC NON-METALS		Analyst:	**LRR**			**SM 2540C**	**SM 2540 C**
Total dissolved solids	1210	20		mg/L	1	09/24/20 5:00 PM	09/24/20 5:26 PM
INORGANIC NON-METALS		Analyst:	**LRR**				**ASTM D 1067-11**
Alkalinity to pH 4.5	44	10		mg/L CaCO3	1		09/24/20 4:06 PM
INORGANIC NON-METALS		Analyst:	**MBG**			**EPA 300.0**	**EPA 300.0**
Chloride	321	1.0		mg/L	1	09/24/20 10:35 AM	09/24/20 5:32 PM
Fluoride	< 0.1	0.1		mg/L	1	09/24/20 10:35 AM	09/24/20 5:32 PM
Sulfate	465	2.0		mg/L	1	09/24/20 10:35 AM	09/24/20 5:32 PM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Aluminum, dissolved	< 0.1	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:25 PM
Cobalt, dissolved	0.050	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 1:25 PM
Iron, dissolved	11.0	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:25 PM
Manganese, dissolved	6.45	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:25 PM
INORGANIC METALS		Analyst:	**LXM**			**SM 3112 B**	**SM 3112 B**
Mercury	< 0.20	0.20		µg/L	1	09/25/20 6:35 AM	09/28/20 11:17 AM
INORGANIC METALS		Analyst:	**GMG**			**EPA 200.2**	**EPA 200.7**
Aluminum	< 0.1	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
Barium	0.01	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
Beryllium	< 0.001	0.001		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
Boron	0.07	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
Cadmium	< 0.002	0.002		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
Calcium	119	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
Chromium	< 0.01	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM

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I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *21-Oct-20*

CLIENT:	CONEMAUGH OPERATING, LLC	**Client Sample ID:**	MW-23 DUP
Lab Order:	G2009E00		
Project:	Conemaugh CCR 3rd Qtr 2020	**Sampled By:**	CME Engineering
Lab ID:	G2009E00-006	**Collection Date:**	9/23/2020 2:25:00 PM
Matrix:	GROUNDWATER	**Received Date:**	9/23/2020 5:41:19 PM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
INORGANIC METALS		Analyst: **GMG**				**EPA 200.2**	**EPA 200.7**
Cobalt	0.050	0.005		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
Iron	10.8	0.05		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
Lithium	< 0.01	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
Magnesium	45.3	0.1		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
Manganese	6.26	0.01		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
Molybdenum	< 0.02	0.02		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
Potassium	2.2	0.5		mg/L	1	09/25/20 10:35 AM	09/29/20 3:49 PM
Sodium	158	0.2		mg/L	1	09/25/20 10:35 AM	09/28/20 1:17 PM
INORGANIC METALS		Analyst: **RLR**				**EPA 200.2**	**EPA 200.8**
Antimony	< 1.0	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 1:59 PM
Arsenic	< 1.0	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 1:59 PM
Lead	< 1.0	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 1:59 PM
Selenium	< 1.0	1.0		µg/L	1	09/25/20 10:35 AM	09/28/20 1:59 PM
Thallium	< 0.2	0.2		µg/L	1	09/25/20 10:35 AM	09/28/20 1:59 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 903.1**
Radium 226	0.0547+-0.322	0.657		pCi/L	1		10/14/20 12:06 PM
RADIOLOGICAL PARAMETERS		Analyst: **SUB**					**EPA 904.0**
Radium 228	0.351+-0.611	1.33		pCi/L	1		10/13/20 11:51 AM

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I.D. 56-00306 PA DEP

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

October 14, 2020

Ms. Leslie Nemeth
Geochemical Testing
2005 N. Center Avenue
Somerset, PA 15501

RE: Project: G2009E00
Pace Project No.: 30384557

Dear Ms. Nemeth:

Enclosed are the analytical results for sample(s) received by the laboratory on September 29, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Megan A Rager

Megan A. Rager
megan.rager@pacelabs.com
(724)850-5600
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: G2009E00
Pace Project No.: 30384557

Pace Analytical Services Pennsylvania
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: G2009E00
Pace Project No.: 30384557

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30384557001	**G2009E00-001**	Water	09/23/20 09:24	09/29/20 09:30
30384557002	**G2009E00-002**	Water	09/23/20 11:14	09/29/20 09:30
30384557003	**G2009E00-003**	Water	09/23/20 13:59	09/29/20 09:30
30384557004	**G2009E00-004**	Water	09/23/20 12:25	09/29/20 09:30
30384557005	**G2009E00-005**	Water	09/23/20 14:25	09/29/20 09:30
30384557006	**G2009E00-006**	Water	09/23/20 14:25	09/29/20 09:30

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Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: G2009E00
Pace Project No.: 30384557

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30384557001	**G2009E00-001**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30384557002	**G2009E00-002**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30384557003	**G2009E00-003**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30384557004	**G2009E00-004**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30384557005	**G2009E00-005**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30384557006	**G2009E00-006**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA

PASI-PA = Pace Analytical Services - Greensburg

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G2009E00
Pace Project No.: 30384557

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Geochemical Testing
Date: October 14, 2020

General Information:
6 samples were analyzed for EPA 903.1 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: G2009E00
Pace Project No.: 30384557

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Geochemical Testing
Date: October 14, 2020

General Information:
6 samples were analyzed for EPA 904.0 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G2009E00
Pace Project No.: 30384557

Sample: G2009E00-001 **Lab ID: 30384557001** Collected: 09/23/20 09:24 Received: 09/29/20 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0671 ± 0.436 (0.880) C:NA T:84%**	pCi/L	10/13/20 16:37	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.226 ± 0.388 (0.847) C:76% T:87%**	pCi/L	10/13/20 11:08	15262-20-1	

Sample: G2009E00-002 **Lab ID: 30384557002** Collected: 09/23/20 11:14 Received: 09/29/20 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.132 ± 0.408 (0.928) C:NA T:94%**	pCi/L	10/13/20 16:37	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.459 ± 0.438 (1.09) C:75% T:72%**	pCi/L	10/13/20 11:08	15262-20-1	

Sample: G2009E00-003 **Lab ID: 30384557003** Collected: 09/23/20 13:59 Received: 09/29/20 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.227 ± 0.353 (0.611) C:NA T:93%**	pCi/L	10/14/20 12:06	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.21 ± 0.637 (1.14) C:58% T:78%**	pCi/L	10/13/20 11:51	15262-20-1	

Sample: G2009E00-004 **Lab ID: 30384557004** Collected: 09/23/20 12:25 Received: 09/29/20 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.0566 ± 0.400 (0.849) C:NA T:94%**	pCi/L	10/14/20 12:06	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.278 ± 0.504 (1.10) C:53% T:86%**	pCi/L	10/13/20 11:51	15262-20-1	

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1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G2009E00
Pace Project No.: 30384557

Sample: G2009E00-005 **Lab ID: 30384557005** Collected: 09/23/20 14:25 Received: 09/29/20 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.116 ± 0.395 (0.761) C:NA T:82%**	pCi/L	10/14/20 12:06	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.818 ± 0.676 (1.37) C:50% T:82%**	pCi/L	10/13/20 11:51	15262-20-1	

Sample: G2009E00-006 **Lab ID: 30384557006** Collected: 09/23/20 14:25 Received: 09/29/20 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0547 ± 0.322 (0.657) C:NA T:96%**	pCi/L	10/14/20 12:06	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.351 ± 0.611 (1.33) C:55% T:61%**	pCi/L	10/13/20 11:51	15262-20-1	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: G2009E00
Pace Project No.: 30384557

QC Batch: 416315
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30384557001, 30384557002

METHOD BLANK: 2012832
Matrix: Water
Associated Lab Samples: 30384557001, 30384557002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.547 ± 0.529 (0.829) C:NA T:90%	pCi/L	10/13/20 15:31	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL - RADIOCHEMISTRY

Project: G2009E00
Pace Project No.: 30384557

QC Batch: 416318 | Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 | Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30384557003, 30384557004, 30384557005, 30384557006

METHOD BLANK: 2012841 | Matrix: Water
Associated Lab Samples: 30384557003, 30384557004, 30384557005, 30384557006

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.000 ± 0.277 (0.586) C:NA T:88%	pCi/L	10/14/20 11:42	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL - RADIOCHEMISTRY

Project: G2009E00
Pace Project No.: 30384557

QC Batch: 416316
QC Batch Method: EPA 904.0
Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30384557001, 30384557002

METHOD BLANK: 2012833
Matrix: Water
Associated Lab Samples: 30384557001, 30384557002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.585 ± 0.436 (0.848) C:74% T:70%	pCi/L	10/13/20 11:06	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL - RADIOCHEMISTRY

Project: G2009E00
Pace Project No.: 30384557

QC Batch: 416319 | Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 | Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30384557003, 30384557004, 30384557005, 30384557006

METHOD BLANK: 2012842 | Matrix: Water
Associated Lab Samples: 30384557003, 30384557004, 30384557005, 30384557006

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.197 ± 0.397 (0.877) C:65% T:74%	pCi/L	10/13/20 11:52	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: G2009E00
Pace Project No.: 30384557

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Shuttle/Cooler ID#:

CHAIN OF CUSTODY

Geochemical Testing

Form F-5002, 04.13

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: Geochemical Testing	**Contact (Company):** Leslie Nemeth	**Phone:** (814) 443-1671
Address: 2005 North Center Avenue	e-mail: lnemeth@geo-ces.com	Fax: (814) 445-6729
City: Somerset **State:** PA **Zip:** 15501	**Sampled by:** Client	**Preservatives by** __Sampler__GT
WO#:	Project:	PO/Quote#: P2020-10420

Sample Matrix:	**GW** Ground Water	**SW** Surface Water	**PW** Potable Water	**WW** Wastewater	**SO** Soil	**SL** Sludge	**nHZ** Not Hazardous / **HZ** Hazardous	**PCBs**
Sample Type:	G Grab	C Composite	D Distribution/DW	R Raw/DW	S Special/DW	O Other	Containers Supplied by: ☐ Client ☐ GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers	
***NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG*									
G2009E00-001		nHZ / HZ GW	9/23/2020	9:24	G	Radium 226, 228	Field Filtered: Y / N HNO3	2	001
G2009E00-002		nHZ / HZ GW	9/23/2020	11:14	G	Radium 226, 228	Field Filtered: Y / N HNO3	2	002
G2009E00-003		nHZ / HZ GW	9/23/2020	13:59	G	Radium 226, 228	Field Filtered: Y / N HNO3	2	003
G2009E00-004		nHZ / HZ GW	9/23/2020	12:25	G	Radium 226, 228	Field Filtered: Y / N HNO3	2	004
G2009E00-005		nHZ / HZ GW	9/23/2020	14:25	G	Radium 226, 228	Field Filtered: Y / N HNO3	2	005
G2009E00-006		nHZ / HZ GW	9/23/2020	14:25	G	Radium 226, 228	Field Filtered: Y / N HNO3	2	006
		nHZ / HZ					Field Filtered: Y / N		
		nHZ / HZ					Field Filtered: Y / N		

WO# : 30384557

30384557

Note Deficiencies Here: PA CCR samples

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
Leslie Nemeth	9/24/2020	9:00:00	[illegible]	9/24/20	09:30

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ___Yes or ✓No | Cooler Temp (°C) on receipt: N/A

Sample Receiving (1st Review):_____ | Client Support (2nd Review):_____

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: Geochemical Project # # - 30384557

Courier: ☐ Fed Ex ☐ UPS ☑ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label Rpm
LIMS Login Rpm

Tracking #: 12 544 007 03 5560 4204

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Thermometer Used N/A Type of Ice: Wet Blue None

Cooler Temperature Observed Temp — °C Correction Factor: — °C Final Temp: — °C

Temp should be above freezing to 6°C

Comments:	Yes	No	N/A	pH paper Lot# 100401	Date and Initials of person examining contents: Rpm 9/29/20
Chain of Custody Present:	✓			1.	
Chain of Custody Filled Out:	✓			2.	
Chain of Custody Relinquished:	✓			3.	
Sampler Name & Signature on COC:		✓		4. No name or signature	
Sample Labels match COC: -Includes date/time/ID Matrix: WT	✓			5.	
Samples Arrived within Hold Time:	✓			6.	
Short Hold Time Analysis (<72hr remaining):		✓		7.	
Rush Turn Around Time Requested:		✓		8.	
Sufficient Volume:	✓			9.	
Correct Containers Used: -Pace Containers Used:	✓	✓		10.	
Containers Intact:	✓			11.	
Orthophosphate field filtered			✓	12.	
Hex Cr Aqueous sample field filtered			✓	13.	
Organic Samples checked for dechlorination:			✓	14.	
Filtered volume received for Dissolved tests			✓	15.	
All containers have been checked for preservation. exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, Non-aqueous matrix	✓			16. PH < 2	
All containers meet method preservation requirements.	✓			Initial when completed Rpm	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):			✓	17.	
Trip Blank Present:			✓	18.	
Trip Blank Custody Seals Present			✓		
Rad Samples Screened < 0.5 mrem/hr	✓			Initial when completed: Rpm	Date: 9/29/20

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

Appendix D

Sanitas™ Input/Output for Cobalt

Sanitas Input Data File

SampleID	Collect Date	TestName	Flag	Value	PQL	Units
MW-1B	12/17/2015	Cobalt, Total		0.012	0.005	mg/L
MW-1B	1/27/2016	Cobalt, Total	<	0.005	0.005	mg/L
MW-1B	4/20/2016	Cobalt, Total	<	0.005	0.005	mg/L
MW-1B	7/19/2016	Cobalt, Total		0.006	0.005	mg/L
MW-1B	10/11/2016	Cobalt, Total	<	0.005	0.005	mg/L
MW-1B	1/17/2017	Cobalt, Total		0.005	0.005	mg/L
MW-1B	4/24/2017	Cobalt, Total		0.005	0.005	mg/L
MW-1B	7/20/2017	Cobalt, Total		0.013	0.005	mg/L
MW-2	10/11/2016	Cobalt, Total	<	0.005	0.005	mg/L
MW-2	11/16/2016	Cobalt, Total	<	0.005	0.005	mg/L
MW-2	12/21/2016	Cobalt, Total	<	0.005	0.005	mg/L
MW-2	1/25/2017	Cobalt, Total	<	0.005	0.005	mg/L
MW-2	3/21/2017	Cobalt, Total	<	0.005	0.005	mg/L
MW-2	4/25/2017	Cobalt, Total	<	0.005	0.005	mg/L
MW-2	6/13/2017	Cobalt, Total	<	0.005	0.005	mg/L
MW-2	7/27/2017	Cobalt, Total	<	0.005	0.005	mg/L

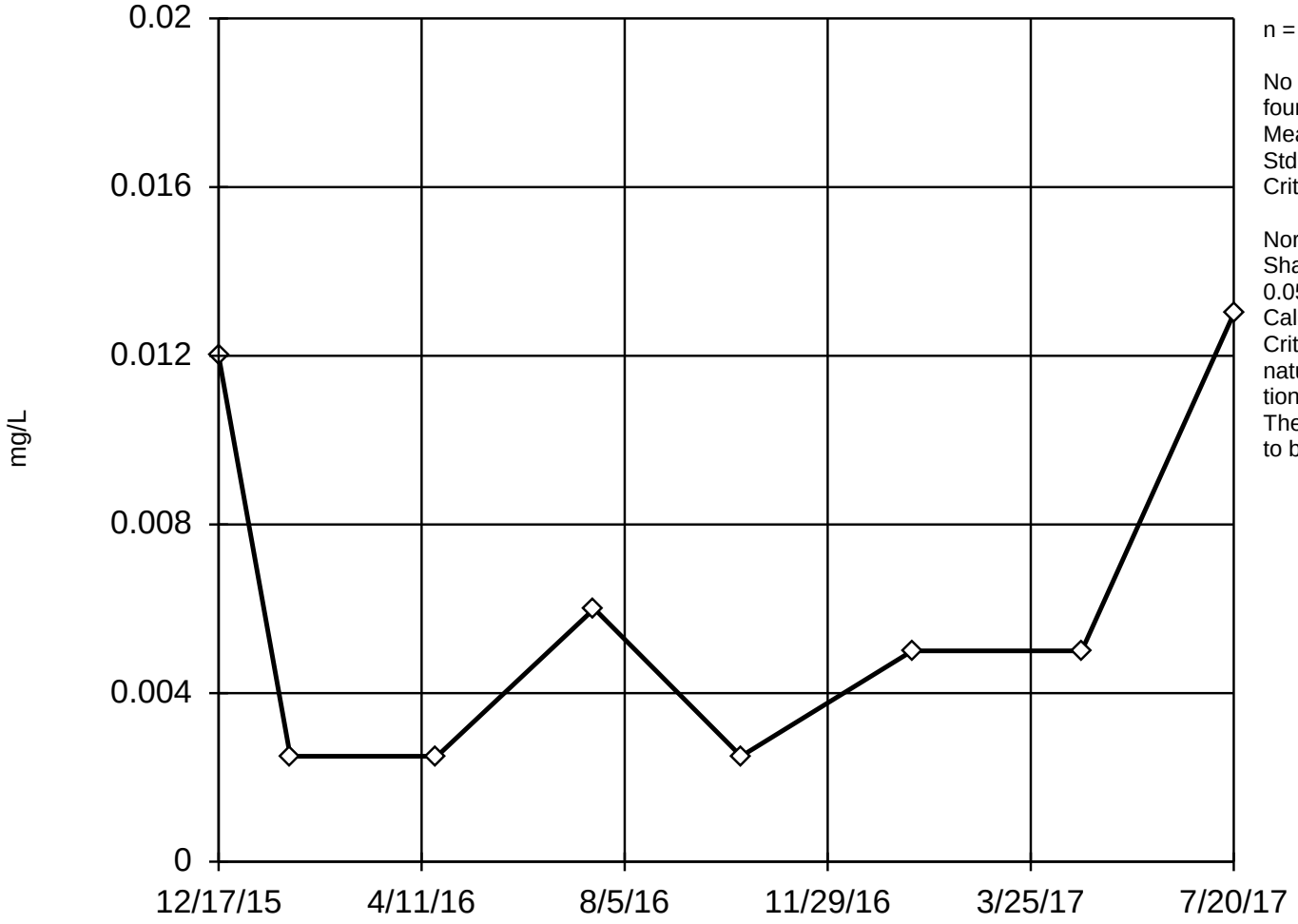
Outlier Analysis

Facility: Conemaugh Generating Station Client: Key-Con Data File: Conemaugh Cobalt Data Sept 2020 Printed 10/26/2020, 1:41 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution
Cobalt, Total (mg/L)	MW-1B (bg)	No	n/a	n/a	EPA 1989	0.05	8	0.006062	0.004204	ln(x)
Cobalt, Total (mg/L)	MW-2 (bg)	No	n/a	n/a	EPA 1989	0.05	8	0.0025	0	unknown

EPA 1989 Outlier Test

MW-1B (bg)



n = 8

No statistical outliers found.
Mean = 0.006062
Std. dev. = 0.004204
Critical Tn = 2.032

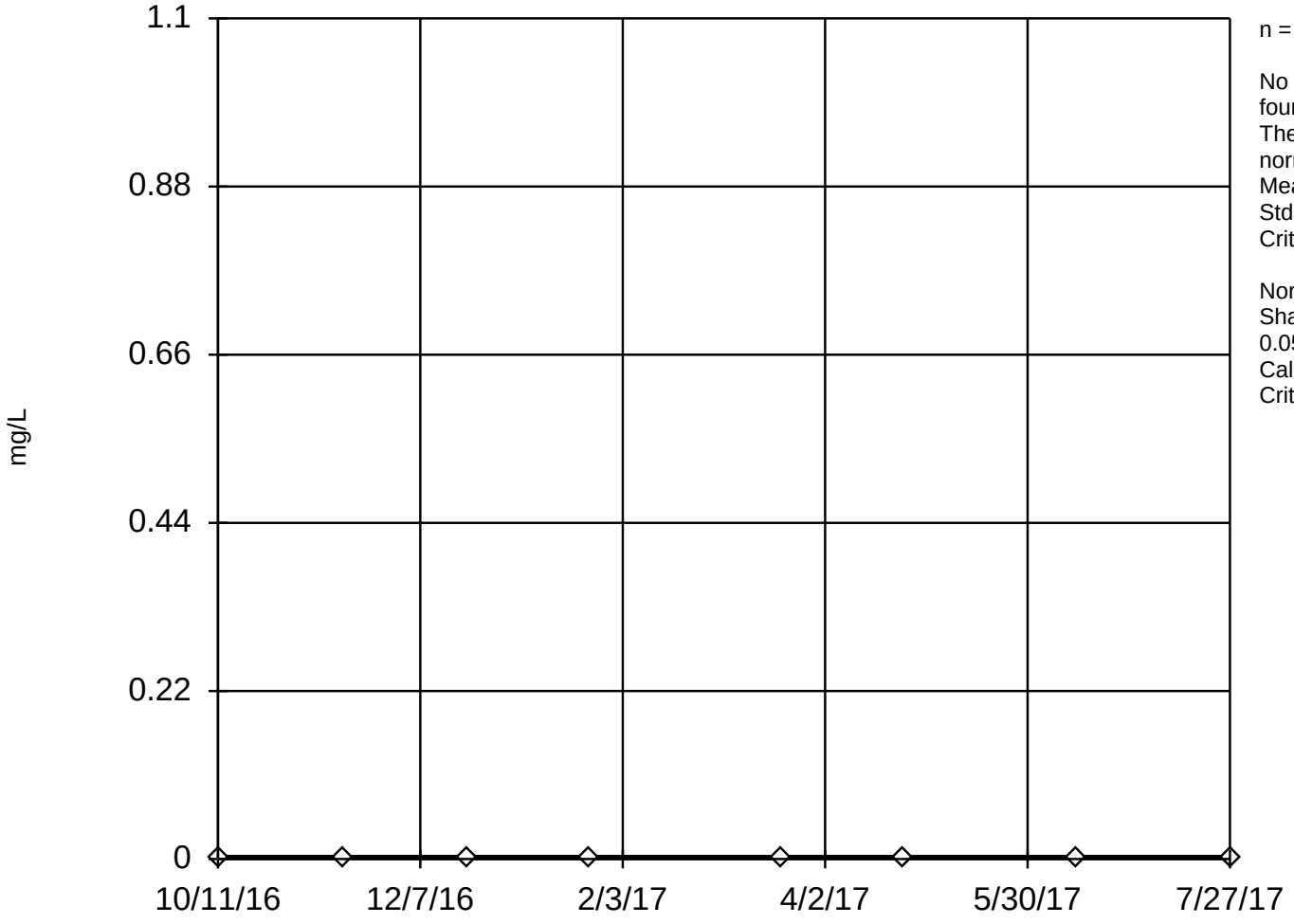
Normality test used:
Shapiro Wilk@alpha = 0.05
Calculated = 0.8598
Critical = 0.818 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Cobalt, Total Analysis Run 10/26/2020 1:34 PM

Facility: Conemaugh Generating Station Client: NRG Data File: Conemaugh Cobalt Data Sept 2020

EPA 1989 Outlier Test

MW-2 (bg)



n = 8

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.0025
Std. dev. = 0
Critical Tn = 2.032

Normality test used:
Shapiro Wilk@alpha = 0.05
Calculated = 0
Critical = 0.818

Constituent: Cobalt, Total Analysis Run 10/26/2020 1:41 PM

Facility: Conemaugh Generating Station Client: NRG Data File: Conemaugh Cobalt Data Sept 2020

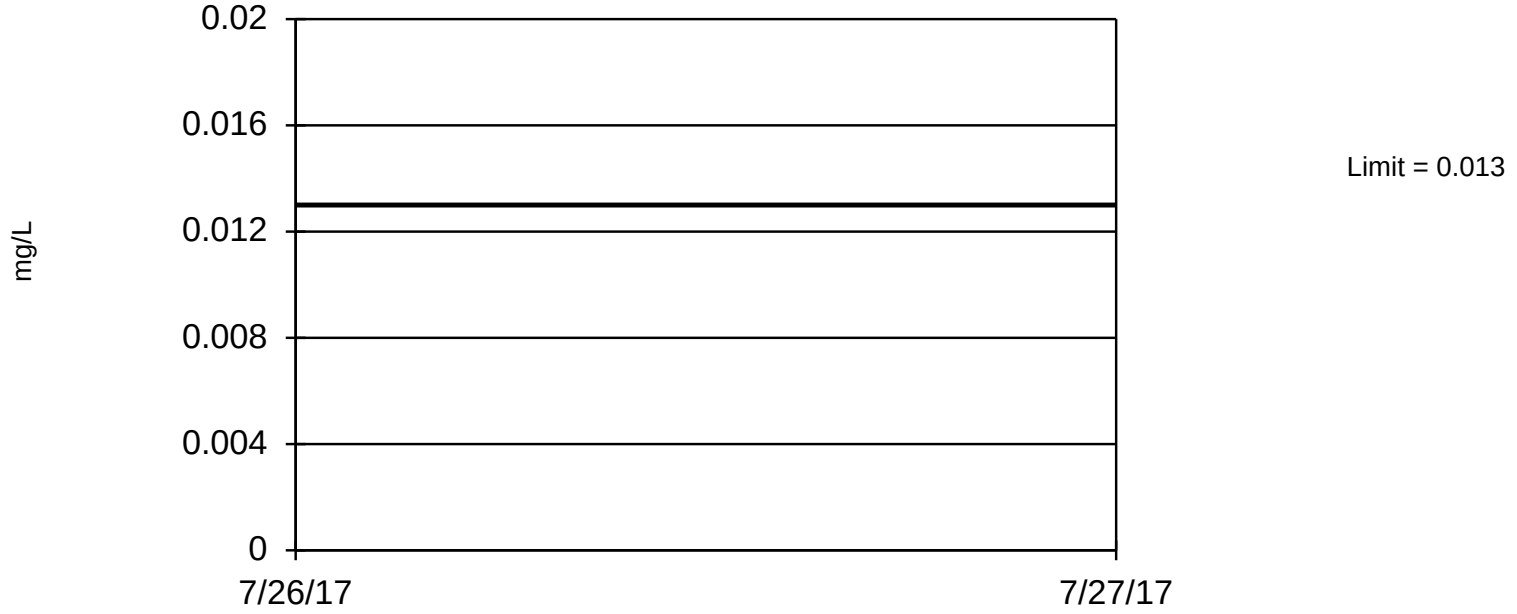
Prediction Limit

Facility: Conemaugh Generating Station Client: Key-Con Data File: Conemaugh Cobalt Data Sept 2020 Printed 10/27/2020, 9:26AM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Cobalt, Total (mg/L)	n/a	0.013	n/a	1 future	n/a	16	68.75	n/a	0.05882	NP Inter (NDs)

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 68.75% NDs. Report alpha = 0.05882. Assumes 1 future value. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Cobalt, Total Analysis Run 10/27/2020 9:26 AM

Facility: Conemaugh Generating Station Client: NRG Data File: Conemaugh Cobalt Data Sept 2020

Appendix E

Soil Boring Logs

Drilling Log

Soil Boring **SB-1**

Project: Conemaugh Soil Borings - GW Investigation | Owner: Keystone-Conemaugh Projects, LLC.
Location: New Florence, PA | Proj. No.: 631016449
Surface Elev.: 1076 ft. | Total Hole Depth: 20.0 ft. | North: 40.3825 ft. | East: -79.0629 ft.
Top of Casing: NA | Water Level Initial: ▽ 17.0 ft. | Static: NA | Diameter: 2 in.
Screen: Dia: NA | Length: NA | Type/Size: NA
Casing: Dia: NA | Length: NA | Type: NA
Fill Material: Soil Boring Cuttings/Bentonite | Rig/Core: DPT Geoprobe 7822 DT
Drill Co.: Eichelbergers, Inc. | Method: Hand clear to 5 feet, Direct-Push-Technology
Driller: Paul Wirrick | Log By: T. Hochbein | Date: 9/21/20 | Permit #: NA
Checked By: D. Shott | License No.:

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-1(5-7), SB-1(7-8), and SB-1(18-20)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					TOPSOIL	Dark brown TOPSOIL, organic matter, dry
					GP	Gray LIMESTONE GRAVEL, 2B, fizzes, dry
	0.0	100%			CLS	Dark brown to organish-brown CLAY with some sand and pebbles, moist
2						
	0.0	100%				
4						
	0.0	(SB-1(5-7)) 100%			CL ML	Orangish-gray CLAY, mottled, some silt, little sand, moist
6						
	0.0	SB-1(7-8) 100%			CLAY	Dark black CLAY seam, moist
8					SW SM	Orangish-brown SAND, fine-coarse grained, some silt and trace clay, moist
	0.0	100%				
10					SW SM	Orangish-red to brown SAND, fine-medium grained, sub-rounded, some clay, silt, and pebbles (1-10mm), fizzes, damp
	0.0	100%				
12						
	0.0	100%				
14						
	0.0	100%			SW SM	Orangish-brown SAND, medium-coarse grained, some gravel, fizzes, moist (increasing moisture content)
16						
▽	0.0	100%				
18					SM/G	Dark brown to orangish-brown SAND, coarse grained, some pebbles (1-20mm), fizzes, wet
	0.0	SB-1(18-20) 100%				
20						Bottom of boring at 20 feet bgs
22						

Drilling Log

Soil Boring **SB-2**

Project: Conemaugh Soil Borings - GW Investigation | Owner: Keystone-Conemaugh Projects, LLC.
Location: New Florence, PA | Proj. No.: 631016449
Surface Elev.: 1075 ft. | Total Hole Depth: 20.0 ft. | North: 40.3826 ft. | East: -79.0632 ft.
Top of Casing: NA | Water Level Initial: ▽ 14.0 ft. | Static: NA | Diameter: 2 in.
Screen: Dia: NA | Length: NA | Type/Size: NA
Casing: Dia: NA | Length: NA | Type: NA
Fill Material: Soil Boring Cuttings/Bentonite | Rig/Core: DPT Geoprobe 7822 DT
Drill Co.: Eichelbergers, Inc. | Method: Hand clear to 5 feet, Direct-Push-Technology
Driller: Paul Wirrick | Log By: T. Hochbein | Date: 9/21/20 | Permit #: NA
Checked By: D. Shott | License No.:

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-2(6-8), SB-2(13-13.5), and SB-2(18-20)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						
	0.0	100%			TOPSOIL	Dark brown TOPSOIL, organic matter, dry
					GP	Gray LIMESTONE GRAVEL, 2B, fizzes, some asphalt pieces, dry
2	0.0	100%			CL ML	Dark brown to orangish-red silty CLAY, some fine-grained sand and gravel (0-10mm), fizzes, dry
4	0.0	100%				
6	0.0	SB-2(6-8) 100%			ML	Dark brown SILT with some clay, very fine-fine grained sand, and gravel, well-rounded, fizzes, moist
8	0.0	100%			CL ML	Orangish-brown to gray silty CLAY, mottled, some very fine-fine grained sand, gravel, and trace organic material, moist
10	0.0	100%			ML	Dark brown SILT, some clay and very fine-fine grained sand, moist
12	0.0	SB-2(13-13.5) 100%			COAL	Dark black COAL lens, fizzes
14 ▽	0.0	100%			S&G/C	Orangish-brown SAND, medium-coarse grained, some large sandstone pebbles, well-rounded, wet (river sands)
16	0.0	100%			S&G/C	Dark brown SAND, coarse grained, some pebbles, wet
18	0.0	SB-2(18-20) 100%			SANDSTONE	Light gray to tan SANDSTONE boulder, extremely weathered, iron-staining, wet
20						Bottom of boring at 20 feet bgs
22						

Drilling Log

Soil Boring **SB-3**

Project *Conemaugh Soil Borings - GW Investigation* Owner *Keystone-Conemaugh Projects, LLC.*
Location *New Florence, PA* Proj. No. *631016449*
Surface Elev. *1084 ft.* Total Hole Depth *20.0 ft.* North *40.3825 ft.* East *-79.0618 ft.*
Top of Casing *NA* Water Level Initial ▽ *13.0 ft.* Static *NA* Diameter *2 in.*
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Soil Boring Cuttings/Bentonite* Rig/Core *DPT Geoprobe 7822 DT*
Drill Co. *Eichelbergers, Inc.* Method *Hand clear to 5 feet, Direct-Push-Technology*
Driller *Paul Wirrick* Log By *T. Hochbein* Date *9/22/20* Permit # *NA*
Checked By *D. Shott* License No.

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-3(6-8), SB-3(9-10), and SB-3(18-20)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					TOPSOIL	Dark brown TOPSOIL and 2B LIMESTONE GRAVEL, dry
	0.0	100%			S&G/C	Tan to lighy gray SAND AND GRAVEL, some large sandstone boulders, fizzes, dry
2	0.0	100%				
4	0.0	100%				
6	0.2	SB-3(6-8) 100%			CLS	Dark brown sandy CLAY, mottled orange, some calcareous-rich sandstone boulders at 6-7.5 feet, well-rounded, dry
8	0.8	SB-3(9-10) 100%			CLS	Dark brown to black sandy CLAY, some well-rounded pebbles and organic material, fizzes, damp (appears to be the original ground surface)
10	0.0	100%			CL ML	Brownish-orange to gray silty CLAY, mottled, some sandstone fragments, dry
12	0.0	100%			SC	Dark brown clayey SAND, fine-coarse grained, sub-rounded, some sandstone fragments, wet
14	0.0	100%			SC	Orangish-brown to gray clayey SAND, mottled, moist
16	0.0	100%			NDSTONE	Light gray SANDSTONE boulder, moist
18	0.1	SB-3(18-20) 100%			SP SC	Orangish-brown to dark brown SAND, coarse-grained, some silt, pebbles, and sandstone fragments, wet
20						Bottom of boring at 20 feet bgs
22						

Drilling Log

Soil Boring **SB-4/SB-4R**

Project *Conemaugh Soil Borings - GW Investigation* Owner *Keystone-Conemaugh Projects, LLC.*
Location *New Florence, PA* Proj. No. *631016449*
Surface Elev. *1072 ft.* Total Hole Depth *20.0 ft.* North *40.3827 ft.* East *-79.0598 ft.*
Top of Casing *NA* Water Level Initial ▽ *14.0 ft.* Static *NA* Diameter *4.25 in.*
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Soil Boring Cuttings/Bentonite* Rig/Core *DPT Geoprobe 7822 DT*
Drill Co. *Eichelbergers, Inc.* Method *Hand clear to 5 feet, Direct-Push-Technology, HSA Auger*
Driller *Paul Wirrick* Log By *T. Hochbein* Date *9/23/20* Permit # *NA*
Checked By *D. Shott* License No.

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-4(5-7), SB-4(8-10), and SB-4(18-20)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					TOPSOIL	Dark brown TOPSOIL, organic material, dry
	0.0	100%			S&G/C	Dark brown SAND and GRAVEL, some large boulders, dry
2						
	0.0	100%			CLS	Dark brown sandy CLAY with some sandstone and coal fragments, dry
4		SB-4(5-7)				
	0.0	100%			CLAY	Dark brown to black CLAY, stained black, some coal fragments, organics, and sub-rounded sandstone pebbles, dry
6						
	0.0	100%			NDSTONE	Yellowish-tan SANDSTONE boulder, fizzes, dry
8					CLS	Light brown to orangish-red sandy CLAY, mottled dark gray, some small sub-rounded sandstone pebbles, dry
	0.0	SB-4(8-10) 100%				
10						
	0.0	100%				
12						
	0.0	100%			SC SM	Orangish-brown clayey SAND, some large sandstone fragments, moist
14 ▽						
	0.0	100%			SC SM	SAA, increasing sand content, moist - wet
16						
	0.0	100%			SP	Orangish-brown to red SAND, coarse grained, some yellowish-brown sandstone fragments and large black coal fragments, wet
18						
	0.0	SB-4(18-20) 100%				
20						Bottom of boring at 20 feet bgs
22						

Drilling Log

Soil Boring **SB-5**

Project *Conemaugh Soil Borings - GW Investigation* Owner *Keystone-Conemaugh Projects, LLC.*
Location *New Florence, PA* Proj. No. *631016449*
Surface Elev. *1054 ft.* Total Hole Depth *15.0 ft.* North *40.3814 ft.* East *-79.063 ft.*
Top of Casing *NA* Water Level Initial ▽ *10.0 ft.* Static *NA* Diameter *2 in.*
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Soil Boring Cuttings/Bentonite* Rig/Core *DPT Geoprobe 7822 DT*
Drill Co. *Eichelbergers, Inc.* Method *Hand clear to 5 feet, Direct-Push-Technology*
Driller *Paul Wirrick* Log By *T. Hochbein* Date *9/22/20* Permit # *NA*
Checked By *D. Shott* License No.

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-5(5-6) and SB-5(12.5-14.5)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					TOPSOIL	Dark brown TOPSOIL, organic material, dry
	0.0	100%			SHALE	Dark gray SHALE, weathered, iron-staining between layering, breaking down to silt and clay, dry
2						
	0.0	100%			SANDSTONE	Light gray SANDSTONE boulder, dry
4					CL ML	Dark gray CLAY, organic-rich, some silts and pebbles, trace coal, iron-staining, dry
	0.0	SB-5(5-6) 100%			SW	Orangish-brown SAND, very fine-medium grained, some clay and coal fragments, damp
6					SC	Orangish-brown to dark gray clayey SAND, mottled, some silt and pebbles, moist
	0.0	100%			SC	Dark brown clayey SAND, fine-medium grained, some pebbles(<1mm), moist-wet
8						
	0.0	100%				
10 ▽						SAA, increasing moisture content, wet at 10' bgs
	0.0	100%			SC	
12						
	0.0	SB-5(12-14.5) 100%			SP	Tan to light brown SAND, very coarse grained, some quartz pebbles (1-3mm), wet
14						
					SANDSTONE	Tan to yellowish-tan SANDSTONE, quartz-rich, friable, wet
						Bottom of boring at 15 feet bgs
16						

Drilling Log

Soil Boring **SB-6**

Project *Conemaugh Soil Borings - GW Investigation* Owner *Keystone-Conemaugh Projects, LLC.*
Location *New Florence, PA* Proj. No. *631016449*
Surface Elev. *1054 ft.* Total Hole Depth *15.0 ft.* North *40.3811 ft.* East *-79.0622 ft.*
Top of Casing *NA* Water Level Initial ▽ *10.0 ft.* Static *NA* Diameter *2 in.*
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Soil Boring Cuttings/Bentonite* Rig/Core *DPT Geoprobe 7822 DT*
Drill Co. *Eichelbergers, Inc.* Method *Hand clear to 5 feet, Direct-Push-Technology*
Driller *Paul Wirrick* Log By *T. Hochbein* Date *9/22/20* Permit # *NA*
Checked By *D. Shott* License No.

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-6(4-5), SB-6(6-8), and SB-6(12-14)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					TOPSOIL	Dark brown TOPSOIL, organic material, dry
	0.0	100%			SHALE	Dark gray to brownish-red SHALE, weathered, some coal fragments and organic matter, breaking down to silt and clay, dry
2						
	0.0	100%				
4					SHALE	Dark gray weathered SHALE, dry
	0.0	SB-6(4-5) 100%			CLS	Orangish-brown sandy CLAY, mottled dark black, some coal fragments, iron-oxidation, and angular pebbles, dry
6					CLS	SAA, increasing coal fragments, moist
	0.0	SB-6(6-8) 100%				
8					SC	Dark brown to orangish-brown clayey SAND, fine-medium grained, some pebbles (iron-coated), moist - wet
	0.0	100%				
10 ▽					SC	SAA, increasing grain size and pebbles, wet
	0.0	100%				
12						
	0.0	SB-6(12-14) 100%				
14						
	0.0	100%				
16						Bottom of boring at 15 feet bgs

Drilling Log

Soil Boring **SB-7**

Project *Conemaugh Soil Borings - GW Investigation* Owner *Keystone-Conemaugh Projects, LLC.*
Location *New Florence, PA* Proj. No. *631016449*
Surface Elev. *1058 ft.* Total Hole Depth *15.0 ft.* North *40.3813 ft.* East *-79.0608 ft.*
Top of Casing *NA* Water Level Initial ▽ *12.0 ft.* Static *NA* Diameter *2 in.*
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Soil Boring Cuttings/Bentonite* Rig/Core *DPT Geoprobe 7822 DT*
Drill Co. *Eichelbergers, Inc.* Method *Hand clear to 5 feet, Direct-Push-Technology*
Driller *Paul Wirrick* Log By *T. Hochbein* Date *9/22/20* Permit # *NA*
Checked By *D. Shott* License No.

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-7(6-8) and SB-7(12-14)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0	0.0	100%			TOPSOIL	Dark brown TOPSOIL, organic material (twigs, roots), moist
2	0.0	100%			CL ML	Orangish-brown silty CLAY, some shale fragments, wet
4	0.0	100%				
6	0.0	SB-7(6-8) 100%			SC	Dark brown clayey SAND, very fine-medium grained, some small pebbles and yellowish-orange sandstone fragments, wet (trace coal at 7.3')
8	0.0	100%				
10	0.0	100%				
12 ▽	0.0	SB-7(12-14) 100%			CL ML	Orangish-brown silty CLAY, some pebbles and organic matter, moist
14	0.0	100%			SP	Dark brown SAND, coarse grained, well-rounded, some sandstone fragments, wet
16						Bottom of boring at 15 feet bgs

Drilling Log

Soil Boring **SB-8**

Project: Conemaugh Soil Borings - GW Investigation | Owner: Keystone-Conemaugh Projects, LLC.
Location: New Florence, PA | Proj. No.: 631016449
Surface Elev.: 1064 ft. | Total Hole Depth: 25.0 ft. | North: 40.3803 ft. | East: -79.0606 ft.
Top of Casing: NA | Water Level Initial: ▽ 18.0 ft. | Static: NA | Diameter: 2 in.
Screen: Dia: NA | Length: NA | Type/Size: NA
Casing: Dia: NA | Length: NA | Type: NA
Fill Material: Soil Boring Cuttings/Bentonite | Rig/Core: DPT Geoprobe 7822 DT
Drill Co.: Eichelbergers, Inc. | Method: Hand clear to 5 feet, Direct-Push-Technology
Driller: Paul Wirrick | Log By: T. Hochbein | Date: 9/23/20 | Permit #: NA
Checked By: D. Shott | License No.:

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-8(8-10), SB-8(13-15), and SB-8(22-24)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					TOPSOIL	Dark brown TOPSOIL, organic material, dry
	0.0	100%			GW	Brown SILT, SAND, CLAY, and COBBLES, 25% each, sub-rounded, moist
2	0.0	100%				
4	0.0	100%				
6	0.0	100%			ML	Dark gray to black clayey SILT, some sand and organic material, trace pebbles and coal fragments, moist
8	0.1	SB-8(8-10) 100%				
10	0.0	100%			ML	Dark gray to black clayey SILT, some yellowish-tan sandstone fragments, organic matter, large coal and wood fragments, mosit
12	0.3	SB-8(13-15) 100%				
14	0.0	100%			ML	SAA, increasing sand content, moist
16	0.0	100%				
18 ▽	0.0	100%			SM	Orangish-brown silty SAND, very fine-fine grained, some rounded pebbles and sandstone fragments, wet
20	0.0	100%			MLS	Dark gray to black sandy SILT, some clay, coal fragments, and organic material, wet
22	0.0	SB-8(22-24) 100%			SW	Dark brown to black SAND, fine-coarse grained, some sandstone fragments, wet
24	0.0	100%				
26						Bottom of boring at 25 feet bgs

Drilling Log

Soil Boring **SB-9**

Project *Conemaugh Soil Borings - GW Investigation* Owner *Keystone-Conemaugh Projects, LLC.*
Location *New Florence, PA* Proj. No. *631016449*
Surface Elev. *1086 ft.* Total Hole Depth *20.0 ft.* North *40.3844 ft.* East *-79.0626 ft.*
Top of Casing *NA* Water Level Initial ▽ *15.0 ft.* Static *NA* Diameter *2 in.*
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Soil Boring Cuttings/Bentonite* Rig/Core *DPT Geoprobe 7822 DT*
Drill Co. *Eichelbergers, Inc.* Method *Hand clear to 5 feet, Direct-Push-Technology*
Driller *Paul Wirrick* Log By *T. Hochbein* Date *9/23/20* Permit # *NA*
Checked By *D. Shott* License No.

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-9(4-5), SB-9(8-10), and SB-9(18-20)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					TOPSOIL	Dark brown TOPSOIL, organic material, some gravel, dry
	0.0	100%			CL ML	Orangish-brown to grayish-black silty CLAY, some sand and coal fragments, damp
2						
	0.0	100%				
4						
	0.0	SB-9(4-5) 100%			SC	Orangish-brown clayey SAND, fine-coarse grained, well-rounded, some sandstone fragments, trace coal fragments, fizzes, damp
6						
	0.0	100%				
8						
	0.0	SB-9(8-10) 100%				
10					SC	SAA, increasing sand content, increasing grain size and pebbles, moist
	0.0	100%				
12						
	0.0	100%				
14					SP	Dark brown to orangish-brown SAND, medium-coarse grained, some clay and sandstone fragments, trace organics, iron-oxidation on sandstone fragments, wet
▽	0.0	100%			SP	Dark brown to organish-brown SAND, medium-coarse grained, sub-rounded, some sandstone pebbles and cobbles, and coal fragments, fizzes, wet
16						
	0.0	100%				
18						
	0.0	SB-9(18-20) 100%				
20						Bottom of boring at 20 feet bgs
22						

Drilling Log

Soil Boring **SB-10**

Project *Conemaugh Soil Borings - GW Investigation* Owner *Keystone-Conemaugh Projects, LLC.*
Location *New Florence, PA* Proj. No. *631016449*
Surface Elev. *1085 ft.* Total Hole Depth *20.0 ft.* North *40.3844 ft.* East *-79.0638 ft.*
Top of Casing *NA* Water Level Initial ▽ *18.0 ft.* Static *NA* Diameter *2 in.*
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Soil Boring Cuttings/Bentonite* Rig/Core *DPT Geoprobe 7822 DT*
Drill Co. *Eichelbergers, Inc.* Method *Hand clear to 5 feet, Direct-Push-Technology*
Driller *Paul Wirrick* Log By *T. Hochbein* Date *9/23/20* Permit # *NA*
Checked By *D. Shott* License No.

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-10(5-5.5), SB-10(10-12), and SB-10(18-20)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					LIMESTONE	Gray LIMESTONE GRAVEL, dry
	0.0	100%			SP	Dark gray to back SAND, medium grained, some coal fragments, moist
2						
	0.0	100%				
4					ML	Orangish-brown clayey SILT, some sandstone pebbles and coal fragments, moist
	0.0	SB-10(5-5.5) 100%			SP	Black SAND, medium grained, some coal fragments, moist
6					ML	Orangish-brown clayey SILT, some sandstone fragments, sand, and sub-rounded pebbles, trace organic material and coal, dry
	0.0	100%				
8						
	0.0	100%				
10					ML	SAA, increasing sand and pebble content (coal seam from 10.5-11'), dry-moist
	0.0	SB-10(10-12) 100%				
12						
	0.0	100%				
14						
	0.0	100%			MLS	SAA, increasing sand content, wet
16						
	0.0	100%			SP	Dark brown SAND, coarse grained, well-rounded, some yellowish-tan sandstone fragments and pebbles, wet
18 ▽						
	0.2	SB-10(18-20) 100%				
20						Bottom of boring at 20 feet bgs
22						

Drilling Log

Soil Boring **SB-11**

Project *Conemaugh Soil Borings - GW Investigation* Owner *Keystone-Conemaugh Projects, LLC.*
Location *New Florence, PA* Proj. No. *631016449*
Surface Elev. *1048 ft.* Total Hole Depth *15.0 ft.* North *40.388 ft.* East *-79.0733 ft.*
Top of Casing *NA* Water Level Initial ▽ *7.0 ft.* Static *NA* Diameter *2 in.*
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Soil Boring Cuttings/Bentonite* Rig/Core *DPT Geoprobe 7822 DT*
Drill Co. *Eichelbergers, Inc.* Method *Hand clear to 5 feet, Direct-Push-Technology*
Driller *Paul Wirrick* Log By *T. Hochbein* Date *9/23/20* Permit # *NA*
Checked By *D. Shott* License No.

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-11(4-5) and SB-11(10-13)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					TOPSOIL	Dark brown TOPSOIL, organic material, dry
	0.0	100%			CL ML	Dark brown to orangish-brown silty CLAY, mottled gray, some sand, trace coal fragments, damp
2						
	0.0	100%				
4						
	0.0	SB-11(4-5) 100%			CL ML	SAA, increasing sand content and grain size, moist-wet
6						
▽	0.0	100%			SM	Orangish-brown to dark brown silty SAND, some clay, coal fragments, sub-rounded pebbles, and yellowish-orange sandstone fragments, wet
8						
	0.0	100%				
10					SW	Dark brown to orangish-red SAND, fine-coarse grained, some coal and sandstone fragments, wet
	0.0	SB-11(10-13) 100%				
12						
	0.0	100%				
14						
	0.0	100%				
						Bottom of boring at 15 feet bgs
16						

Drilling Log

Soil Boring **SB-12**

Project *Conemaugh Soil Borings - GW Investigation* Owner *Keystone-Conemaugh Projects, LLC.*
Location *New Florence, PA* Proj. No. *631016449*
Surface Elev. *1062 ft.* Total Hole Depth *24.0 ft.* North *40.3887 ft.* East *-79.0541 ft.*
Top of Casing *NA* Water Level Initial ▽ *23.0 ft.* Static *NA* Diameter *2 in.*
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Soil Boring Cuttings/Bentonite* Rig/Core *DPT Geoprobe 7822 DT*
Drill Co. *Eichelbergers, Inc.* Method *Hand clear to 5 feet, Direct-Push-Technology*
Driller *Paul Wirrick* Log By *T. Hochbein* Date *9/23/20* Permit # *NA*
Checked By *D. Shott* License No.

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-12(8-10), SB-12(18-20), and SB-12(23-24)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					TOPSOIL	Dark brown TOPSOIL, organic material, dry
	0.0	100%			LIMESTONE	Gray LIMESTONE GRAVEL, dry
2					SHALE	Light gray to tan SHALE, weathered, breaking down to silt and clay, dry
	0.0	100%				
4						
	0.0	100%			MLS	Tan to brown sandy SILT, some clay, gravel, and shale fragments, trace coal, iron-oxidation between shale fragment layers, dry
6						
	0.0	100%				
8						
	0.0	SB-12(8-10) 100%				
10					ML	Orangish-brown to grayish-black clayey SILT, some sub-rounded pebbles and shale framents, trace coal fragments, moist
	0.0	100%				
12						
	0.0	100%				
14					CL	Orangish-brown CLAY, some silt, moist (thin layer of coal at 14.2' bgs)
	0.0	100%				SAA, increasing silt and shale fragments, moist
16					CL	
	0.0	100%				
18						
	0.0	SB-12(18-20) 100%				
20					ML	Bright orangish-red clayey SILT, mottled gray, some sand and weathered shale fragments, moist to wet (wet at 23' bgs)
	0.0	100%				
22						
▽	0.0	SB-12(23-24) 100%				
24						Bottom of boring at 24 feet bgs
26						

Drilling Log

Soil Boring **SB-13**

Project *Conemaugh Soil Borings - GW Investigation* Owner *Keystone-Conemaugh Projects, LLC.*
Location *New Florence, PA* Proj. No. *631016449*
Surface Elev. *1085 ft.* Total Hole Depth *15.0 ft.* North *40.3831 ft.* East *-79.0647 ft.*
Top of Casing *NA* Water Level Initial ▽ *11.0 ft.* Static *NA* Diameter *2 in.*
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Soil Boring Cuttings/Bentonite* Rig/Core *DPT Geoprobe 7822 DT*
Drill Co. *Eichelbergers, Inc.* Method *Hand clear to 5 feet, Direct-Push-Technology*
Driller *Paul Wirrick* Log By *T. Hochbein* Date *9/23/20* Permit # *NA*
Checked By *D. Shott* License No.

COMMENTS
bgs = below ground surface
Soil samples were collected from SB-13(6-8) and SB-1(12-14)
Soil samples were screened using a 10.6 eV Photoionization Detector (PID)
Surface elevation and coordinates are approximate based on use of a hand-held GPS device

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count or RQD Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					LIMESTONE	Gray LIMESTONE GRAVEL, dry
	0.0	100%			CL	Dark gray to brownish-black silty CLAY, some coal fragments and sandstone pebbles, dry
2						
	0.0	100%				
4					CL	Orangish-brown to dark brown silty CLAY, some coal fragments and quartz sandstone pebbles, dry
	0.0	100%				SAA, dry
6					CL	
	0.0	SB-13(6-8) 100%				
8					SC SM	Dark brown to orangish-brown clayey SAND, very fine to fine grained, some silt and sandstone pebbles, trace coal fragments, moist (coal lens at 10' bgs)
	0.0	100%				
10					SC SM	Dark brown clayey SAND, medium-coarse grained, yellowish-white, sub-rounded sandstone pebbles, wet
▽	0.0	100%				
12						
	0.0	(SB-13(12-14) 100%				
14						
	0.0	100%				
						Bottom of boring at 15 feet bgs
16						

Appendix F

Laboratory Analytical Reports—Cobalt in Soils

RJ Lee Group, Inc.
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LABORATORY REPORT

APTIM
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Attn: David Shott
Phone: 412-858-3329

Email: david.shott@aptim.com

RJ Lee Group Job No.: TLH008881
RJ Lee Group Chemistry Job No.: IN24092020P019
Samples Received: September 24, 2020
Report Date: October 8, 2020
Client Project: 631016449
Purchase Order No.: N/A
Matrix: Solid
Prep/Analysis: Acid Digestion / EPA 6010C
ASTM D4698 mod (borate fusion) / EPA 6010C
Moisture / Moisture

Client Sample ID	RJ Lee Group ID	Sampling Date	Preparation/ Analysis	Analyte	Sample Concentration		Minimum Reporting Limit		Analysis Date	Q
					Weight Percent (%)	Parts per Million (PPM) - mg/kg	Weight Percent (%)	Parts per Million (PPM) - mg/kg		
SB-1 (5-7)	3165456	09/21/2020	Acid Digestion / EPA 6010C	Cobalt	0.00340	34.0	0.00095	9.5	10/2/2020	–
SB-1 (5-7)	3165456	09/21/2020	Acid Digestion / EPA 6010C	Iron	4.86	48600	0.238	2380	10/2/2020	–
SB-1 (5-7)	3165456	09/21/2020	Acid Digestion / EPA 6010C	Manganese	0.125	1250	0.00095	9.5	10/2/2020	–
SB-1 (5-7)	3165456	09/21/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	5.11	51100	0.471	4710	9/30/2020	–
SB-1 (5-7)	3165456	09/21/2020	Moisture / Moisture	% Moisture	11	--	--	--	9/29/2020	–
SB-1 (7-8)	3165457	09/21/2020	Acid Digestion / EPA 6010C	Cobalt	0.00175	17.5	0.00098	9.8	10/2/2020	–
SB-1 (7-8)	3165457	09/21/2020	Acid Digestion / EPA 6010C	Iron	5.55	55500	0.245	2450	10/2/2020	–
SB-1 (7-8)	3165457	09/21/2020	Acid Digestion / EPA 6010C	Manganese	0.0380	380	0.00098	9.8	10/2/2020	–
SB-1 (7-8)	3165457	09/21/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	6.92	69200	0.489	4890	9/30/2020	–
SB-1 (7-8)	3165457	09/21/2020	Moisture / Moisture	% Moisture	22	--	--	--	9/29/2020	–
SB-1 (18-20)	3165458	09/21/2020	Acid Digestion / EPA 6010C	Cobalt	0.00113	11.3	0.00094	9.4	10/2/2020	–
SB-1 (18-20)	3165458	09/21/2020	Acid Digestion / EPA 6010C	Iron	6.02	60200	0.234	2340	10/2/2020	–
SB-1 (18-20)	3165458	09/21/2020	Acid Digestion / EPA 6010C	Manganese	0.0295	295	0.00094	9.4	10/2/2020	–
SB-1 (18-20)	3165458	09/21/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	3.25	32500	0.478	4780	9/30/2020	–
SB-1 (18-20)	3165458	09/21/2020	Moisture / Moisture	% Moisture	12	--	--	--	9/29/2020	–
SB-2 (6-8)	3165459	09/21/2020	Acid Digestion / EPA 6010C	Cobalt	0.00214	21.4	0.00094	9.4	10/2/2020	–
SB-2 (6-8)	3165459	09/21/2020	Acid Digestion / EPA 6010C	Iron	4.66	46600	0.234	2340	10/2/2020	–
SB-2 (6-8)	3165459	09/21/2020	Acid Digestion / EPA 6010C	Manganese	0.0801	801	0.00094	9.4	10/2/2020	–
SB-2 (6-8)	3165459	09/21/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	5.42	54200	0.474	4740	9/30/2020	–
SB-2 (6-8)	3165459	09/21/2020	Moisture / Moisture	% Moisture	12	--	--	--	9/29/2020	–
SB-2 (13-13.5)	3165460	09/21/2020	Acid Digestion / EPA 6010C	Cobalt	0.00148	14.8	0.00097	9.7	10/2/2020	–
SB-2 (13-13.5)	3165460	09/21/2020	Acid Digestion / EPA 6010C	Iron	3.88	38800	0.242	2420	10/2/2020	–
SB-2 (13-13.5)	3165460	09/21/2020	Acid Digestion / EPA 6010C	Manganese	0.0425	425	0.00097	9.7	10/2/2020	–
SB-2 (13-13.5)	3165460	09/21/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	4.75	47500	0.491	4910	9/30/2020	–
SB-2 (13-13.5)	3165460	09/21/2020	Moisture / Moisture	% Moisture	13	--	--	--	9/29/2020	–
SB-2 (18-20)	3165461	09/21/2020	Acid Digestion / EPA 6010C	Cobalt	0.00227	22.7	0.00096	9.6	10/2/2020	–
SB-2 (18-20)	3165461	09/21/2020	Acid Digestion / EPA 6010C	Iron	4.36	43600	0.240	2400	10/2/2020	–
SB-2 (18-20)	3165461	09/21/2020	Acid Digestion / EPA 6010C	Manganese	0.0537	537	0.00096	9.6	10/2/2020	–
SB-2 (18-20)	3165461	09/21/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	6.59	65900	0.484	4840	9/30/2020	–

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LABORATORY REPORT

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Attn: David Shott
Phone: 412-858-3329

Email: david.shott@aptim.com

RJ Lee Group Job No.: TLH008881
RJ Lee Group Chemistry Job No.: IN24092020P019
Samples Received: September 24, 2020
Report Date: October 8, 2020
Client Project: 631016449
Purchase Order No.: N/A
Matrix: Solid
Prep/Analysis: Acid Digestion / EPA 6010C
ASTM D4698 mod (borate fusion) / EPA 6010C
Moisture / Moisture

Client Sample ID	RJ Lee Group ID	Sampling Date	Preparation/ Analysis	Analyte	Sample Concentration		Minimum Reporting Limit		Analysis Date	Q
					Weight Percent (%)	Parts per Million (PPM) - mg/kg	Weight Percent (%)	Parts per Million (PPM) - mg/kg		
SB-2 (18-20)	3165461	09/21/2020	Moisture / Moisture	% Moisture	10	--	--	--	9/29/2020	—
SB-3 (6-8)	3165462	09/22/2020	Acid Digestion / EPA 6010C	Cobalt	0.00265	26.5	0.00095	9.5	10/2/2020	—
SB-3 (6-8)	3165462	09/22/2020	Acid Digestion / EPA 6010C	Iron	3.59	35900	0.238	2380	10/2/2020	—
SB-3 (6-8)	3165462	09/22/2020	Acid Digestion / EPA 6010C	Manganese	0.0169	169	0.00095	9.5	10/2/2020	—
SB-3 (6-8)	3165462	09/22/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	3.60	36000	0.479	4790	9/30/2020	—
SB-3 (6-8)	3165462	09/22/2020	Moisture / Moisture	% Moisture	10	--	--	--	9/29/2020	—
SB-3 (9-10)	3165463	09/22/2020	Acid Digestion / EPA 6010C	Cobalt	0.00244	24.4	0.00096	9.6	10/2/2020	—
SB-3 (9-10)	3165463	09/22/2020	Acid Digestion / EPA 6010C	Iron	4.70	47000	0.241	2410	10/2/2020	—
SB-3 (9-10)	3165463	09/22/2020	Acid Digestion / EPA 6010C	Manganese	0.108	1080	0.00096	9.6	10/2/2020	—
SB-3 (9-10)	3165463	09/22/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	6.55	65500	0.476	4760	9/30/2020	—
SB-3 (9-10)	3165463	09/22/2020	Moisture / Moisture	% Moisture	18	--	--	--	9/29/2020	—
SB-3(18-20)	3165464	09/22/2020	Acid Digestion / EPA 6010C	Cobalt	0.00099	9.9	0.00094	9.4	10/2/2020	—
SB-3(18-20)	3165464	09/22/2020	Acid Digestion / EPA 6010C	Iron	3.37	33700	0.234	2340	10/2/2020	—
SB-3(18-20)	3165464	09/22/2020	Acid Digestion / EPA 6010C	Manganese	0.0183	183	0.00094	9.4	10/2/2020	—
SB-3(18-20)	3165464	09/22/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	3.73	37300	0.465	4650	9/30/2020	—
SB-3(18-20)	3165464	09/22/2020	Moisture / Moisture	% Moisture	13	--	--	--	9/29/2020	—
SB-4 (5-7)	3165465	09/22/2020	Acid Digestion / EPA 6010C	Cobalt	0.00152	15.2	0.00097	9.7	10/2/2020	—
SB-4 (5-7)	3165465	09/22/2020	Acid Digestion / EPA 6010C	Iron	3.31	33100	0.244	2440	10/2/2020	—
SB-4 (5-7)	3165465	09/22/2020	Acid Digestion / EPA 6010C	Manganese	0.0632	632	0.00097	9.7	10/2/2020	—
SB-4 (5-7)	3165465	09/22/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	5.26	52600	0.461	4610	9/30/2020	—
SB-4 (5-7)	3165465	09/22/2020	Moisture / Moisture	% Moisture	19	--	--	--	9/29/2020	—
SB-4 (8-10)	3165466	09/22/2020	Acid Digestion / EPA 6010C	Cobalt	0.00171	17.1	0.00095	9.5	10/5/2020	—
SB-4 (8-10)	3165466	09/22/2020	Acid Digestion / EPA 6010C	Iron	3.60	36000	0.237	2370	10/5/2020	—
SB-4 (8-10)	3165466	09/22/2020	Acid Digestion / EPA 6010C	Manganese	0.0429	429	0.00095	9.5	10/5/2020	—
SB-4 (8-10)	3165466	09/22/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	5.22	52200	0.486	4860	10/1/2020	—
SB-4 (8-10)	3165466	09/22/2020	Moisture / Moisture	% Moisture	15	--	--	--	9/29/2020	—
SB-5 (5-6)	3165467	09/22/2020	Acid Digestion / EPA 6010C	Cobalt	0.00114	11.4	0.00094	9.4	10/5/2020	—
SB-5 (5-6)	3165467	09/22/2020	Acid Digestion / EPA 6010C	Iron	2.83	28300	0.236	2360	10/5/2020	—
SB-5 (5-6)	3165467	09/22/2020	Acid Digestion / EPA 6010C	Manganese	0.0227	227	0.00094	9.4	10/5/2020	—

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LABORATORY REPORT

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Attn: David Shott
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RJ Lee Group Job No.: TLH008881
RJ Lee Group Chemistry Job No.: IN24092020P019
Samples Received: September 24, 2020
Report Date: October 8, 2020
Client Project: 631016449
Purchase Order No.: N/A
Matrix: Solid
Prep/Analysis: Acid Digestion / EPA 6010C
ASTM D4698 mod (borate fusion) / EPA 6010C
Moisture / Moisture

Client Sample ID	RJ Lee Group ID	Sampling Date	Preparation/ Analysis	Analyte	Sample Concentration		Minimum Reporting Limit		Analysis Date	Q
					Weight Percent (%)	Parts per Million (PPM) - mg/kg	Weight Percent (%)	Parts per Million (PPM) - mg/kg		
SB-5 (5-6)	3165467	09/22/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	5.63	56300	0.470	4700	10/1/2020	–
SB-5 (5-6)	3165467	09/22/2020	Moisture / Moisture	% Moisture	18	--	--	--	9/29/2020	–
SB-5 (12.5-14.5)	3165468	09/22/2020	Acid Digestion / EPA 6010C	Cobalt	0.00175	17.5	0.00095	9.5	10/5/2020	–
SB-5 (12.5-14.5)	3165468	09/22/2020	Acid Digestion / EPA 6010C	Iron	4.17	41700	0.238	2380	10/5/2020	–
SB-5 (12.5-14.5)	3165468	09/22/2020	Acid Digestion / EPA 6010C	Manganese	0.0524	524	0.00095	9.5	10/5/2020	–
SB-5 (12.5-14.5)	3165468	09/22/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	3.85	38500	0.489	4890	10/1/2020	–
SB-5 (12.5-14.5)	3165468	09/22/2020	Moisture / Moisture	% Moisture	9.3	--	--	--	9/29/2020	–
SB-6 (4-5)	3165469	09/22/2020	Acid Digestion / EPA 6010C	Cobalt	0.00295	29.5	0.00095	9.5	10/5/2020	–
SB-6 (4-5)	3165469	09/22/2020	Acid Digestion / EPA 6010C	Iron	5.80	58000	0.236	2360	10/5/2020	–
SB-6 (4-5)	3165469	09/22/2020	Acid Digestion / EPA 6010C	Manganese	0.161	1610	0.00095	9.5	10/5/2020	–
SB-6 (4-5)	3165469	09/22/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	10.6	106000	0.491	4910	10/1/2020	–
SB-6 (4-5)	3165469	09/22/2020	Moisture / Moisture	% Moisture	13	--	--	--	9/29/2020	–
SB-6 (6-8)	3165470	09/22/2020	Acid Digestion / EPA 6010C	Cobalt	0.00280	28.0	0.00094	9.4	10/5/2020	–
SB-6 (6-8)	3165470	09/22/2020	Acid Digestion / EPA 6010C	Iron	5.50	55000	0.236	2360	10/5/2020	–
SB-6 (6-8)	3165470	09/22/2020	Acid Digestion / EPA 6010C	Manganese	0.130	1300	0.00094	9.4	10/5/2020	–
SB-6 (6-8)	3165470	09/22/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	10.2	102000	0.460	4600	10/1/2020	–
SB-6 (6-8)	3165470	09/22/2020	Moisture / Moisture	% Moisture	14	--	--	--	9/30/2020	–
SB-6 (12-14)	3165471	09/22/2020	Acid Digestion / EPA 6010C	Cobalt	0.00280	28.0	0.00093	9.3	10/5/2020	–
SB-6 (12-14)	3165471	09/22/2020	Acid Digestion / EPA 6010C	Iron	6.15	61500	0.232	2320	10/5/2020	–
SB-6 (12-14)	3165471	09/22/2020	Acid Digestion / EPA 6010C	Manganese	0.247	2470	0.00927	92.7	10/5/2020	–
SB-6 (12-14)	3165471	09/22/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	5.27	52700	0.474	4740	10/1/2020	–
SB-6 (12-14)	3165471	09/22/2020	Moisture / Moisture	% Moisture	12	--	--	--	9/30/2020	–
SB-7 (6-8)	3165472	09/22/2020	Acid Digestion / EPA 6010C	Cobalt	0.00267	26.7	0.00097	9.7	10/5/2020	–
SB-7 (6-8)	3165472	09/22/2020	Acid Digestion / EPA 6010C	Iron	5.20	52000	0.242	2420	10/5/2020	–
SB-7 (6-8)	3165472	09/22/2020	Acid Digestion / EPA 6010C	Manganese	0.160	1600	0.00097	9.7	10/5/2020	–
SB-7 (6-8)	3165472	09/22/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	5.52	55200	0.488	4880	10/1/2020	–
SB-7 (6-8)	3165472	09/22/2020	Moisture / Moisture	% Moisture	12	--	--	--	9/30/2020	–
SB-7 (12-14)	3165473	09/22/2020	Acid Digestion / EPA 6010C	Cobalt	0.00154	15.4	0.00096	9.6	10/5/2020	–
SB-7 (12-14)	3165473	09/22/2020	Acid Digestion / EPA 6010C	Iron	3.84	38400	0.240	2400	10/5/2020	–

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Prep/Analysis: Acid Digestion / EPA 6010C
ASTM D4698 mod (borate fusion) / EPA 6010C
Moisture / Moisture

Client Sample ID	RJ Lee Group ID	Sampling Date	Preparation/ Analysis	Analyte	Sample Concentration		Minimum Reporting Limit		Analysis Date	Q
					Weight Percent (%)	Parts per Million (PPM) - mg/kg	Weight Percent (%)	Parts per Million (PPM) - mg/kg		
SB-7 (12-14)	3165473	09/22/2020	Acid Digestion / EPA 6010C	Manganese	0.0381	381	0.00096	9.6	10/5/2020	–
SB-7 (12-14)	3165473	09/22/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	3.75	37500	0.461	4610	10/1/2020	–
SB-7 (12-14)	3165473	09/22/2020	Moisture / Moisture	% Moisture	12	--	--	--	9/30/2020	–
SB-8 (8-10)	3165474	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00181	18.1	0.00096	9.6	10/5/2020	–
SB-8 (8-10)	3165474	09/23/2020	Acid Digestion / EPA 6010C	Iron	3.93	39300	0.241	2410	10/5/2020	–
SB-8 (8-10)	3165474	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.0831	831	0.00096	9.6	10/5/2020	–
SB-8 (8-10)	3165474	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	5.44	54400	0.479	4790	10/1/2020	–
SB-8 (8-10)	3165474	09/23/2020	Moisture / Moisture	% Moisture	18	--	--	--	9/30/2020	–
SB-8 (13-15)	3165475	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00101	10.1	0.00096	9.6	10/5/2020	–
SB-8 (13-15)	3165475	09/23/2020	Acid Digestion / EPA 6010C	Iron	2.81	28100	0.239	2390	10/5/2020	–
SB-8 (13-15)	3165475	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.00818	81.8	0.00096	9.6	10/5/2020	–
SB-8 (13-15)	3165475	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	7.61	76100	0.478	4780	10/1/2020	–
SB-8 (13-15)	3165475	09/23/2020	Moisture / Moisture	% Moisture	31	--	--	--	9/30/2020	–
SB-8 (22-24)	3165476	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00215	21.5	0.00096	9.6	10/5/2020	–
SB-8 (22-24)	3165476	09/23/2020	Acid Digestion / EPA 6010C	Iron	8.16	81600	0.240	2400	10/5/2020	–
SB-8 (22-24)	3165476	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.0569	569	0.00096	9.6	10/5/2020	–
SB-8 (22-24)	3165476	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	4.94	49400	0.467	4670	10/1/2020	–
SB-8 (22-24)	3165476	09/23/2020	Moisture / Moisture	% Moisture	16	--	--	--	9/30/2020	–
SB-13 (6-8)	3165477	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00182	18.2	0.00097	9.7	10/5/2020	–
SB-13 (6-8)	3165477	09/23/2020	Acid Digestion / EPA 6010C	Iron	4.01	40100	0.242	2420	10/5/2020	–
SB-13 (6-8)	3165477	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.0858	858	0.00097	9.7	10/5/2020	–
SB-13 (6-8)	3165477	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	5.77	57700	0.473	4730	10/1/2020	–
SB-13 (6-8)	3165477	09/23/2020	Moisture / Moisture	% Moisture	15	--	--	--	9/30/2020	–
SB-13(12-14)	3165478	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00120	12.0	0.00094	9.4	10/5/2020	–
SB-13(12-14)	3165478	09/23/2020	Acid Digestion / EPA 6010C	Iron	2.43	24300	0.235	2350	10/5/2020	–
SB-13(12-14)	3165478	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.0192	192	0.00094	9.4	10/5/2020	–
SB-13(12-14)	3165478	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	3.26	32600	0.477	4770	10/5/2020	–
SB-13(12-14)	3165478	09/23/2020	Moisture / Moisture	% Moisture	12	--	--	--	9/30/2020	–
SB-10 (5-5.5)	3165479	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00248	24.8	0.00097	9.7	10/5/2020	–

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RJ Lee Group Job No.: TLH008881
RJ Lee Group Chemistry Job No.: IN24092020P019
Samples Received: September 24, 2020
Report Date: October 8, 2020
Client Project: 631016449
Purchase Order No.: N/A
Matrix: Solid
Prep/Analysis: Acid Digestion / EPA 6010C
ASTM D4698 mod (borate fusion) / EPA 6010C
Moisture / Moisture

Client Sample ID	RJ Lee Group ID	Sampling Date	Preparation/ Analysis	Analyte	Sample Concentration		Minimum Reporting Limit		Analysis Date	Q
					Weight Percent (%)	Parts per Million (PPM) - mg/kg	Weight Percent (%)	Parts per Million (PPM) - mg/kg		
SB-10 (5-5.5)	3165479	09/23/2020	Acid Digestion / EPA 6010C	Iron	6.75	67500	0.242	2420	10/5/2020	–
SB-10 (5-5.5)	3165479	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.0411	411	0.00097	9.7	10/5/2020	–
SB-10 (5-5.5)	3165479	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	8.23	82300	0.482	4820	10/5/2020	–
SB-10 (5-5.5)	3165479	09/23/2020	Moisture / Moisture	% Moisture	12	--	--	--	9/30/2020	–
SB-10 (10-12)	3165480	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00282	28.2	0.00095	9.5	10/5/2020	–
SB-10 (10-12)	3165480	09/23/2020	Acid Digestion / EPA 6010C	Iron	7.94	79400	0.238	2380	10/5/2020	–
SB-10 (10-12)	3165480	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.177	1770	0.00095	9.5	10/5/2020	–
SB-10 (10-12)	3165480	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	6.71	67100	0.496	4960	10/5/2020	–
SB-10 (10-12)	3165480	09/23/2020	Moisture / Moisture	% Moisture	13	--	--	--	10/2/2020	–
SB-10 (18-20)	3165481	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00249	24.9	0.00093	9.3	10/5/2020	–
SB-10 (18-20)	3165481	09/23/2020	Acid Digestion / EPA 6010C	Iron	8.09	80900	0.233	2330	10/5/2020	–
SB-10 (18-20)	3165481	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.0853	853	0.00093	9.3	10/5/2020	–
SB-10 (18-20)	3165481	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	5.89	58900	0.458	4580	10/5/2020	–
SB-10 (18-20)	3165481	09/23/2020	Moisture / Moisture	% Moisture	12	--	--	--	10/2/2020	–
SB-9 (4-5)	3165482	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00281	28.1	0.00097	9.7	10/5/2020	–
SB-9 (4-5)	3165482	09/23/2020	Acid Digestion / EPA 6010C	Iron	5.10	51000	0.243	2430	10/5/2020	–
SB-9 (4-5)	3165482	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.0903	903	0.00097	9.7	10/5/2020	–
SB-9 (4-5)	3165482	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	8.65	86500	0.492	4920	10/5/2020	–
SB-9 (4-5)	3165482	09/23/2020	Moisture / Moisture	% Moisture	12	--	--	--	10/2/2020	–
SB-9 (8-10)	3165483	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00293	29.3	0.00095	9.5	10/5/2020	–
SB-9 (8-10)	3165483	09/23/2020	Acid Digestion / EPA 6010C	Iron	7.24	72400	0.238	2380	10/5/2020	–
SB-9 (8-10)	3165483	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.0858	858	0.00095	9.5	10/5/2020	–
SB-9 (8-10)	3165483	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	5.79	57900	0.468	4680	10/5/2020	–
SB-9 (8-10)	3165483	09/23/2020	Moisture / Moisture	% Moisture	12	--	--	--	10/2/2020	–
SB-9 (18-20)	3165484	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00237	23.7	0.00097	9.7	10/5/2020	–
SB-9 (18-20)	3165484	09/23/2020	Acid Digestion / EPA 6010C	Iron	8.38	83800	0.242	2420	10/5/2020	–
SB-9 (18-20)	3165484	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.0341	341	0.00097	9.7	10/5/2020	–
SB-9 (18-20)	3165484	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	6.23	62300	0.482	4820	10/5/2020	–
SB-9 (18-20)	3165484	09/23/2020	Moisture / Moisture	% Moisture	11	--	--	--	10/2/2020	–

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RJ Lee Group Job No.: TLH008881
RJ Lee Group Chemistry Job No.: IN24092020P019
Samples Received: September 24, 2020
Report Date: October 8, 2020
Client Project: 631016449
Purchase Order No.: N/A
Matrix: Solid
Prep/Analysis: Acid Digestion / EPA 6010C
ASTM D4698 mod (borate fusion) / EPA 6010C
Moisture / Moisture

Client Sample ID	RJ Lee Group ID	Sampling Date	Preparation/ Analysis	Analyte	Sample Concentration		Minimum Reporting Limit		Analysis Date	Q
					Weight Percent (%)	Parts per Million (PPM) - mg/kg	Weight Percent (%)	Parts per Million (PPM) - mg/kg		
SB-4R (18-20)	3165485	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00236	23.6	0.00095	9.5	10/5/2020	–
SB-4R (18-20)	3165485	09/23/2020	Acid Digestion / EPA 6010C	Iron	4.80	48000	0.237	2370	10/5/2020	–
SB-4R (18-20)	3165485	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.0515	515	0.00095	9.5	10/5/2020	–
SB-4R (18-20)	3165485	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	4.31	43100	0.493	4930	10/5/2020	–
SB-4R (18-20)	3165485	09/23/2020	Moisture / Moisture	% Moisture	11	--	--	--	10/2/2020	–
SB-12 (8-10)	3165486	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00292	29.2	0.00093	9.3	10/5/2020	–
SB-12 (8-10)	3165486	09/23/2020	Acid Digestion / EPA 6010C	Iron	6.51	65100	0.231	2310	10/5/2020	–
SB-12 (8-10)	3165486	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.174	1740	0.00093	9.3	10/5/2020	–
SB-12 (8-10)	3165486	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	10.3	103000	0.464	4640	10/5/2020	–
SB-12 (8-10)	3165486	09/23/2020	Moisture / Moisture	% Moisture	9.8	--	--	--	10/2/2020	–
SB-12 (18-20)	3165487	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00591	59.1	0.00094	9.4	10/5/2020	–
SB-12 (18-20)	3165487	09/23/2020	Acid Digestion / EPA 6010C	Iron	4.01	40100	0.235	2350	10/5/2020	–
SB-12 (18-20)	3165487	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.0417	417	0.00094	9.4	10/5/2020	–
SB-12 (18-20)	3165487	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	7.32	73200	0.494	4940	10/5/2020	–
SB-12 (18-20)	3165487	09/23/2020	Moisture / Moisture	% Moisture	9.5	--	--	--	10/2/2020	–
SB-12 (23-24)	3165488	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00321	32.1	0.00092	9.2	10/5/2020	–
SB-12 (23-24)	3165488	09/23/2020	Acid Digestion / EPA 6010C	Iron	5.82	58200	0.231	2310	10/5/2020	–
SB-12 (23-24)	3165488	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.0205	205	0.00092	9.2	10/5/2020	–
SB-12 (23-24)	3165488	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	8.28	82800	0.499	4990	10/5/2020	–
SB-12 (23-24)	3165488	09/23/2020	Moisture / Moisture	% Moisture	24	--	--	--	10/2/2020	–
SB-11 (4-5)	3165489	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00265	26.5	0.00096	9.6	10/5/2020	–
SB-11 (4-5)	3165489	09/23/2020	Acid Digestion / EPA 6010C	Iron	4.21	42100	0.240	2400	10/5/2020	–
SB-11 (4-5)	3165489	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.127	1270	0.00096	9.6	10/5/2020	–
SB-11 (4-5)	3165489	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	6.33	63300	0.489	4890	10/5/2020	–
SB-11 (4-5)	3165489	09/23/2020	Moisture / Moisture	% Moisture	14	--	--	--	10/2/2020	–
SB-11 (10-13)	3165490	09/23/2020	Acid Digestion / EPA 6010C	Cobalt	0.00248	24.8	0.00098	9.8	10/5/2020	–
SB-11 (10-13)	3165490	09/23/2020	Acid Digestion / EPA 6010C	Iron	6.59	65900	0.244	2440	10/5/2020	–
SB-11 (10-13)	3165490	09/23/2020	Acid Digestion / EPA 6010C	Manganese	0.144	1440	0.00098	9.8	10/5/2020	–
SB-11 (10-13)	3165490	09/23/2020	ASTM D4698 mod (borate fusion) / EPA 6010C	Aluminum	5.90	59000	0.458	4580	10/5/2020	–

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RJ Lee Group Job No.: TLH008881
RJ Lee Group Chemistry Job No.: IN24092020P019
Samples Received: September 24, 2020
Report Date: October 8, 2020
Client Project: 631016449
Purchase Order No.: N/A
Matrix: Solid
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Moisture / Moisture

Client Sample ID	RJ Lee Group ID	Sampling Date	Preparation/ Analysis	Analyte	Sample Concentration		Minimum Reporting Limit		Analysis Date	Q
					Weight Percent (%)	Parts per Million (PPM) - mg/kg	Weight Percent (%)	Parts per Million (PPM) - mg/kg		
SB-11 (10-13)	3165490	09/23/2020	Moisture / Moisture	% Moisture	12	--	--	--	10/2/2020	—

Comments: Metals analysis reported on a dried weight basis.

Report Qualifiers (Q):

P *: PA-DEP Accredited (PA DEP Lab ID 02-00396, NELAP)*
N *: NY ELAP Accredited (NY ELAP Lab Code 10884)*
C *: CA ELAP Accredited (CA ELAP Certificate 1970)*
A *: AIHA-LAP, LLC Accredited (Lab ID 100364)*
E = Value above highest calibration standard
J = Value below lowest calibration standard but above MDL (Method Detection Limit)
L = LCS (Laboratory Control Standard)/SRM (Standard Reference Material) recovery outside accepted recovery limits
H = Holding times for preparation or analysis exceeded
B = Analyte detected in the associated Method Blank
S = Spike Recovery outside accepted limits
R = RPD (relative percent difference) outside accepted limits
D = RL (reporting limit verification) outside accepted limits
NP = Not Provided
— : Test (analyte-matrix-preparation-analysis) is performed under RJLG's General Quality System requirements and is not part to any of the above scopes of accredidations

These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of thirty (30) days before discarding. A shipping and handling fee will be assessed for the return of any samples.
This laboratory operates in accord with ISO 17025:2017 guidelines, and holds a limited scope of accreditations under different accrediting agencies; refer to http://www.rjlg.com/about-us/accreditations/ for more information and current status. Unless it is specifically stated otherwise (under the Q column using the appropriate accrediting agency qualifier(s)) the work contained in this report is performed under RJLG's General Quality System requirements and is not part of any scope of accreditations. This report may not be used to claim product endorsement by any laboratory accrediting agency. The results contained in this report relate only to the items tested or to the sample(s) as received by the laboratory. Any reproduction of this document must be in full for the report to be valid.

Unless otherwise noted (either in the comments section of the report and/or with the appropiate qualifiers under the report qualifiers (Q) column) the following apply: (a) Samples were received in good condition, (b) All QC samples are within acceptable established limits, (c) All samples designated as NELAP meet the requirements of the NELAC standard; if not applicable qualifiers will be used to designate the non-compliance and (d) Results have not been blank corrected. Quality Control data is available upon request.

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ATTACHMENT 5

Documentation that AFPs Meet Location Restrictions per § 257.71(d)(1)(i)(B)(3)

CCR COMPLIANCE
LOCATION RESTRICTIONS DEMONSTRATION REPORT
CONEMAUGH ASH FILTER PONDS

Prepared for:

GenOn Northeast Management Company
Conemaugh Generating Station
New Florence, Pennsylvania

Prepared by:

Aptim Environmental & Infrastructure, Inc.
St. Charles, Illinois

October 2018

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FIGURES

1.0 INTRODUCTION AND PURPOSE

GenOn Northeast Management Company (GenOn) operates the coal-fired Conemaugh Generating Station located in New Florence, Pennsylvania. The Conemaugh Generating Station utilizes surface impoundments for the purpose of managing coal combustion residuals (CCR).

In 2015, the *Disposal of Coal Combustion Residuals from Electric Utilities Final Rule* (CCR Rule) was enacted within the Federal Register under 40 CFR §257. The CCR Rule establishes technical requirements for CCR landfills and surface impoundments under Subtitle D of the Resource Conservation and Recovery Act (RCRA), which is the primary law regulating solid waste. Under the CCR Rule, the Conemaugh Station surface impoundments are designated as "existing CCR impoundments" as defined in §257.53. Multiple location restrictions are identified for landfills and surface impoundments to ensure that they are not placed in environmentally sensitive areas. These location requirements are defined under 40 CFR §257.60 through §257.64.

Demonstrations of compliance with location restrictions for an existing CCR surface impoundment are required to be placed in the facility's operating record [§257.105(e)] by October 17, 2018. In addition, the owner or operator must notify the State Director [§257.106(e)] that the demonstrations have been placed in the operating record and on the owner or operator's publicly accessible CCR internet site [§257.107(e)].

Per the applicable sections of the Rule, the location restrictions for CCR surface impoundments require that these units are NOT located:

- with a base that is constructed no less than 5 feet above the upper limit of the uppermost aquifer (§257.60);
- in wetlands (§257.61);
- within 200 feet of the outermost damage zone of a fault which has been displaced in Holocene time (§257.62);
- within a seismic impact zone (§257.63); or
- in an unstable area (§257.64).

The location restriction details are further described within **Section 3** of this report.

2.0 OVERVIEW OF SURFACE IMPOUNDMENTS

Four CCR surface impoundments are located at the Conemaugh Generating Station, and are referred to as Ash Filter Ponds A through D (ponds). The ponds have been in operation since 1986, and are aligned in a side-by-side layout in a southward progression. At a minimum, two ponds are in service at all times with the third being drained and cleaned (as needed) and the fourth used to store decant water for later use. **Figure 1** shows the location of the ponds.

The bottom liner system for each of the ponds, from top to bottom is comprised of 2.5 feet of bottom ash protective cover, 1.5 feet of American Association of State Highway and Transportation Officials (AASHTO) No. 8 coarse aggregate for pond dewatering, 1.5 feet of impervious fill, and an impervious liner comprised of 0.67 foot of bentonite-amended low-permeability compacted soil underlain by 1.33 feet of low-permeability compacted soil. The total liner system thickness is 7.5 feet of which the low-permeability soil barrier layer is the lowermost two feet.

The crest elevation is approximately 1,092 feet above mean sea level (ft MSL) and the elevation of the top of the protective bottom ash layer ranges from 1,084.6 ft MSL on the eastern end of each ash pond to 1,083.0 ft MSL on the western end. This provides an average pond depth of approximately eight (8) feet. The bottom elevation of the base liner is approximately 1,077.1 ft MSL on the eastern end and 1,075.5 ft MSL on the western end, with an estimated elevation of 1,076.3 ft MSL at the midpoint across each pond.

3.0 LOCATION DEMONSTRATIONS

3.1 PLACEMENT ABOVE UPPERMOST AQUIFER (§257.60(a))

Per §257.60(a) of the Rule, *"new CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must be constructed with a base that is located no less than 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table)."*

The ponds are underlain by recent alluvium that was deposited by the Conemaugh River. The alluvium typically ranges from 20 to 25 feet thick but can extend to depths as great as 32 feet below ground surface (bgs). The alluvium directly overlies shale and siltstone bedrock and is comprised of clayey sand to sandy clay that extends from ground surface to depths ranging from 12 to 18 feet bgs. The alluvial materials become coarser grained with increasing depth and grade into silty sand and sand and gravel near the upper bedrock surface. Groundwater beneath the Ash Filter Ponds resides within the alluvium. This water-bearing zone further represents the uppermost aquifer in this area and exists in an unconfined condition.

Groundwater flow is topographically controlled and flows toward the Conemaugh River which is the naturally occurring groundwater discharge zone in the area of the ponds. Groundwater flowing from upgradient of the ponds will pass beneath the CCR unit and through the areas in which the downgradient monitoring wells are located.

The groundwater monitoring system for the ponds is comprised of five wells, including Wells MW-1B and MW-2 (upgradient), and Wells MW-3, MW-4, and MW-23 (downgradient). All five wells communicate with the alluvium, which is the uppermost aquifer. The locations of the groundwater monitoring wells are shown on **Figure 2**, along with depiction of the generalized groundwater flow direction in the area of the ponds.

The groundwater elevation in each of these wells (representing the upper surface of the uppermost aquifer) has been monitored on a routine basis since the inception of the CCR Rule. A summary of these observations is provided in **Table 1**.

TABLE 1 Groundwater Level Observations Near Ponds					
Monitoring Date	Groundwater Elevation (ft MSL)				
	MW-1B	MW-2	MW-3	MW-4	MW-23
December 16, 2015	1070.99	1072.72	1065.24	1069.53	1068.03
January 26, 2016	1071.19	1072.42	1065.89	1069.73	1069.08
April 25, 2016	1071.69	1073.02	1066.14	1070.08	1069.38
July 25, 2016	1071.69	1073.72	1064.99	1068.98	1067.93
October 24, 2016	1072.99	1073.82	1066.19	1070.08	1068.83
January 17, 2017	1072.54	1072.92	1066.94	1070.88	1070.13
April 25, 2017	1072.69	1073.02	1067.09	1070.93	1069.68
July 25, 2017	1072.04	1072.57	1065.99	1070.23	1069.18
October 1, 2017	1070.84	1071.17	1064.89	1068.83	1067.98
May 23, 2018	1074.94	1075.57	1067.79	1070.53	1071.18
Highest Water Level:	1074.94	1075.57	1067.79	1070.93	1071.18
Lowest Water Level:	1070.84	1071.17	1064.89	1068.83	1067.93
Average Water Level:	1072.16	1073.10	1066.12	1069.98	1069.14

As shown in **Table 1**, the highest observed groundwater elevation across the majority of the wells was recorded on May 23, 2018. The groundwater elevations from this date have been developed into a potentiometric surface and overlain on an aerial image of the ponds, as presented on **Figure 3**. As shown, the groundwater surface is greater than elevation 1,071.3 ft MSL in the location of the Ash Filter Ponds. This elevation serves as the 5-foot vertical offset of the bottom of the ponds' base liners (midpoint elevation 1,076.3 ft MSL – 5 ft separation = elevation 1,071.3 ft MSL). This indicates that these ponds are located above the uppermost aquifer, but with less than five feet of separation.

However, §257.60 states that if the base of the surface impoundment is less than five feet above the upper limit of the uppermost aquifer, a demonstration must be made "that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table)." Based on the two and one-half years of groundwater elevation data collected (and reflecting seasonal variations), it is observed that the seasonal high water table was observed during May 2018. The May 2018 potentiometric surface is presented in Figure 3. As shown, the highest elevation contour underneath the base of the ponds is 1075 ft MSL, located under the northeast corner of Ash Filter Pond A. This elevation is approximately 1.3 feet below the average base elevation of 1076.3 ft MSL. Upon further examination of Figure 3, this separation distance increases in the southward direction moving from Pond A to Pond D, whereupon the five-feet separation distance is achieved. It is therefore concluded that there is not an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table).

This information demonstrates compliance with the requirements of §257.60(a).

3.2 WETLANDS (§257.61(a))

Per §257.61 of the Rule, *"new CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in wetlands, as defined in §232.2 of this chapter, unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that the CCR unit meets the requirements of paragraphs (a)(1) through (5) of this section."*

Wetlands are defined under §232.2 as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances, do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas."

APTIM reviewed the U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) Database Surface Waters and Wetlands Map to determine whether wetlands are shown to overlap with the ponds. The map, presented as **Figure 4**, does not show any wetlands in or near the ponds.

Additionally, a wetland delineation report was completed by GAI Consultants, Inc. and a Pennsylvania Natural Diversity Inventory was completed in advance of the rail line construction in 2005. While there were several wetlands present in low-lying areas between the ponds and Conemaugh River, no wetlands were found in the location of the ponds. The study indicated that in general, the wetlands in the vicinity of the rail line and downstream of the ponds are palustrine emergent (with precipitation and runoff as the only water sources) and palustrine scrub-shrub wetlands.

These data sources are presented as a demonstration of compliance with the requirements of §257.61(a).

3.3 FAULT AREAS (§257.62(a))

Per §257.62 of the Rule, *"new CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene time unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that an alternative setback distance of less than 60 meters (200 feet) will prevent damage to the structural integrity of the CCR unit."*

APTIM compared the location of the ponds to the location of faults that have undergone displacement during the Holocene time, as recorded in the United States Geological Survey (USGS) Quaternary Fault and Fold Database for the United States. There are no known faults that are identified within 200 feet of the ponds. This information demonstrates compliance with the requirements of §257.62(a).

3.4 SEISMIC IMPACT ZONE (§257.63(a))

Per §257.63 of the Rule, *"new CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in seismic impact zones unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that all structural components including liners, leachate collection and removal systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site."*

A seismic impact zone is an area with a ten percent or greater probability that the maximum horizontal acceleration in lithified earth material, expressed as a percentage of the earth's gravitation pull (g), will exceed 0.10g in 250 years. Probabilistically, this is equal to a two percent or greater probability within a 50-year timeframe.

APTIM compared the location of the ponds to the location of seismic impact zones, as defined in §257.53, using the USGS map "Two Percent Probability of Exceedance in 50 Years Map of Peak Ground Acceleration", shown in **Figure 5**. The maximum ground acceleration for the location of the ponds is estimated to be 0.046g, and is therefore not considered a seismic impact zone. This information demonstrates compliance with the requirements of §257.63(a).

3.5 UNSTABLE AREAS (§257.64(a))

Per §257.64 of the Rule, *"an existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted."*

APTIM evaluated the location of the ponds for the presence of on-site or local unstable areas, as defined in §257.53. Evaluation of the conditions listed in §257.64(b)(1)-(3) were conducted and are discussed in the following subsections. Based on these evaluations, APTIM concludes that the ponds are not located within an unstable area and are compliant with the requirements of §257.64(a).

> *The owner or operator must consider all of the following factors, at a minimum, when determining whether an area is unstable:*

3.5.1 Unstable Factors Considered: Differential Settling (§257.64(b)(1))

> *On-site or local soil conditions that may result in significant differential settling;*

The alluvial soils underlying the ponds are typically in the range of 20 to 25 feet thick but extend to depths as great as 32 feet bgs and are comprised of sandy clay to clayey and silty sand that extends from ground surface to depths of 12 to 18 feet below ground surface. The alluvial soil becomes coarser grained with increasing depth grading into silty sand and sand and gravel. Standard penetration tests in the test boring for Monitoring Well MW-23 indicate that the cohesive alluvial soil is very stiff and that the granular alluvial soil is dense to very dense. The very stiff consistency and dense to very dense in place density indicate that the alluvial soil has low compressibility and will not undergo significant differential settling beneath the ponds. The bottoms of the ponds are very near original grade and the only increase in loads will be from the dikes and material contained within the ponds. Moreover, the ponds have existed for approximately 30 years and no measurable settling has occurred, based on the present topography.

Based on the information presented above, on-site and local soil conditions will not cause excessive differential settling of the ponds or any components thereof.

3.5.2 Unstable Factors Considered: Geologic/Geomorphologic Features (§257.64 (b)(2))

On-site or local geologic or geomorphologic features;

The ash ponds are underlain by alluvial soil which in turn is underlain by rocks of the Glenshaw Formation (Conemaugh Group) of the Pennsylvanian System. The Lower Mahoning Sandstone, which is the basal member of the Glenshaw Formation underlies the alluvium and is comprised of siltstone and argillaceous sandstone with some thin shale interbeds. The Lower Mahoning Sandstone is approximately 80 feet thick but in the generating station proper, it has been eroded and approximately the lowermost 50 feet remains. Because the Lower Mahoning Sandstone is a clastic sedimentary rock rather than a carbonate sedimentary rock, there is no karst development in the area of the ash ponds. Moreover, the uppermost 150 feet of the Allegheny Group underlying the Glenshaw Formation is also largely comprised of clastic sedimentary rocks, including the Butler and Freeport Sandstones. No carbonate beds capable of karst development are present in the upper part of the Allegheny Group. Considering the absence of carbonate beds capable of karst development in either the Lower Mahoning Sandstone or in the rock units of the upper portion of the Allegheny Group, including the Butler and Freeport Sandstones, no on-site or local geologic or geomorphic features capable of producing unstable conditions exist within the area of the ash ponds.

3.5.3 Unstable Factors Considered: Human-made Features or Events (§257.64 (b)(3))

On-site or local human-made features or events (both surface and subsurface).

Deep mining of the Upper Freeport Coal, Lower Freeport Coal, and Lower Kittanning Coal Beds occurred within the Conemaugh Generating Station property. According to a study conducted by the John T. Boyd Company (Boyd), the Upper Freeport Coal Bed, which is discontinuous and of varying thickness in the area, was deep mined in the Florence Mining Company's Florence No. 2 Mine. This mine is located mostly west and southwest of the Conemaugh Station's Ash/Refuse Disposal Site. The mine operated from 1970 to 1992 when it was abandoned and sealed. Per the Boyd report, the Upper Freeport Coal Bed ranges from 36 to 84 inches thick in the area where it was mined. No portions of mining took place beneath the ponds based on mine location maps contained within the Boyd report.

Per the Boyd Report, the Lower Kittanning Coal Bed is 0 to 83 inches thick, has an average thickness of 52 inches, and was mined in the Conemaugh No. 1 Mine by various companies, including the North American Coal Company between 1914 and 1982. The Conemaugh No. 1 mine was later renamed the Penelec No. 5 Mine which was operated by the Pennsylvania Electric Company from 1940 to 1989. According to a map showing the limits of the Conemaugh No. 1/Penelec No. 5 Mine, the Lower Kittanning Coal Bed was underground mined mostly east of the Ash/Refuse Disposal Site, but the mine did not extend beneath the current station property proper.

Based on the evidence presented above in Sections 3.5.1 through 3.5.3, the ponds are not located in an unstable area and meet the requirements of §257.64(b)(1)-(3), and in, turn the requirements of §257.64(a).

4.0 SUMMARY

The Conemaugh Generating Station operates four CCR surface impoundments, which are collectively known as the Ash Filter Ponds (Ponds A, B, C, and D). These ponds meet all location restrictions, as defined within §257.60 through §257.64, and as summarized below in Table 2.

Table 2 Location Restriction Compliance Demonstration Summary		
40 CFR Section	**Location Restriction Description**	**Demonstration Provided**
§257.60(a)	Placement above the uppermost aquifer	Yes
§257.61(a)	Wetlands	Yes
§257.62(a)	Fault Areas	Yes
§257.63(a)	Seismic Impact Zone	Yes
§257.64(a)	Unstable Areas	Yes

5.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION (§§257.60(b), 257.61(b), 257.62(b), 257.63(b), 257.64(c))

I, the undersigned Professional Engineer licensed in the Commonwealth of Pennsylvania, am familiar with the requirements of the CCR Rule Section 257. It is my professional opinion that the impoundments described in this report meet the requirements of §§257.60(a), 257.61(a), 257.62(a), 257.63(a) and 257.64(a). The basis of this professional opinion is described within this report and is limited to the available information known to APTIM. This professional opinion is not to be interpreted or construed as a guarantee, warranty, or legal opinion.

Name of Professional Engineer: Richard Southorn, P.E. P.G.,

Company: APTIM

PE Registration State: Pennsylvania

PE Registration Number: PE 085411

Professional Engineer Seal:

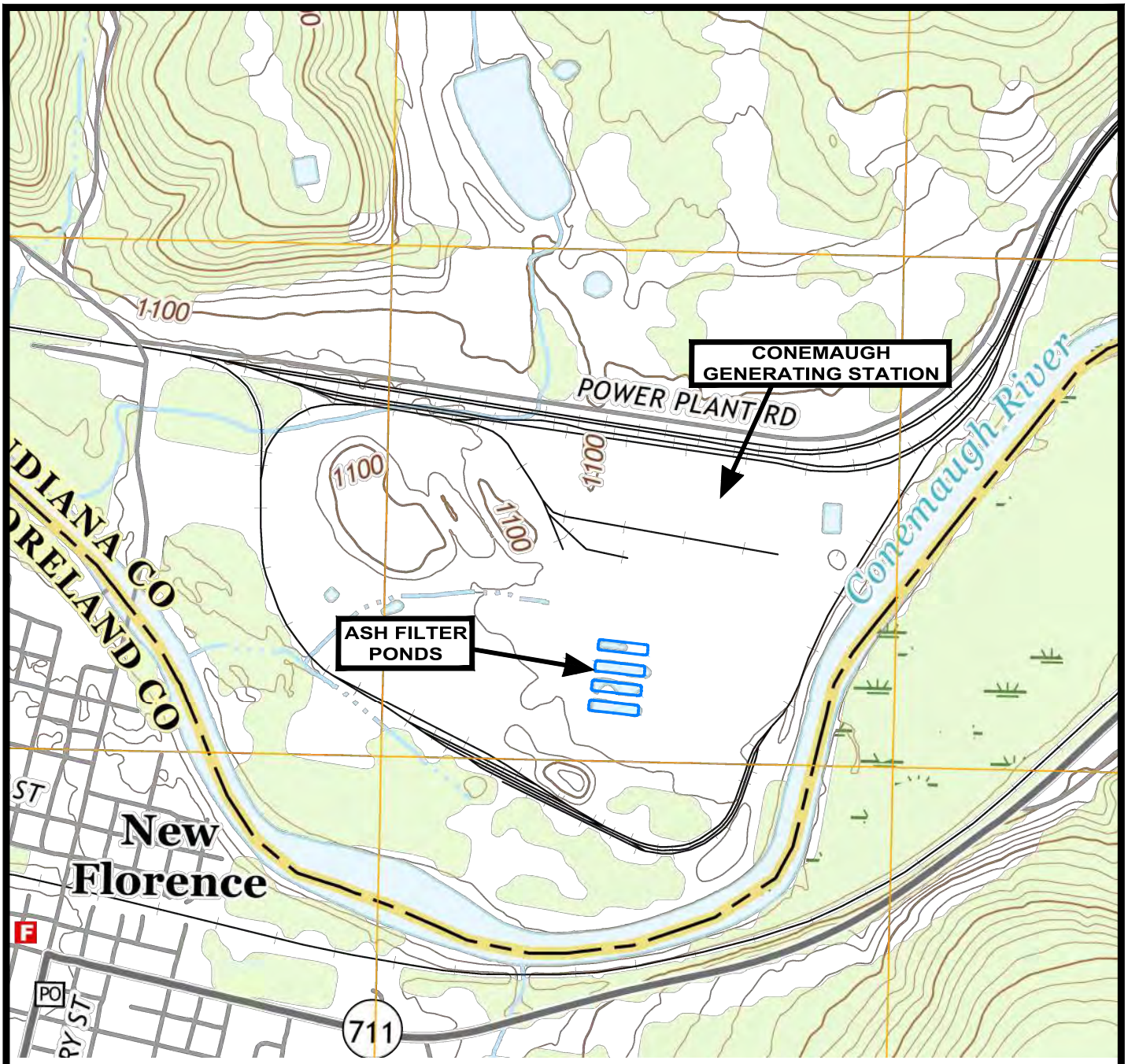
6.0 REFERENCES

"Coal and Mineral Resource Study Conemaugh Generating Station Residual Waste Disposal Site, Indiana County Pennsylvania," John T. Boyd Company, December 1994.

"Pennsylvania Department of Environmental Protection Residual Waste Major Permit Modification, Conemaugh Station Disposal Site, New Florence, Pennsylvania, Volume 1, Form 6R – Geologic Information," GAI Consultants, Inc., May 1997.

U.S. Environmental Protection Agency (2015), Hazardous Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, Federal Register Volume 80, No. 74 40 CFR Parts 257 and 261, April 17, 2015.

United States Geological Survey (USGS) Quaternary Fault and Fold Database for the United States.



LEGEND

APPROXIMATE CCR UNIT BOUNDARY

N

0 1000'

GRAPHIC SCALE

NOTES

1. TOPOGRAPHY OBTAINED FROM USGS 7.5-MINUTE SERIES, NEW FLORENCE QUADRANGLE, PENNSYLVANIA, 2016.
2. ALL BOUNDARIES ARE APPROXIMATE

APTIM Environmental & Infrastructure, Inc.

GenOn

CONEMAUGH GENERATING STATION

FIGURE 1
SITE LOCATION PLAN

APPROVED BY: RDS	PROJ. NO.: 1009144003	DATE: SEPT. 2018

LEGEND:

MW-3 (1064.89) — CCR GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION MEASURED BETWEEN OCTOBER 1 AND 4, 2017

GROUNDWATER FLOW DIRECTION

REFERENCE:

GOOGLE AERIAL PHOTOGRAPH, DATED 10/2015.

SCALE

0 100 200 FEET

APTIM

500 Penn Center Boulevard,
Suite 1000
Pittsburgh, Pennsylvania 15235

GenOn

FIGURE 2
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
ASH FILTER PONDS
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	1/31/18	--	E. Schlegel	--	--	1009144003-B7

File: O:\PROJECT\1009144003_Conemaugh\1009144003-B7.dwg
Plot Date/Time: Jan 31, 2018 – 9:02am
Plotted By: Evan.Schlegel
Xref:
Image

LEGEND

MONITORING WELL

1070 POTENTIOMETRIC CONTOUR

N

0 100'

GRAPHIC SCALE

NOTES

1. AERIAL IMAGERY OBTAINED FROM GOOGLE EARTH PRO DATED APRIL 2016.
2. POTENTIOMETRIC DATA COLLECTED ON MAY 2018.

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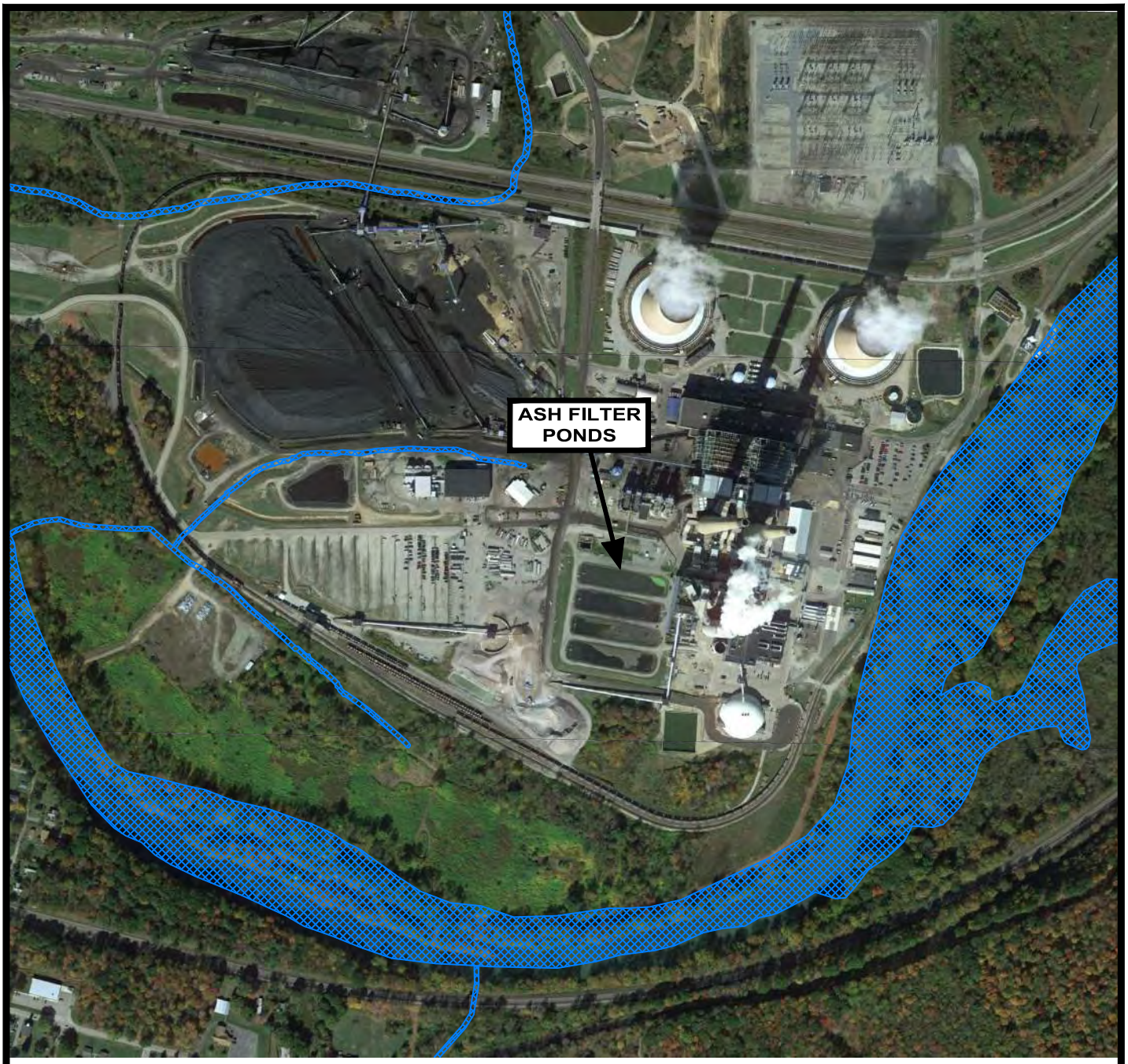
CONEMAUGH GENERATING STATION

FIGURE 3
UPPERMOST AQUIFER POTENTIOMETRIC SURFACE: MAY 2018

APPROVED BY: RDS	PROJ. NO.: 1009144003	DATE: SEPT. 2018



LEGEND

APPROXIMATE NATIONAL WETLAND INVENTORY (NWI) WETLAND BOUNDARY

N

0 700'

GRAPHIC SCALE

NOTES

1. AERIAL IMAGERY OBTAINED FROM GOOGLE EARTH PRO DATED APRIL 2016.
2. APPROXIMATE WETLAND BOUNDARIES OBTAINED FROM THE UNITED STATES FISH AND WILDLIFE SERVICES NATIONAL WETLANDS INVENTORY DATABASE. WETLAND DELINEATIONS ARE PHOTO INTERPRETED USING IMAGERY FROM 1977.

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CONEMAUGH GENERATING STATION

FIGURE 4
NATIONAL WETLANDS INVENTORY

APPROVED BY: RDS	PROJ. NO.: 1009144003	DATE: SEPT. 2018

USGS
science for a changing world

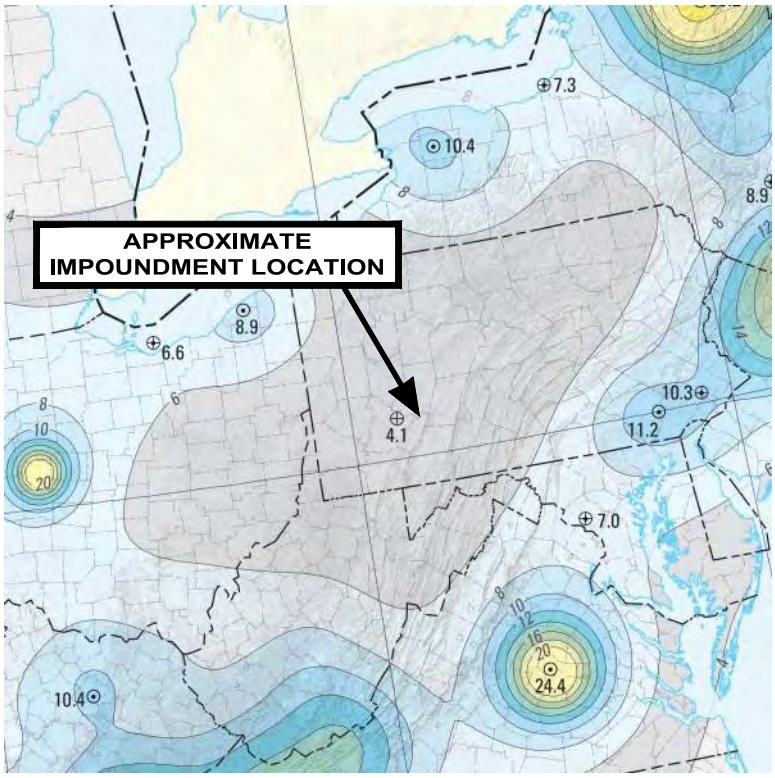
Earthquake Hazards Program

LOCATION 40.383316 Lat. -79.062566 Long.

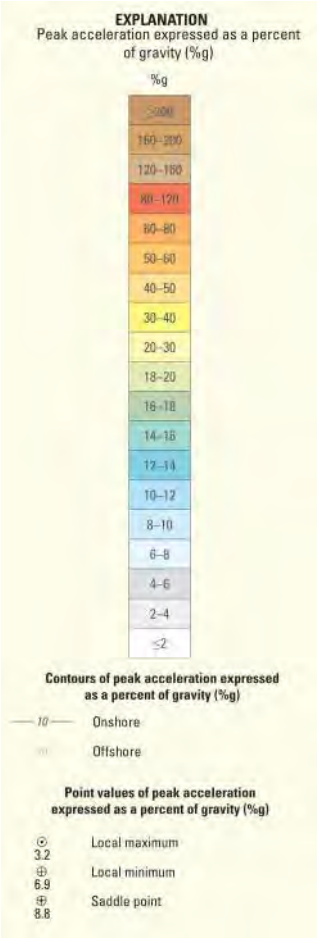
The interpolated probabilistic ground motion values, in %g, at the requested point are:

P.E. %	Exp. Time (years)	Ground Motion (g)
2	50	0.04617

U.S. NATIONAL SEISMIC HAZARD MAPS: Peterson, M.D., et al, 2014



Peak Horizontal Acceleration with 2% Probability of Exceedance in 50 Years



NOTES

1. Information obtained from the United States Geological Survey website.

APTIM Environmental & Infrastructure, Inc.

GenOn

CONEMAUGH GENERATING STATION

FIGURE 5
MAP OF HORIZONTAL ACCELERATION

APPROVED BY: RDS	PROJ. NO.: 1009144003	DATE: SEPT. 2018

ATTACHMENT 6	Documentation of Design Specifications, Material Suitability, and Construction Quality for Engineered Clay Liner per § 257.71(d)(1)(i)(C)
Attachment 6A	Record Drawings
Attachment 6B	Construction Specification 140-4479-158 – *Ash Filter Ponds and Ash Silo Ponds,* November 1984
Attachment 6C	Testing and Inspection Specification GDE-CON-983 – *Soils, Concrete, and Grout Testing and Inspection,* April 1985
Attachment 6D	Preliminary Engineering Report #335-83, Rev 2, March 1984
Attachment 6E	Correspondence – Letter from PaDER Regarding Requirements for AFPs Engineered Liner System, January 1984
Attachment 6F	Engineering Scope of Services for Ash Filter Pond Construction, August 1983
Attachment 6G	Purchase Requisition for Lab and Field Testing, April 1985
Attachment 6H	Water Quality Management Permit Application for AFP Improvements, April 1984
Attachment 6I	Ash Filter Ponds Liner Certification Report, August 2016

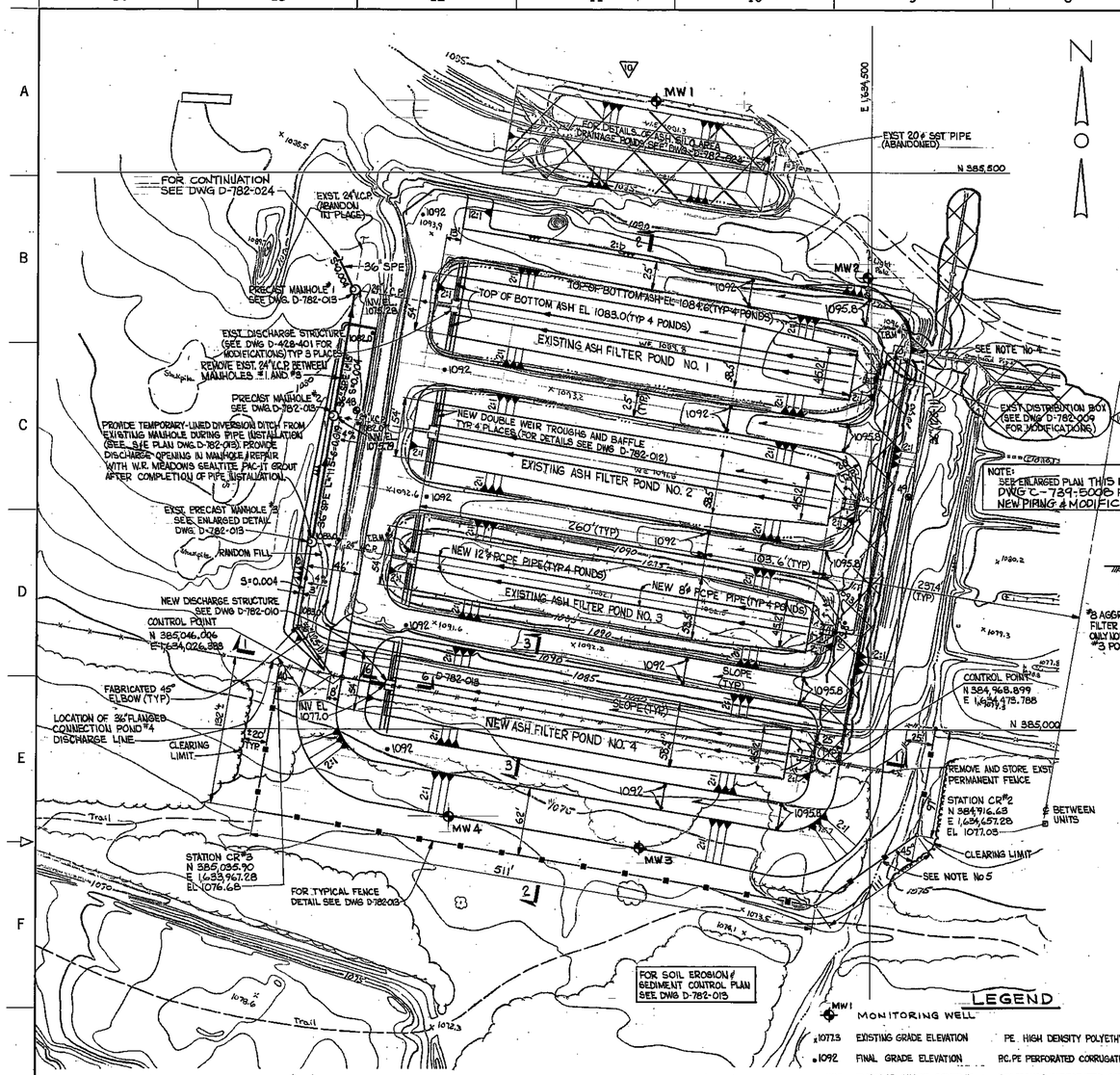
Notes:

Notes are included on the individual fly sheets of some attachments to provide context regarding the applicability of the document to the Part B application. Red boxes are used throughout the attachments to highlight pertinent information.

The historical documents provided in this application are for reference purposes only. The information related to the liners has been reviewed and deemed to be a reasonable representation of the permitting, design, and construction of the AFP liners. Other information presented in these documents may not be applicable to the AFPs and may include dated or inaccurate information regarding other facilities at the Station, which has not been fully evaluated. Since the time that many of these reference documents were prepared, facilities and operations at the Station have changed, along with applicable regulations and permit conditions under which they may operate. As such, information presented may no longer be applicable. For example, the permit application attachment includes reference to Ash Silo Ponds, which are no longer present at the Station.

ATTACHMENT 6A

Record Drawings

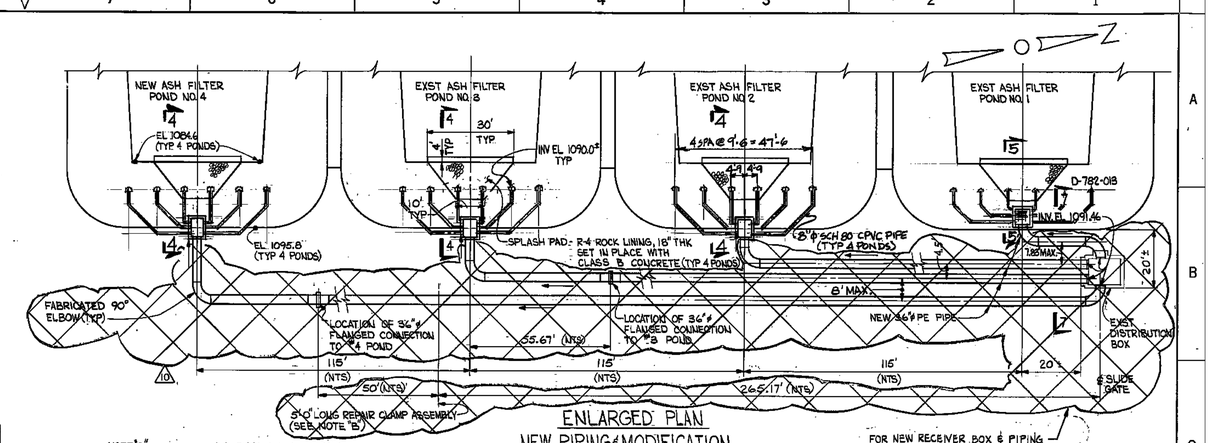


LOCATION PLAN

SCALE 1"=50'

LEGEND

MW1 MONITORING WELL	
1073.3	EXISTING GRADE ELEVATION
•1092	FINAL GRADE ELEVATION
—1080—	EXISTING GRADE CONTOUR
—1075—	FINAL GRADE CONTOUR
—x—x—	EXISTING FENCE
—■—■—	NEW FENCE
#-x-#-x-#	EXISTING FENCE TO BE REMOVED
C.M.P	CORRUGATED METAL PIPE
SPE	SPIROLITE POLYETHYLENE PIPE
PE	HIGH DENSITY POLYETHYLENE PIPE
RC.PE	PERFORATED CORRUGATED POLYETHYLENE PIPE
NRC.PE	NON PERFORATED CORRUGATED POLYETHYLENE PIPE
VCP	VITRIFIED CLAY PIPE
48●	TEST BORING
▲	TEMPORARY BENCH MARK
TBM#1	TOP OF SOUTH WALL OF DISTRIBUTION BOX ON ℄ OF BOX ELEVATION 1098.715
TBM#2	N.W. CORNER ON TOP OF POND #3 DISCHARGE STRUCTURE ELEVATION 1091.91



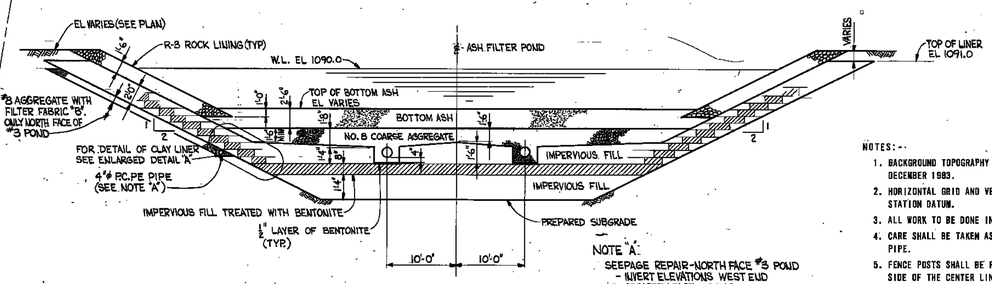
ENLARGED PLAN
NEW PIPING & MODIFICATION

(EAST END OF FILTER PONDS)
SCALE 1"=20'

NOTE "B"

36" x 5'-0" REPAIR CLAMP INSTALLATION PROCEDURE

1. GRIND OUT AREA OF FAULTY FUSSION BUTT WELD AND REFUSE WITH HAND OPERATED HEAT GUN.
2. DRILL TWO ¼" DIA. HOLES AT END OF CRACKED SECTION TO PREVENT CRACK PROPAGATION.
3. INSTALL A 5' WIDE, ⅜" THICK STAINLESS STEEL CLAMP WITH NEOPRENE GASKET AND STAINLESS STEEL BOLTS ON THE OUTSIDE OF THE PIPE.



SECTION 3-3

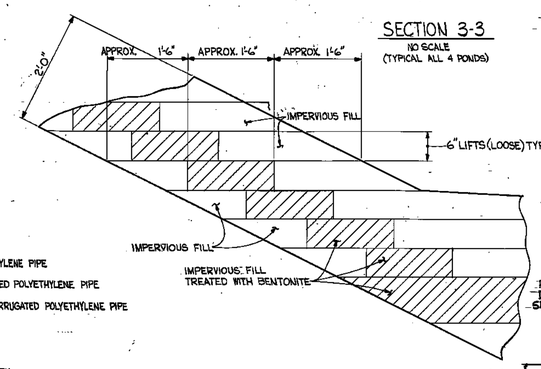
NO SCALE
(TYPICAL ALL 4 PONDS)

NOTE 'A'

SEEPAGE REPAIR-NORTH FACE #3 POND
- INVERT ELEVATIONS WEST END OF NORTH FACE = 80.10
- EAST END OF NORTH FACE = 78.45
- TIE IN AT #4 DISCHARGE STRUCTURE = 76.91 (GROUTED SHUT AFTER COMPLETION OF POND)

NOTES:--

1. BACKGROUND TOPOGRAPHY WAS TAKEN FROM AERIAL SURVEY FLOWN DECEMBER 1983.
2. HORIZONTAL GRID AND VERTICAL DATUM ARE BASED ON CONEMAUGH STATION DATUM.
3. ALL WORK TO BE DONE IN ACCORDANCE WITH SP-140-4479-158.
4. CARE SHALL BE TAKEN AS TO NOT DAMAGE EXISTING ABOVE GROUND PIPE.
5. FENCE POSTS SHALL BE PLACED NO CLOSER THAN 5 FEET ON EITHER SIDE OF THE CENTER LINE OF THE STREAM.
6. CARE SHALL BE TAKEN BY THE CONTRACTOR AS TO NOT DISTURB EXISTING MONUMENTS.
7. ALL PIPE PENETRATIONS THROUGH THE IMPERVIOUS FILL SHALL BE ENCASED WITH A MINIMUM 4 INCH LAYER OF TAMPED BENTONITE ALL AROUND.
8. ALL STRUCTURAL PENETRATIONS THROUGH THE IMPERVIOUS FILL SHALL BE ENCASED WITH A MINIMUM 2 INCH LAYER OF TAMPED BENTONITE ALL AROUND.

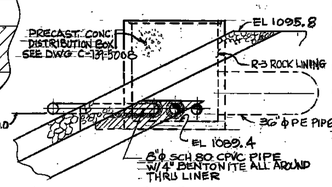


DETAIL 'A'

CLAY LINER
SCALE 1"=1'

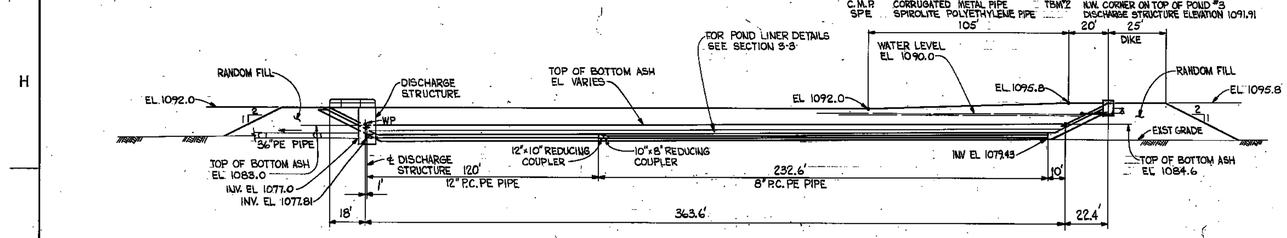
REFERENCES:-

D-782-009	ADDITION OF 4TH ASH FILTER POND – EXISTING DISTRIBUTION BOX MODIFICATION – PLAN, SECTIONS, AND DETAILS
D-782-010	ADDITION OF 4TH ASH FILTER POND – NEW DISCHARGE-STRUCTURE FOR POND 4 – PLAN, SECTIONS, AND DETAILS
D-782-011	ADDITION OF 4TH ASH FILTER POND – NEW DISCHARGE STRUCTURE FOR POND 4 – SECTIONS AND DETAILS
D-782-012	ADDITION OF 4TH ASH FILTER POND – NEW WEIR TROUGH INSTALLATION FOR PONDS 1,2,3, AND 4 – PLAN, SECTIONS, AND DETAILS
D-782-013	ADDITION OF 4TH ASH FILTER POND – NEW FILTER POND 4 – SECTIONS AND DETAILS
D-428-401	EXISTING POND DISCHARGE STRUCTURE
D-728-301	EXISTING PLANT WASTE FILTER BEDS
C-739-5006	ASH FILTER POND Nº 1 DISTRIBUTORS
C-739-5007	ASH FILTER POND Nºs 2, 3 & 4 DISTRIBUTORS
C-739-5008	ASH FILTER POND Nºs 1, 2, 3 & 4 DIST. ENLARGED PLAN & SECTIONS
D-354-3902 SH 1 & 2	EXISTING UNDERGROUND PIPING RELOCATION



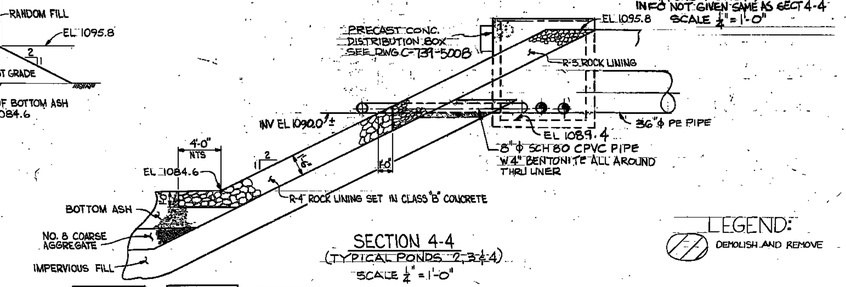
SECTION 5-5

(POND 1 ONLY)
INFO NOT GIVEN SAME AS SECT 4-4
SCALE ¼" = 1'-0"



SECTION 1-1

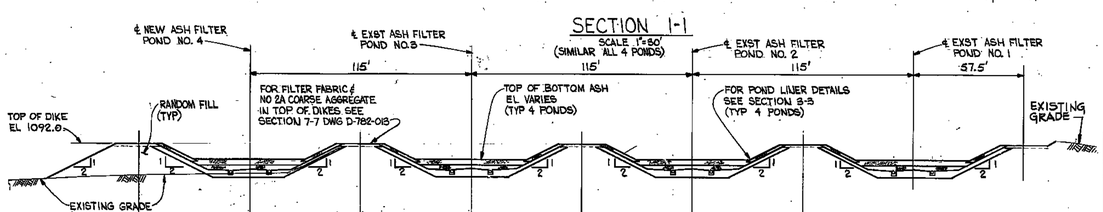
SCALE 1"=50'
(SIMILAR ALL 4 PONDS)



SECTION 4-4

(TYPICAL PONDS 2, 3 & 4)
SCALE ¼" = 1'-0"

LEGEND:
DEMOLISH AND REMOVE



SECTION 2-2

SCALE 1"=50'

¼" = 1'-0"

AS-BUILT/11-10-86
EXCEPT FOR REV. 6

REV	MADE	CHKD	SO LD	APP	DATE

REVISIONS

2-8-80	CONSTRUCTION	RWS
	PRELIMINARY NOT FOR CONSTRUCTION	
2-8-80	BIDDING PURPOSES	RWS
DATE	RELEASED FOR	ENGR.

CONEMAUGH STATION OWNERS GROUP
CONEMAUGH STATION — UNITS 1 & 2
ADDITION OF 4TH ASH FILTER POND
CIVIL
NEW FILTER POND 4
PLAN, SECTIONS, AND DETAILS

Gilbert Commonwealth Companies
GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS READING, PA

ENGINEERING INTERFACES

DRAFTING				
MADE	CHECKED	1.	2.	3.	4.
T.E.C.	P.A.C.				
9/6/79	11-8-79				

SOLIDS: 2-8-80
SCALE: AS SHOWN
W.O. 044478-158
ENGINEER APPROVAL: R.O. Boyer DEPT. 0674 DATE 2-8-80

04	4479	D-782-008	10
		DRAWING NUMBER	REV

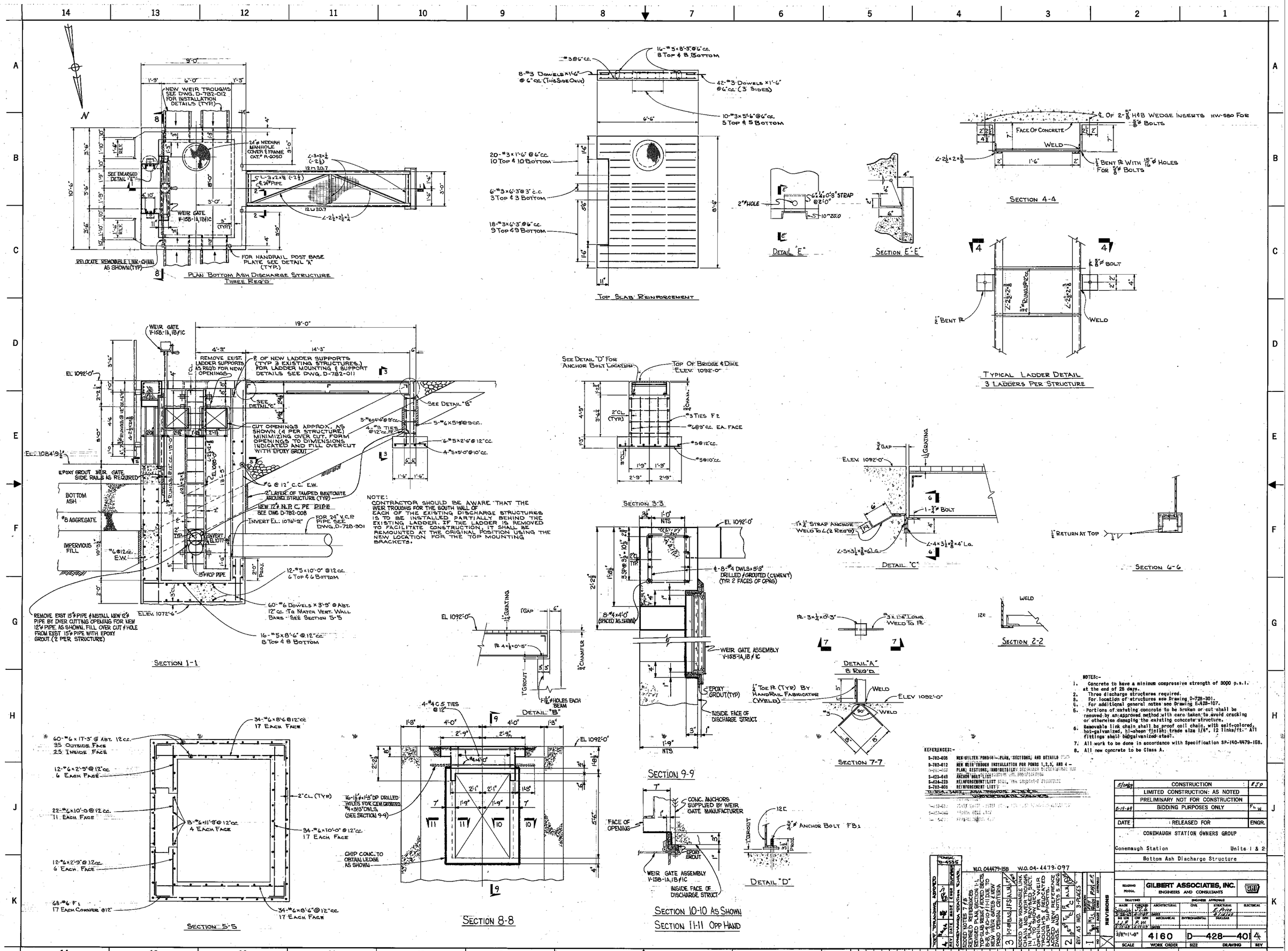
REV	MADE	CHKD	SO LD	APP	DATE	REVISIONS
10	DM	JFW				ADDED: (C2) NOTE, (H2) REF. DWGS, DELETED: (B1 THRU B7, B9 THRU E7) AREAS FOR SPOT GRADE, F4 & F5 UPGRADE. THIS REVISION PREPARED UNDER THE SUPERVISION OF RICHARD W. BOYER, P.E.
9	DM	KKZ				DELETED AREAS CROSSHATCHED FOR PONDS UPGRADE. THIS REVISION PREPARED UNDER THE SUPERVISION OF RICHARD W. BOYER, P.E.
8	DM	GM				REVISED: (A13, B13) PIPING. THIS REVISION PREPARED UNDER THE SUPERVISION OF GERALD M. PE LIC #19448 PA, PE LIC #PE-044444
7	10/90	JPM				REVISED ELEVATION TO EXISTING DISTRIBUTION BOX ELEVATION WAS 1097.25
6	3/84					ADDED NEW DISTRIBUTION SYSTEM & DISCHARGE PIPING.
5						REVISED DWG TO INCORPORATE RESULTS OF ADDED FLANGE ELEVATIONS, ENLARGED PLAN & NOTES A & B. REVISED SECTION 5-5
4						ADDED MONITORING WELLS
3						ADDED DEW 36/SPE PIPE NEW MANHOLE
2						REDRAWN
1						ADDED SOIL EROSION & SEDIMENT CONTROL PLAN, TYP. V-DITCH SECT. AND NOTES 1 THRU 5

PCN 421026 — PCN-421026 — 421026 — PCN 421064 — PCN 421064

ORBITAL ENGINEERING INC.

NEW ASH FILTER POND NO. 4

REVISIONS



NOTES:-

1. Concrete to have a minimum compressive strength of 3000 p.s.i. at the end of 28 days.
2. Three discharge structures required.
3. For location of structures see Drawing D-728-301.
4. For additional general notes see Drawing E-428-107.
5. Portions of existing concrete to be broken or cut shall be removed by an approved method with care taken to avoid cracking or otherwise damaging the existing concrete structure.
6. Removable link chain shall be proof coil chain, with self-colored, hot-galvanized, bi-chem finish; trade size 1/4", 12 links/ft. All fittings shall be galvanized steel.
7. All work to be done in accordance with Specification SP-140-4479-158.
8. All new concrete to be Class A.

REFERENCES:-

D-782-005 NEW WEIR TROUGH INSTALLATION FOR PONDS 1,2,3, AND 4 - PLAN, SECTIONS, AND DETAILS
D-782-012 NEW WEIR TROUGH INSTALLATION FOR PONDS 1,2,3, AND 4 - PLAN, SECTIONS, AND DETAILS
S-423-640 ANCHOR BOLT LIST
S-426-223 REINFORCEMENT LIST
S-782-005 REINFORCEMENT LIST

5/20/69	CONSTRUCTION	EJP
	LIMITED CONSTRUCTION: AS NOTED	
	PRELIMINARY NOT FOR CONSTRUCTION	
5-13-69	BIDDING PURPOSES ONLY	FLW
DATE	RELEASED FOR	ENGR.

CONEMAUGH STATION OWNERS GROUP

Conemaugh Station — Units 1 & 2

Bottom Ash Discharge Structure

GILBERT ASSOCIATES, INC. ENGINEERS AND CONSULTANTS

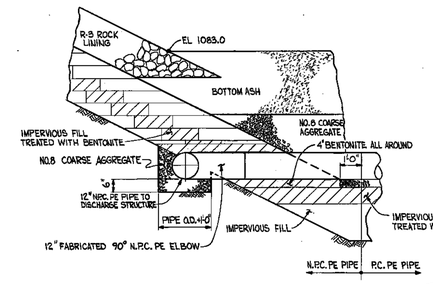
W.O. 044479-158 W.O. 04-4479-097

REVISIONS

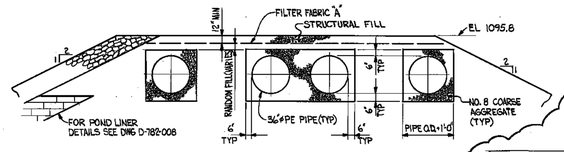
REV	DATE	MADE	CHKD	DESCRIPTION	APPROVALS
4	5/20/69			CONSTRUCTION STATUS, REVISED	
3	1-7-69	RAJ	JFS	ADDED NEW POWDERED LIME CHAIN AND WEIR TROUGHS IN PLAN & REVISED SECT. OPENINGS FOR WEIR TROUGHS & REVISED LADDER SUPPORTS. ADDED NEW REFERENCE DWGS. & REVISED NOTES 3 & 6	
2	3/18/68	TC	FAC	REV. AS IND. 3-PLACES	
1	8-28-67	KJS	FAC	ADDED NOTES 7 & 8 REVISED REFERENCES REVISED PLAN, ADDED SECTS. 9-9, 9-9, 10-10 & 11-11. DUE TO NEW WEIR GATES & NEW BOND DESIGN CRITERIA	

SCALE	WORK ORDER	SIZE	DRAWING	REV
3/8"=1'-0"	4160	D	428—401	4

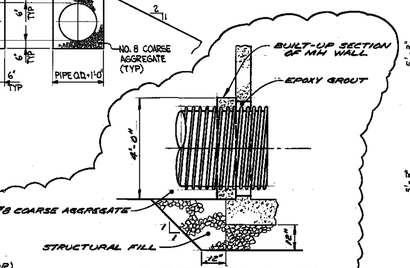
BOTTOM ASH DISCHARGE STRUCTURE



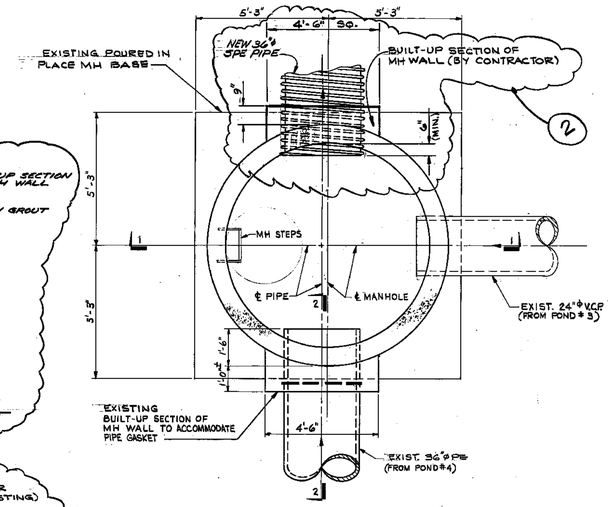
SECTION 6-6
DWG. D-782-008
SCALE 1/8" = 1'-0"
(TYPICAL ALL 4 PONDS)



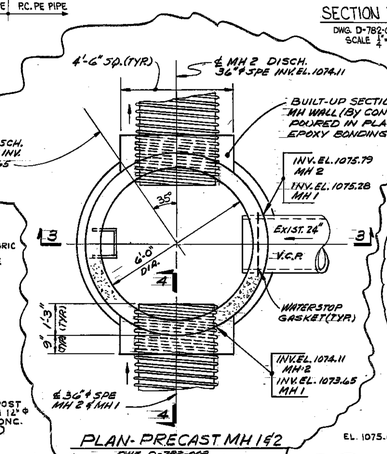
SECTION 7-7
DWG. D-782-008
SCALE 1/8" = 1'-0"



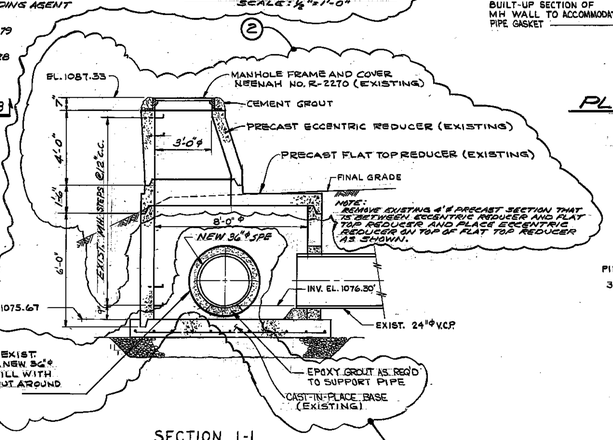
SECTION 4-4
SCALE: 1/2" = 1'-0"



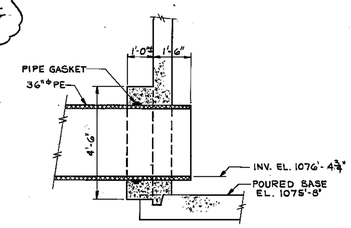
PLAN - PRECAST MH 3
DWG. D-782-008
SCALE: 1/2" = 1'-0"



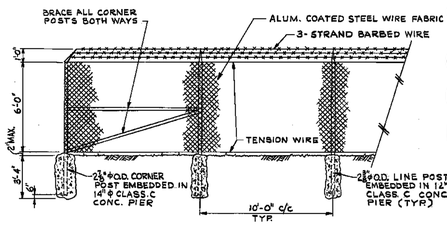
PLAN - PRECAST MH 1 & 2
DWG. D-782-008
SCALE: 1/2" = 1'-0"



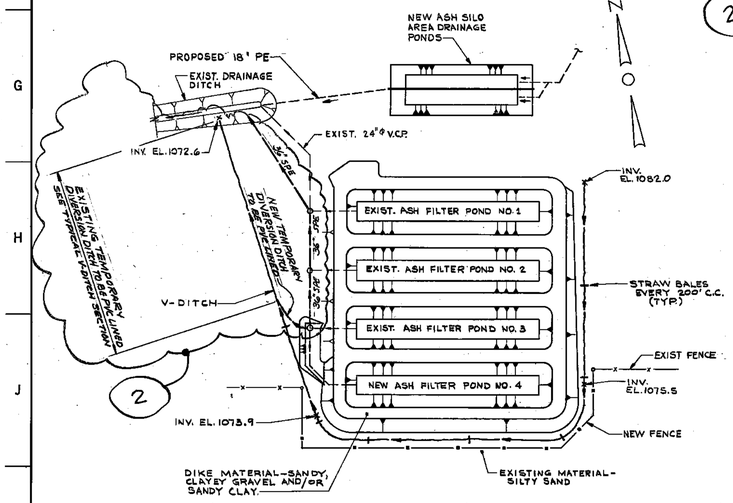
SECTION 1-1
SCALE: 3/8" = 1'-0"



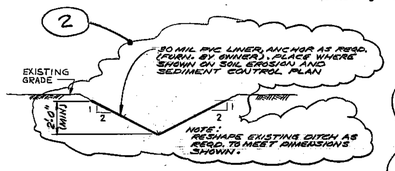
SECTION 2-2
SCALE 1/2" = 1'-0"



TYP. CORNER ELEV. - CHAIN LINK FENCE
NO SCALE



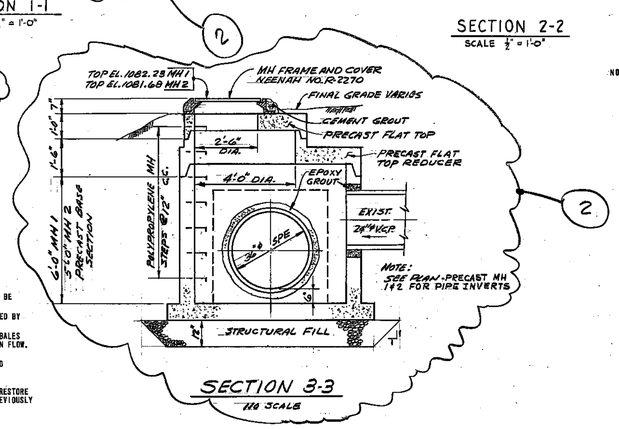
SOIL EROSION & SEDIMENT CONTROL PLAN
NO SCALE



TYPICAL V-DITCH FOR SEDIMENT CONTROL
NO SCALE

SOIL EROSION AND SEDIMENT CONTROL

1. PERIMETER DITCH SHALL BE CONSTRUCTED AND THE STRAW BALE DITCH CHECKS SHALL BE INSTALLED BEFORE THE WORK AREA IS DISTURBED.
2. MATERIAL FROM DITCH CONSTRUCTION SHALL BE STOCKPILED WITHIN THE AREA DRAINED BY THE DITCH FOR LATER RESTORATION USE.
3. DURING CONSTRUCTION OF THE NEW FILTER POND AND ASSOCIATED WORK, THE STRAW BALES SHALL BE REPLACED AND ACCUMULATED SEDIMENT REMOVED AS NECESSARY TO MAINTAIN FLOW. THE SEDIMENT SHALL BE DEPOSITED ON THE STOCKPILE.
4. TOP OF DITCH AND SIDE SLOPES SHALL BE COVERED WITH BOTTOM ASH OR SEEDED AND MULCHED, AS CALLED FOR IN THE SPECIFICATIONS, AS SOON AS POSSIBLE AFTER COMPLETION TO PREVENT EROSION OF THE SURFACES.
5. UPON COMPLETION OF CONSTRUCTION, THE STOCKPILED MATERIAL SHALL BE USED TO RESTORE THE AREA TO ORIGINAL GRADE. ALL DISTURBED AREAS NOT SEEDED AND MULCHED PREVIOUSLY SHALL BE SEEDED AND MULCHED AFTER RESTORATION IS COMPLETE.



SECTION 3-3
NO SCALE

NOTES:-
1. WORK THIS DRAWING IN CONJUNCTION WITH DRAWING D-782-008.

REV	MADE	CHKD	EQ LD	APP	DATE

REVISIONS

DATE	RELEASED FOR	ENGR.
1-7-85	CONSTRUCTION	TWS
1-30-84	PRELIMINARY NOT FOR CONSTRUCTION	TWS
1-7-85	BIDDING PURPOSES	TWS

CONEMAUGH STATION OWNERS GROUP
CONEMAUGH STATION UNITS 1 & 2
ADDITION OF 4TH ASH FILTER POND
CIVIL
NEW FILTER POND 4
SECTIONS AND DETAILS

Gilbert Commonwealth Computer

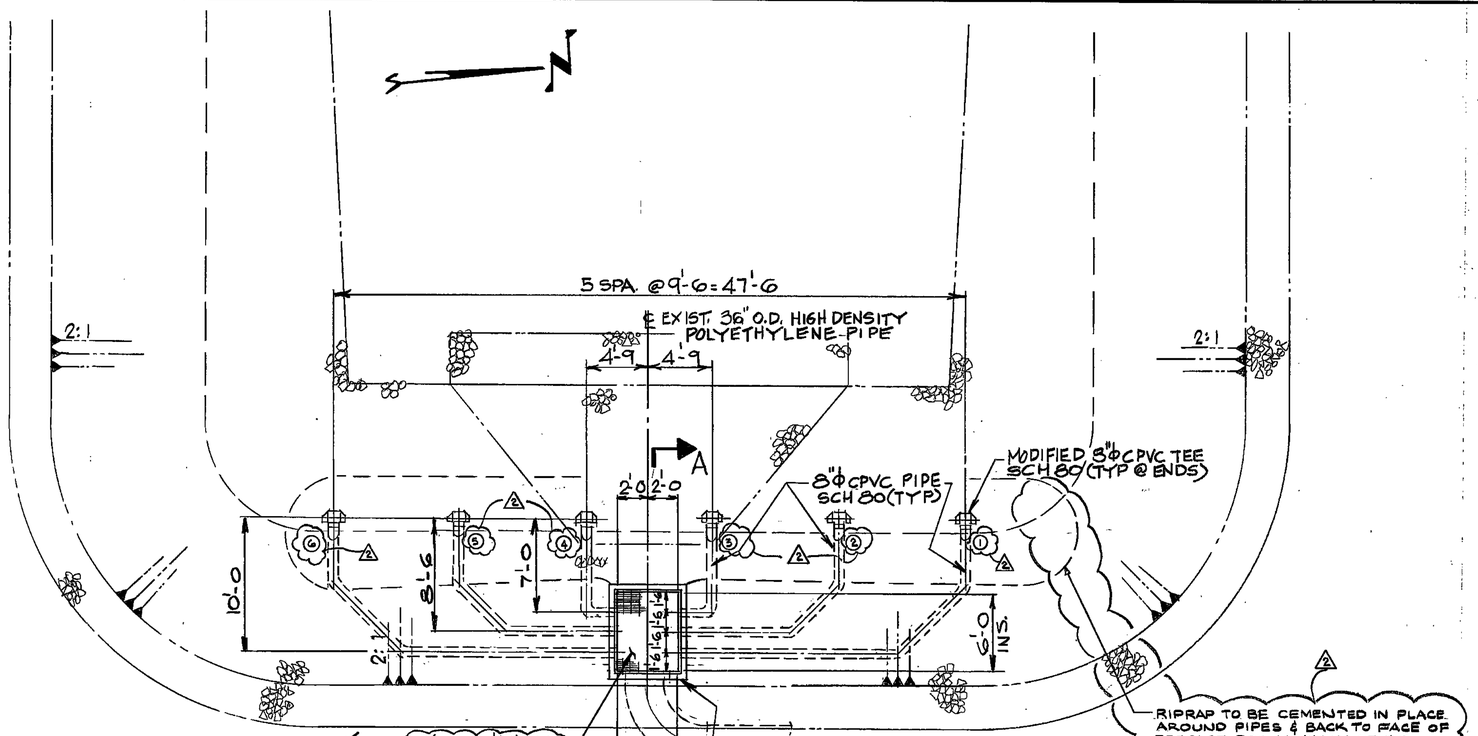
GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS BRADDOCK, PA

DRAFTING: MADE DS/LE; CHECKED EAC; DATE 1-7-85
ENGINEERING INTERFACES: 1. PRELIFF; 2.; 3.; 4.
DESIGN ENGINEER: J. Hilbert 1-7-85
ENGINEER APPROVAL: Thomas S. Wilson 1-7-85
SCALE: AS SHOWN
W.O. 044476-158
DRAWING NUMBER: 04 | 4479 | D-782-013 | REV 2

REVISIONS

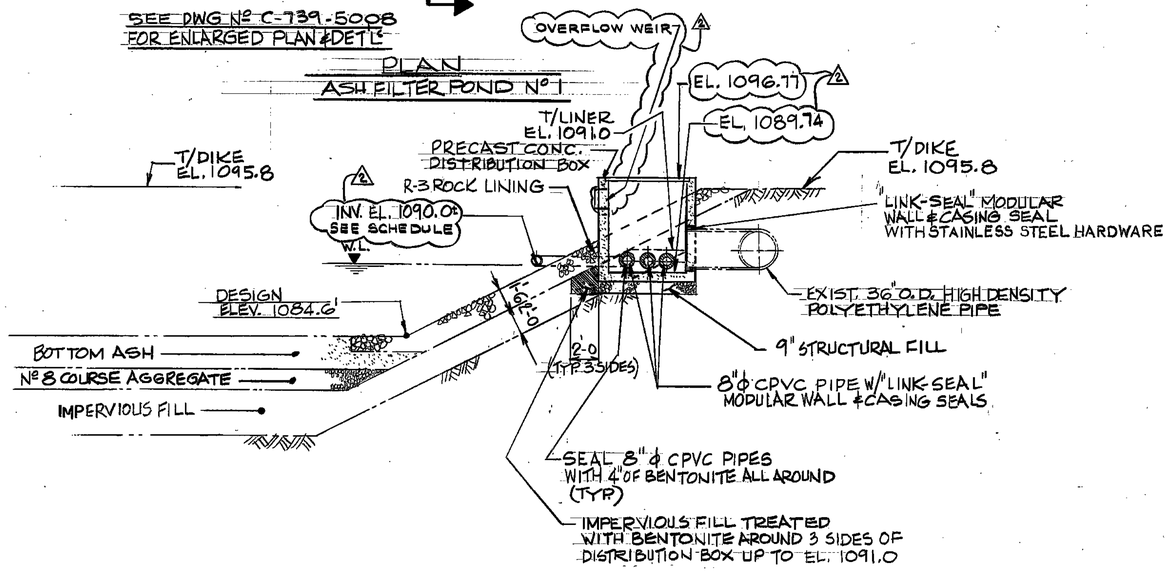
REV	DESCRIPTION	MADE	CHKD	DATE
2	ADDED TITLE IN REVISED TO PRECAST MH 1 & 2 ADDED TWO PRECAST SECTIONS 3'-0" DIA. & 4'-0" DIA. ADDED I.D. AND DESC. BUILT PRECAST BOTTOM REDUCER	TWS	TWS	5-8-86
1	REVISED BUILT-UP SECTION OF MH PRECAST MH TO PRECAST MH 3 ADDED NEW SECTION 7-7 REVISED SECTION 4-4 REVISED PLAN OF MH 3 ADDED NEW DRAWING TYPICAL V-DITCH FOR SANDY AND SEDIMENT CONTROL	TWS	TWS	4-21-86

NEW FILTER POND 4 SECTIONS & DETS



SEE DWG Nº C-739-5008 FOR ENLARGED PLAN & DETL.

PLAN
ASH FILTER POND Nº 1



SECTION A-A

SCHEDULE OF ELEVATIONS SURVEY DATA BY R & L DEVELOPEMENT CORP.	
T/GRTG.	1096.77'
BOX INVERT	1089.74'
INLET NO.1 INV.	1090.30'
INLET NO.2 INV.	1090.24'
INLET NO.3 INV.	1090.32'
INLET NO.4 INV.	1090.21'
INLET NO.5 INV.	1090.30'
INLET NO.6 INV.	1090.21'
36" PIPE INV.	1090.35'
DATE OF SURVEY	9-26-90

GENERAL NOTES

1. FOR CONTROL OF ELEVATIONS USE EXISTING BENCH MARK TBM #1 LOCATED AT THE TOP OF SOUTH WALL OF EXISTING DISTRIBUTION BOX D-782-008 REV. 6.
2. DRAINAGE AND DEWATERING OF ASH FILTER PONDS BY OWNER. COORDINATE INSTALLATION SCHEDULE WITH PLANT OPERATIONS.
3. CARE SHALL BE TAKEN NOT TO DAMAGE EXISTING PIPING DURING EXCAVATION AND CONSTRUCTION. EXISTING INTAKE CLARIFIER SLUDGE DISCHARGE PIPING (PLASTIC) TO BE REROUTED IF REQUIRED.
4. EXISTING ASH FILTER POND BOTTOM AND DIKE TO BE RESTORED IN KIND AFTER CONSTRUCTION. THE ROCK LINING AT DISCHARGE PIPES SHALL BE SET IN CONCRETE.
5. EARTH COMPACTION IS TO BE 90% OF MODIFIED PROCTOR DENSITY. DIKES AND POND BOTTOM ARE TO BE RECONSTRUCTED OF IMPERVIOUS MATERIAL.
6. ALL PENETRATIONS THRU IMPERVIOUS FILL SHALL BE ENCASED WITH A MINIMUM OF 4 INCH WIDE LAYER OF TAMPED BENTONITE ALL AROUND.
7. CONCRETE FOR DISTRIBUTION BOXES SHALL BE ASTM C150 TYPE IIA CEMENT WITH A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI. MAXIMUM WATER/CEMENT RATIO, BY WEIGHT, SHALL BE ESTABLISHED BY METHODS OF SECTION 5.3 OF THE ACI-318-89.
8. ALL REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE BILLET STEEL AND SHALL CONFORM TO THE REQUIREMENTS OF "SPECIFICATIONS FOR BILLET STEEL BARS FOR CONCRETE REINFORCEMENT" ASTM-A615 GRADE 60. PRECAST SECTIONS SHALL BE REINFORCED AND SUITABLE FOR AASHTO H20 SPECIFICATION USE.
9. EMBEDDED STEEL TO BE ASTM A36 AND TO BE HOT-DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123.
10. ALL SURFACES OF GALVANIZED STEEL LEFT UNCOATED OR DAMAGED BY FIELD WELDING OR CUTTING SHALL BE CLEANED THEN PAINTED WITH "GALVANOX" TYPE 1, AS MANUFACTURED BY SUBOX INC. OR APPROVED EQUAL.
11. ALL INSIDE CONCRETE SURFACES TO BE COATED WITH ONE (1) PRIME COAT OF COAL TAR EPOXY AND TWO (2) FINISH COATS OF COAL TAR EPOXY APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS PRIOR TO DELIVERY.
12. PIPE FOR DISTRIBUTION HEADER TO BE 8" DIAMETER SCH 80 SOCKET TYPE CHLORINATED POLYVINYL CHLORIDE, ASTM F-439.
13. GRATING TO BE GALVANIZED 1 1/4 X 3/16 BEARING BARS SPACED AT 1 3/16 C/C WITH CROSS BARS SPACED AT 4" C/C AND TO BE INSTALLED USING SADDLE CLAMPS AND STAINLESS STEEL WELDED STUDS.

FOR ALTERATIONS TO EXIST 36" O.D. H.D.P.E PIPE SEE DWG. D-782-008X
FOR LOCATION SEE DWG. D-782-008 REV. 6
FOR ASH FILTER PONDS 2, 3 & 4 SEE DWG. C-739-5007
FOR ENLARGED PLAN & DETAILS SEE DWG. C-739-5008

REVISIONS					
1	REVISED PER ORBITAL ENGINEERING INC.	BJK	BM	10-29-91	BM
2	ADDED NOTE FOR OVERFLOW WEIR AND SURVEY DATA ON INSTALLED ELEVATIONS	BJK			

PCN 427064

O.E.I. CONTRACT Nº E-3738

ORBITAL ENGINEERING INC.	ENGINEERING APPROVALS				
DRAFTING		DISC.	ARCH	CIVIL	ELEC	MECH
BJK 3/87 MADE DATE	ENGR.			BM 10/89		
RLG 3/1/87 CHKD DATE	DATE					
	SUPV./MGR.			BM 11/89		
	DATE					

Penelec / GPU — PENNSYLVANIA ELECTRIC COMPANY — JOHNSTOWN PA 15907

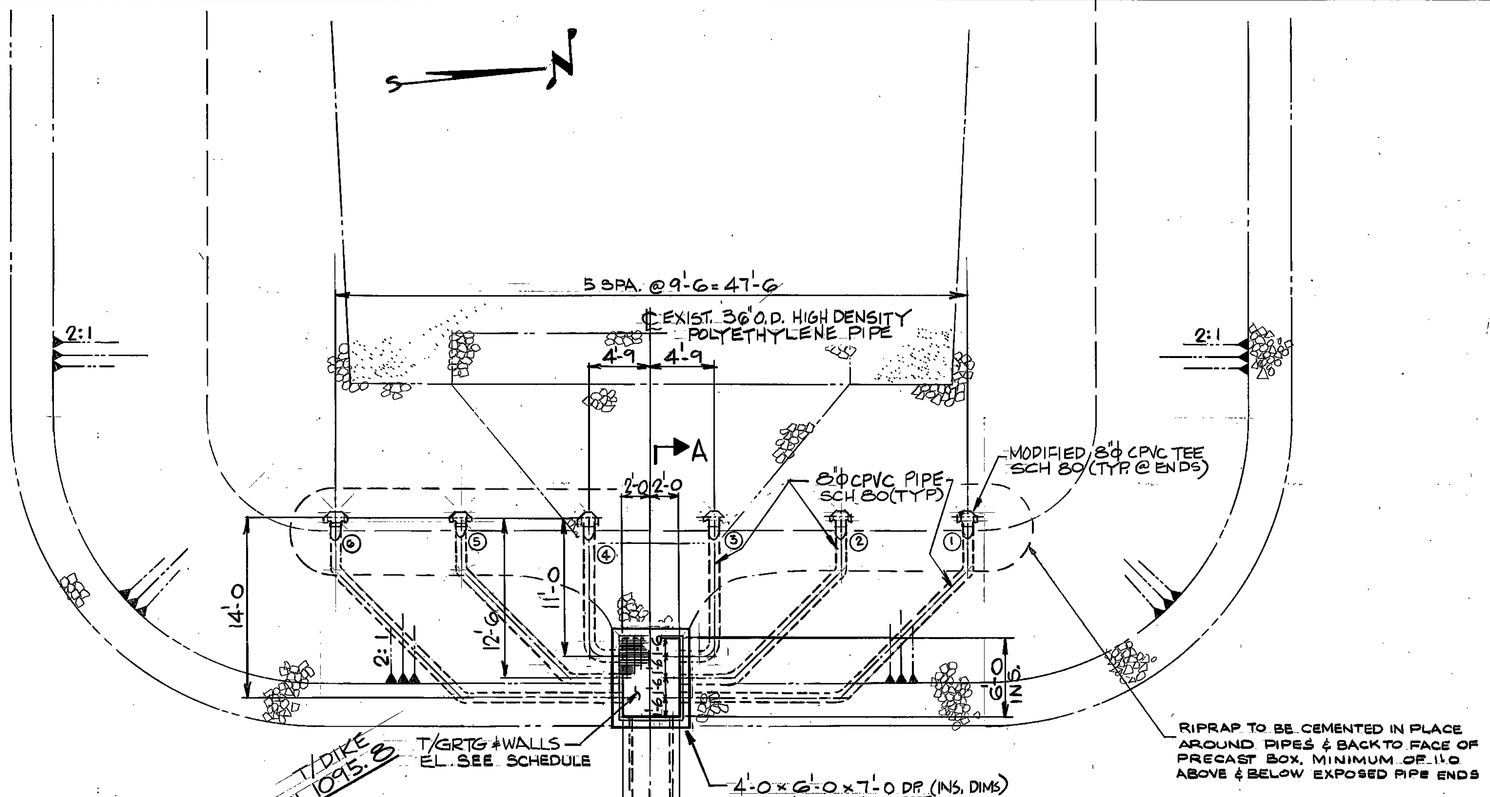
STATION: CONEMAUGH — UNIT NO(S): 1 & 2

DWG. TYPE: CIVIL

TITLE: WASTEWATER TREATMENT IMPROVEMENTS
ASH FILTER POND Nº 1 DISTRIBUTOR.
PLAN & SECTION

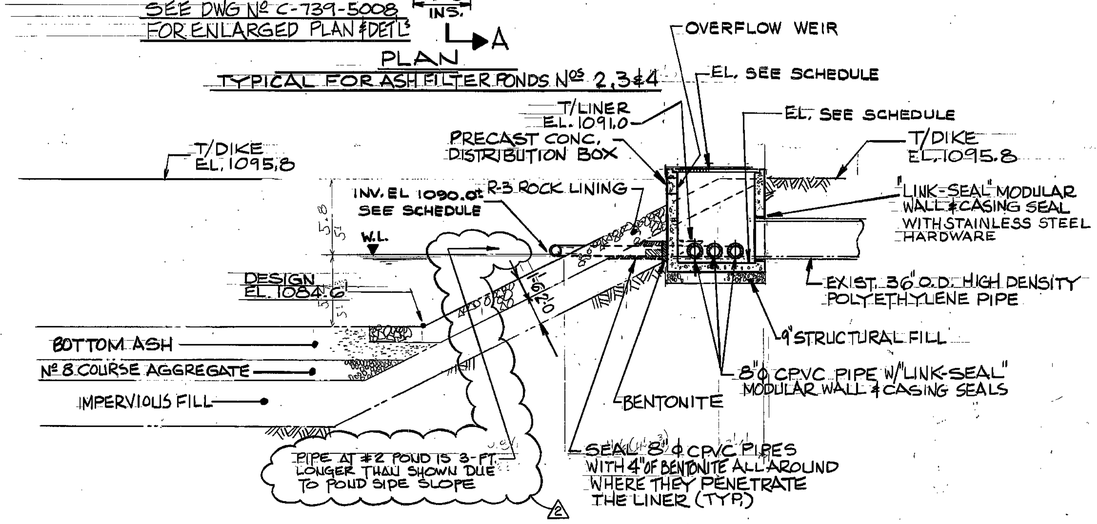
PROJECT CONTROL NO.	SCALE	DRAWING NUMBER	REV
427064	3/16"=1'-0" & 1/4"=1'-0"	C-739-5006	2

1/4" = 1'-0"
0' 5' 10' 15' 20'



PLAN

TYPICAL FOR ASH FILTER PONDS Nºs 2, 3 & 4



SECTION A-A

SCHEDULE OF ELEVATIONS

SURVEY DATA BY R & L DEVELOPEMENT CORP

LOCATION	POND 2	POND 3	POND 4
T/GRTG.	1096.66	1096.29'	1096.37
BOX INV.	1089.64	1089.32'	1089.35
INLET ①	1090.26	1089.86'	1089.84
INLET ②	1090.23	1089.77'	1089.84
INLET ③	1090.25	1089.85'	1089.91
INLET ④	1090.25	1089.62'	1089.89
INLET ⑤	1090.25	1089.75'	1089.89
INLET ⑥	1090.26	1090.03'	1089.95
36" PIPE INVERT	1090.13	1090.08'	1089.91
DATE OF SURVEY	2-13-91	9-26-90	1-8-91

THIS DWG IS TYPICAL FOR 3 ASH FILTER PONDS Nºs 2, 3 & 4
FOR GENERAL NOTES SEE DWG C-739-5006
FOR ALTERATIONS TO EXIST. 36" O.D. H.D.PE PIPE SEE DWG D-782-008X
FOR LOCATION SEE DWG D-782-008 REV. 6
FOR ENLARGED PLAN & DETAILS SEE DWG C-739-5008

REVISIONS				
PCN 427064	REVISED TO AS-BUILT CONDITIONS			
PCN 427064	ADDED SURVEY DATA FOR POND No. 3, LOCATION OF WEIR AND GROUTING OF RIPRAP			
	ORBITAL ENGINEERING INC.			
2	MD	5-24-91	KRZ	
No.	MADE	DATE	CHK.	APPRD
	ORBITAL ENGINEERING INC.			
1	JM	10-16-90	KRZ	
No.	MADE	DATE	CHECKED	APPROVED

O.E.I. CONTRACT Nº E-3738

ORBITAL ENGINEERING INC.

ENGINEERING APPROVALS	DISC.	ARCH	CIVIL	ELEC	MECH
ENGR.					
DATE					
SUPV./MGR.					
DATE					

DRAFTING: MADE 10/88 DATE; CHKD. 3/1/89 DATE

Penelec GPU — PENNSYLVANIA ELECTRIC COMPANY, JOHNSTOWN PA 15907

STATION: CONEMAUGH — UNIT NO(S).: 1 & 2

DWG. TYPE: CIVIL

TITLE: WASTEWATER TREATMENT IMPROVEMENTS
ASH FILTER POND Nºs 2, 3 & 4 DISTRIBUTORS
PLAN & SECTION

PROJECT CONTROL NO.	SCALE	DRAWING NUMBER	REV
427064	3/16" = 1'-0"	C-739-5007	2

1/4" = 1'-0" (0' 5' 10' 15' 20')

ATTACHMENT 6B

Construction Specification 140-4479-158 –
Ash Filter Ponds and Ash Silo Ponds, November 1984

Note: This document presents the specifications for construction of the Ash Filter Pond engineered clay liners and associated protective cover.

SPECIFICATION 140-4479-158

ASH FILTER PONDS AND ASH SILO PONDS

CONEMAUGH STATION - UNITS 1 AND 2

PRELIMINARY - NOVEMBER 30, 1984

PENELEC W.O. C344

PENNSYLVANIA ELECTRIC COMPANY
FOR THE
CONEMAUGH STATION OWNERS GROUP

GCI APPROVAL _____ DATE _____

PENELEC ENGINEERING REVIEW _____ DATE _____

PENELEC QA REVIEW _____ DATE _____

PENELEC APPROVAL _____ DATE _____

Gilbert/Commonwealth, Inc.
P.O. Box 1498
Reading, Pennsylvania

J.F.W.-D.G.G.-T.W.S.
F.G.N.-D.R.E.-L.E.W.
W.O. 04-4479-158

CONTENTS

CONTENTS (cont)

CONTENTS (Cont)

SECTION III

EXCAVATION AND FILL

3.01 SCOPE

3.01.1 Description of Work:

This section includes technical requirements for performing excavation and fill operations.

3.01.2 Items Included:

This section includes the following:

1. Establishing lines and grades.
2. Performing soil erosion and sedimentation control.
3. Clearing, grubbing, and disposition of materials.
4. Excavation to the required lines and grades, including removal of unsuitable materials.
5. Dewatering of excavations and diversion of all surface water away from earthwork operations.
6. Subgrade preparation.
7. Furnishing, placing, and compacting of fill materials.
8. Excavation and fill of trenches.
9. Furnishing and placing of filter fabrics.

3.01.3 Items Not Included:

The following items are not included in this Section:

1. Providing bituminous and concrete pavement construction.
2. Providing soil testing and inspection.
3. Establishing reference base lines and bench marks.
4. Qualification and in-process testing of materials.

3.02 APPLICABLE CODES AND STANDARDS

The following are referenced in this Section:

1. American Society for Testing and Materials (ASTM):

   a. C 127-81, "Test Method for Specific Gravity and Absorption of Coarse Aggregate."

   b. D 422-63 (1972), "Particle-Size Analysis of Soils."

   c. D 423-66 (1972), "Test Method for Liquid Limit of Soils."

   d. D 424-59 (1971), "Test Method for Plastic Limit and Plasticity Index of Soils."

   e. D 751-79, "Testing Coated Fabrics."

   f. D 1117-80, "Testing Nonwoven Fabrics."

   g. D 1140-54 (1971), "Test Method for Amount of Material in Soils Finer Than the No. 200 (75-μm) Sieve."

   h. D 1557-78, "Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop."

   i. D 1682-64 (1975), "Test Methods for Breaking Load and Elongation of Textile Fabrics."

   j. D 1777-64 (1975), "Measuring Thickness of Textile Fabrics."

   k. D 2487-69 (1975), "Classification of Soils for Engineering Purposes."

2. Commonwealth of Pennsylvania, Department of Environmental Resources, "Soil Erosion and Sedimentation Control Manual", March 1, 1982.

3. Commonwealth of Pennsylvania, Department of Transportation, Publication 408, 1983 Edition and Supplements (PennDOT Pub. 408).

4. U.S. Army Corps of Engineers, CW-02215, "Plastic Filter Cloth."

5. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), "Construction Industry Standards and Interpretations," Volume III, 1980, Subpart P - Excavations, Trenching, and Shoring.

3.03 MATERIAL REQUIREMENTS

3.03.1 Random Fill:

Random fill shall consist of onsite excavated soil and rock, with the maximum particle size not exceeding one-half the specified lift thickness. It shall not contain ash, organic matter, rubbish, ice, or frozen materials.

3.03.2 Structural Fill:

Structural fill shall be No. 2A Coarse Aggregate, Type A, in accordance with PennDOT Pub. 408, Section 703.2, except as modified herein. It shall consist of bank-run sand and gravel, crushed rock, screenings from crushed rock, crushed gravel, or combinations of these. It shall consist of hard, tough, durable, uncoated particles, free of organic matter, clay, or weak, flat, elongated, argillaceous, micaceous or decomposed material. The material shall conform to the following gradation:

Sieve Size U.S. Standard	Percent Passing By Dry Weight
2 in	100
3/4 in	52-100
3/8 in	36-70
No. 4	24-50
No. 16	10-30
No. 200	0-10

3.03.3 Sand Fill:

Sand fill shall be in accordance with PennDOT Pub. 408, Section 703.1, except as modified herein. It shall consist of hard, tough, durable, uncoated particles, free from clay, vegetation, or friable particles. The material shall conform to the following gradation:

Sieve Size U.S. Standard	Percent Passing By Dry Weight
3/8 in	100
No. 8	65-100
No. 30	20-65
No. 100	0-25
No. 200	0-10

3.03.4 Impervious Fill:

1. Impervious fill shall be CL or SC type material as per ASTM D 2487. The minimum liquid limit shall be 30 and the minimum plasticity index shall be 12 in accordance with ASTM D 423 and D 424. The minimum percent (by weight) passing the No. 200 sieve shall be 45% in accordance with ASTM D 1140. The maximum particle or clod size shall not exceed 3 inches.

It shall not contain ash, organic matter, rubbish, ice, or frozen materials.

2. Impervious fill shall be obtained from suitable excavated material or from the Stage II Stockpile located in the onsite ash disposal area approximately 2 miles away. The Stage II Stockpile contains miscellaneous unsuitable fills and suitable impervious fill. The unsuitable impervious fills shall be segregated from the suitable impervious fill.

3.03.5 Uniformly Graded Coarse Aggregate:

Uniformly graded coarse aggregate shall be of the size shown on the Drawings and in accordance with PennDOT Pub. 408, Section 703.2, Type A, except as modified herein. It shall consist of hard, tough, durable, uncoated particles, free of organic matter, clay or weak, flat, elongated, argillaceous, micaceous or decomposed material. It shall not be made of acid forming or toxic-forming rock or slag.

3.03.6 Rock Lining:

Rock lining shall be of the size shown on the Drawings and in accordance with PennDOT Pub. 408, Section 850.2(a), except as modified herein. It shall be angular and irregular in shape, without shale or weak seams, with neither width nor thickness less than one-third its length, and shall have a minimum specific gravity of 2.6 when tested in accordance with ASTM C 127. Each load of rock shall be well-graded from the smallest to largest size.

3.03.7 Bentonite:

Bentonite shall be free flowing, semi-granular, high swelling Wyoming type bentonite, specially processed as a high efficiency soil sealant for the containment of liquid waste. It shall be Volclay PLS-50 as manufactured by American Colloid Company of Stokie, Illinois or OWNER-approved equivalent.

3.03.8 Filter Fabric:

1. Filter Fabric "A" (beneath structural fill):

It shall be of nonwoven needle punched construction and consist of long-chain polymeric fibers composed of polypropylene, polyethylene, or polyamide that are formed whereby they retain their positions relative with each other. It shall be mildew, insect, and rodent resistant, and shall be inert to acidic water from coal mine drainage. It shall meet the physical property requirements listed below. Filter fabric "A" shall be Supac 8NB as manufactured by Philips Fibers Corp. of Greenville, South Carolina or approved equivalent.

2. Filter Fabric "B" (enveloping coarse aggregate):

It shall be of monofilament woven construction and consist of long-chain polymeric filaments or fibers composed of polypropylene, polyethylene, or polyamide. The fibers shall be oriented whereby they retain their relative position with each other and allow the passage of water. It shall be mildew, insect, and rodent resistant, and shall be inert to acidic water from coal mine drainage. It shall meet the physical property requirements listed below. Filter fabric "B" shall be Supac 6WM (uv) - uncalendered as manufactured by Philips Fibers Corp. of Greenville, South Carolina or approved equivalent.

	Property	Test Method	Minimum Criteria	
			Fabric A	Fabric B
1.	Tensile Strength (min in either principal direction), lb	ASTM D 1682, Method 16	330	225
2.	Burst Strength, psi	ASTM D 751, Diaphram Method	450	430
3.	Trapezoid Tear Strength, lb	ASTM D 1117, Method 14	120	75
4.	Pore Size, EOS	Corps of Engineers CW-02215	N/A	40-70
5.	Effective Open Area, %	Corps of Engineers CW-02215	N/A	>8
6.	Thickness, mils	ASTM D 1777	90	N/A

3.03.9 Bottom Ash:

Bottom ash shall be obtained from the onsite stockpile. It shall contain less than 10% (by weight) passing the No. 200 sieve as determined by ASTM D 1140.

3.03.10 Silt Fence:

Silt fence shall be Envirofence as manufactured by Mirafi, Inc. of Charlotte, North Carolina or approved equal.

3.04 LINES AND GRADES

1. The Drawings indicate reference base lines and bench marks which will be established in the field by the OWNER. The Work shall be located from these base lines and bench marks.

2. Established reference base lines and bench marks shall be protected. If they are moved or destroyed they shall be replaced at no expense to the OWNER.

3.05 SOIL EROSION AND SEDIMENTATION CONTROL

1. Soil erosion and sedimentation control shall be implemented prior to the start of any construction activities.

2. Earthmoving operations shall be conducted in such a manner as to minimize accelerated soil erosion, in accordance with the Pennsylvania Department of Environmental Resources, "Soil Erosion and Sedimentation Control Manual", as specified herein, and as shown on the Drawings.

3. Silt barriers shall be installed downstream of construction, borrow, and stockpile areas to confine sediment that may be washed from new fill or cut slopes.

4. Ditches and silt barriers shall be inspected daily. Ditch erosion or silt barrier damage shall be repaired immediately. Sediment accumulations shall be removed and placed in the topsoil stockpile.

5. Silt barriers shall be maintained until final protective vegetation has been established, or other ground cover materials have been placed.

3.06 CONTROL OF WATER

1. Ditches, berms, site grading, sumps, and pumping facilities shall be constructed or provided to direct, collect, and remove water from the working areas. Water shall be conducted to areas away from the work in a manner to prevent erosion, damage to adjacent structures or utilities, or other OWNER requirenents.

2. Water shall not be allowed to accumulate in the excavation or low areas of the site.

3. Groundwater and surface runoff shall be controlled to preclude disturbance of the foundation bearing materials and adjacent structures. Water levels shall be maintained at or below the bottom of the liner until placement of the rock lining is completed. This may be accomplished by temporary sumps or other approved methods.

3.07 CLEARING AND GRUBBING

1. Areas designated for excavation or fill shall be cleared and grubbed of objectionable material, rubbish, trees, stumps, brush, roots, down timber, and other vegetation or organic matter.

2. Materials removed in the clearing and grubbing operations shall be disposed of in the onsite ash disposal area.

3.08 STRIPPING AND STOCKPILING OF TOPSOIL

Cleared and grubbed areas shall be stripped of topsoil. The topsoil shall be stockpiled at the locations designated by the OWNER.

3.09 EXCAVATION

1. Excavation shall conform to the lines, grades, and outlines as shown on the Drawings. Excavation side slopes, bottoms of excavations, and ditches shall be shaped to a smooth and uniform surface free from bumps and hollows.

2. The final excavation lines shall be within 0.1 foot of grades as indicated on the Drawings, unless overexcavation is required.

3. Excavation operations shall be conducted so that material outside the excavation limits is not disturbed or loosened. Material disturbed or loosened shall be restored to at least its original condition. All excavation operations shall be conducted in accordance with OSHA Subpart P.

4. Excavation bottoms shall be approved by the OWNER prior to placement of backfill or structures.

5. To prevent damage to the subgrade from rainfall or other sources of water, the following shall be done:

   a. The final 2 feet of excavation shall not be performed until immediately prior to placement of the fill material.

   b. No final excavation shall be performed when rain is falling or when rain is threatening.

   c. Fill shall be placed on the subgrade as soon as subgrade preparation is finished and approved.

6. Material suitable for fill shall be stockpiled at the locations designated by the OWNER.

7. Material unsuitable for fill shall be disposed of in the onsite ash disposal area (approximately 2 miles away). Disposition must be coordinated with the OWNER.

3.10 SUBGRADE PREPARATION

1. Excavation bottoms and fill areas shall be proofrolled with at least four passes of a large (greater than 10 tons) smooth-wheeled roller or other approved heavy compaction equipment. Confined areas inaccessible to heavy compaction equipment shall be compacted with a minimum of four passes with the largest practicable plate-compactor or roller. Soft or organic areas detected during subgrade preparation shall be overexcavated and backfilled with compacted fill. The

fill shall be the same material that is to be subsequently placed on the prepared subgrade. If a structure is to be placed directly on the subgrade, then the removed material shall be replaced with compacted structural fill.

2. The subgrade shall be compacted to a minimum density equal to 90 percent of the maximum dry density as determined by the Modified Proctor Test (ASTM D 1557) for all areas to receive random, sand, or impervious fill, and to 95 percent of the maximum dry density as determined by the Modified Proctor Test (ASTM D 1557) for all areas to receive structural fill or on which a structure is to be placed.

3. At least 24 hours notice shall be given to the OWNER prior to performing subgrade preparation.

3.11 FILL PLACEMENT

3.11.1 General Requirements:

1. The surface of the fill shall be kept approximately horizontal (unless the Drawings show otherwise) during construction, but shall be provided with sufficient longitudinal and transverse slope to allow for runoff of surface water.

2. Hauling equipment shall not be permitted to follow a single track on the same layer, but shall be directed to spread out in order to provide uniform compaction.

3. Fill materials shall not be placed against or upon an existing grade steeper than two horizontal to one vertical, unless the Drawings show otherwise. At junctions between fill and existing grade the existing grade shall be cut back, if necessary, to expose compact stable material. Rolling shall extend over this junction to provide a compact, stable mass. Similar care shall be taken at junctions between adjacent fills.

4. Fill shall not be placed while rain is falling. Prior to resuming fill operations after rainstorms, all muddy material shall be bladed off the surface to a depth necessary to expose firm compacted material.

5. Fill shall not be placed on frozen ground, and frozen material shall not be used for fill.

6. At the end of the days operation and when rain is threatening, the fill shall be sloped to provide drainage and shall be compacted over the entire cross section and length with a smooth-wheeled roller to seal it against the entry of water.

7. When the top of the fill has dried out or become excessively wet, the surface on which additional fill or structure is to be placed shall be scarified to a minimum depth of 6 inches, brought to the specified moisture content, and recompacted to the specified density prior to the placement of additional fill or structure.

8. Fill which does not meet the requirements for moisture content at the time of compaction shall be dried or wetted to meet the specified requirements. If the fill material requires drying, this may be accomplished by reworking it under warm and dry atmospheric conditions. Water, if required, shall be added carefully by sprinkling and care shall be taken that no more than the amount needed is applied. Ponding or flooding shall not be permitted.

9. Only compaction equipment weighing less than 200 pounds shall be allowed within 3 feet of existing structures or retaining walls.

10. The final fill layer shall be placed within 0.1 foot of the grades as indicated on the Drawings.

11. Rock lining shall be placed in accordance with PennDOT Pub. 408, Section 850.3. It shall be carefully placed in a manner to prevent segregation and to prevent damage to adjacent structures, pipes, or the underlying fill and filter fabric.

12. Where the Drawings indicate that the rock lining is to be set in concrete, the concrete shall be Class B in accordance with Section VI of this Specification and shall be cured in accordance with Section VII of the Specification. The rock shall be thoroughly wet immediately before the concrete is applied. As soon as the concrete is deposited on the surface, it shall be thoroughly worked and racked into the joints to form a solid mass. The application of additional water to the concrete after it has been deposited will <u>not</u> be permitted.

13. The placing of fill shall cease in areas being tested or sampled.

14. Pipe penetrations through the clay liner shall be sealed with a minimum 4-inch thick layer of tamped bentonite around the circumference of the pipe. This layer shall extend through the entire thickness of the clay liner.

15. Concrete penetrations into or through the clay liner shall be sealed with a minimum 2-inch thick layer of tamped bentonite for the entire depth of the penetration.

3.11.2 Compaction Requirements:

1. Random Fill:

Random fill shall be compacted in maximum 12-inch lifts (loose) to a minimum density of 90 percent of the maximum dry density as determined by the Modified Proctor Test (ASTM D 1557) and Appendix A (if applicable). The moisture content at the time of compaction shall not vary from the optimum moisture content by more than three percentage points.

2. Structural Fill:

Structural fill shall be compacted in maximum 10-inch lifts (loose). The fill shall be compacted to a minimum density of 95 percent of the maximum dry density as determined by the Modified Proctor Test (ASTM D 1557) and Appendix A (if applicable). The moisture content at the time of compaction shall not vary from the optimum moisture by more than three percentage points.

3. Sand Fills:

Sand fills shall be compacted in maximum 12 inch lifts (loose) to a minimum density of 92 percent of the maximum dry density as determined by the Modified Proctor Test (ASTM D 1557). The moisture content at the time of compaction shall not vary from the optimum moisture content by more than three percentage points.

4. Impervious Fills:

Impervious fills shall be compacted in maximum 8-inch or 6-inch lifts (loose), as indicated on the Drawings, to a minimum density of 95 percent of the maximum dry density as determined by the Modified Proctor Test (ASTM D 1557). The moisture content at the time of compaction shall be between minus one and plus three percentage points of the optimum moisture content.

5. Uniformily Graded Coarse Aggregate and Bottom Ash:

Uniformily graded coarse aggregate and bottom ash shall be compacted in maximum 12-inch lifts with a minimum of two passes with a smooth-wheeled roller.

6. Impervious Fill Treated With Bentonite:

a. The bentonite shall be spread uniformly across the impervious fill, at the locations shown on the Drawings, using an agricultural seed or lime spreader or other approved equipment. Rotary-type spreaders will <u>not</u> be permitted.

b. Application rate shall be at least 2.25 percent (by dry weight) of the impervious fill. This corresponds to approximately 1.60 pounds per square foot for an 8-inch-thick lift and 1.20 pounds per square foot for a 6-inch-thick lift.

c. The bentonite shall be throughly mixed into the entire lift thickness. A minimum of two passes with an adjustable rototiller shall be used for the mixing operation.

d. The impervious fill treated with bentonite shall be compacted to the same density and using the same methods as specified in paragraphs 3.11.2 and 3.11.3 for impervious fill.

7. In confined areas requiring compaction equipment weighing less than 200 pounds, random, structural and sand fill shall be placed in maximum 6-inch lifts (loose) and impervious fill and impervious fill treated with bentonite shall be placed in maximum 4-inch lifts (loose).

3.11.3 Compaction Equipment Requirements:

1. Compaction equipment shall be of the type and size required to produce the specified compaction. Compaction equipment shall be compatible with the types of materials being placed.

2. Sheepsfoot or rubber-tired rollers shall be used to compact cohesive soils and smooth-wheel vibratory rollers shall be used to compact granular materials unless otherwise approved.

3.12 TRENCH EXCAVATION AND BACKFILL

1. Trench excavations for buried pipes and utilities shall be performed to the lines and grades shown on the Drawings.

2. No damage shall occur to any structures, pipes, or utilities.

3. Sheeting, bracing, and shoring shall be installed as required to safely maintain excavations and protect existing structures, utilities, and personnel as required by federal, state, and local laws and ordinances, including OSHA Subpart P.

4. Trenches for pipes or utilities shall be excavated through natural ground or as required within fills. For pipes or utilities to be installed within fills, the fill shall first be constructed to a minimum height of 4 feet above the required elevation of the top of the pipe or utility. The trench shall then be excavated into the fill, and the pipe or utility installed as required.

5. The minimum width of the trench shall be as shown on the Drawings and shall not be greater than that necessary to permit the work to proceed.

6. Soft or organic material encountered at the bottom of the trench shall be removed for the full width of the trench to the depths required by the OWNER and replaced with compacted sand fill.

7. Trench bottoms shall be accurately shaped so that the pipe or utilities will be in continuous and uniform contact with either undisturbed soil, sand fill material, or bedding material as shown on the Drawings.

8. If stones larger than 6 inch diameter are encountered in the bottom of the trench, they shall be removed and the void shall be backfilled with compacted sand fill.

9. When rock is encountered, it shall be removed to a minimum depth of 6 inches below the bottom of the pipe or utilities for the full width of the trench, and replaced with compacted sand fill.

10. Trenches shall not be backfilled until all joints are made, required tests performed, pipe encased as necessary, and OWNER approval is granted to proceed.

11. Bedding and backfill around the pipe shall be of the type and thickness indicated on the Drawings and compacted to the minimum density as specified in paragraph 3.11.

12. When the Drawings indicate that compacted random fill shall be placed around the pipe or utilities, the fill shall have a maximum particle size of 3 inches.

13. Backfill around pipes and utilities shall be placed so that the elevation of the fill is the same on both sides. Rammer type compactors shall be used with caution adjacent to pipes or utilities to avoid damage or movement.

14. After backfilling, the disturbed areas shall be fine graded to blend in with existing contours, left with puddle-free drainage, and seeded or otherwise protected as shown on the Drawings.

15. Trenches for underdrain pipes in impervious fill shall be performed in the following sequence:

    a. The excavation shall be performed after compaction of the impervious fill.

    b. After excavation of the trench, a minimum 1/2-inch thick layer of bentonite shall be spread along the bottom of the trench.

    c. The bottom of the trench shall be recompacted as specified in paragraph 3.11.2.

    d. Stone bedding and drain pipes shall be placed as shown on the Drawings.

3.13 PLACEMENT OF FILTER FABRICS

1. Filter fabrics shall be placed in accordance with PennDOT Pub, 408, Section 212, except as modified herein.

2. The subgrade on which the filter fabric is to be placed shall be smooth with no depressions or rock projections.

3. The direction of the filter fabric laying on slopes shall be up and down the slope (parallel with slope direction).

4. The adjacent sheets of filter fabric shall be overlapped a minimum of 1 foot.

5. Securing pins (steel, 18 inches long by 3/16 inch diameter, pointed at one end, and with a 1-1/2-inch washer head at the other end, or an OWNER-approved alternative) shall be placed at maximum2-foot intervals along all overlaps and at the top of the slope. If necessary to prevent movement of the filter fabric during backfilling operations or if requested by the OWNER, securing pins shall be placed on a maximum 6-foot grid on the rest of the filter fabric. Securing pins will not be required for slopes flatter than 4:1 (horizontal:vertical).

6. Backfill shall be performed in a manner which prevents damage to the filter fabric.

APPENDIX A

MODIFICATION TO MODIFIED PROCTOR TEST (ASTM D 1557)

For structural or random fills having more than 30 but less than 50 percent (by weight) of material greater than 3/4 inch, the maximum dry density of the fill shall be determined by the following formula:

$$W = \frac{ww'}{Ow' + Cw}$$

W = maximum dry density (lbs/ft^3)

w = density of the material coarser than 3/4 inch, given by its bulk specific gravity (determined by ASTM C 127) multiplied by 62.4 (lb/ft^3)

w' = maximum dry density for the material passing the 3/4-inch sieve as determined by the Modified Proctor Test, Method C (ASTM D 1557) (lb/ft^3)

O = fraction by dry weight of the material coarser than the 3/4-inch sieve

C = fraction by dry weight of the material finer than the 3/4-inch sieve

TABLE 1

DATA/MATERIAL REQUIREMENTS AND SUBMITTAL SCHEDULE

Paragraph Number	Submittal Requirements	Submittal Address	With Proposal	For Approval Date	For Approval Copies	For Record Date	For Record Copies
3.03.2	Structural Fill:						
	a. Source of material	A	No	B	5	N/A	N/A
	b. Material quality	A	No	B	5	N/A	N/A
	c. Grain-size analysis (ASTM D 422)	A	No	B	5	N/A	N/A
	d. 25-lb representative sample	C	No	B	5	N/A	N/A
3.03.3	Sand Fill:						
	a. Source of material	A	No	B	5	N/A	N/A
	b. Material quality	A	No	B	5	N/A	N/A
	c. Grain-size analysis (ASTM D 422)	A	No	B	5	N/A	N/A
	d. 7-lb representative sample	C	No	B	5	N/A	N/A
3.03.5	Uniformly Graded Coarse Aggregate:						
	a. Source of material	A	No	B	5	N/A	N/A
	b. Material quality	A	No	B	5	N/A	N/A
	c. Grain-size analysis (ASTM D 422)	A	No	B	5	N/A	N/A
3.03.6	Rock Lining:						
	a. Source of material	A	No	B	5	N/A	N/A
	b. Material quality	A	No	B	5	N/A	N/A
	c. Grain-size analysis (ASTM D 422)	A	No	B	5	N/A	N/A
3.03.7	Bentonite:						
	a. Source of material	A	No	B	5	N/A	N/A
	b. Material quality	A	No	B	5	N/A	N/A
	c. 1-lb representative sample	C	No	B	5	N/A	N/A

TABLE 1 (Cont'd)

DATA MATERIAL REQUIREMENTS AND SUBMITTAL SCHEDULE

Paragraph Number	Submittal Requirements	Submittal Address	With Proposal	For Approval Date	For Approval Copies	For Record Date	For Record Copies
3.03.8	Filter Fabric:						
	a. Source of material	A	No	B	5	N/A	N/A
	b. Manufacturer's list of physical properties	A	No	B	5	N/A	N/A
3.11.2-6	Spreader for Bentonite:						
	Manufacturer's data	A	No	B	5	N/A	N/A
3.11.2-6	Rototiller:						
	Manufacturer's data	A	No	B	5	N/A	N/A
3.11.3	Compaction Equipment:						
	a. Manufacturers' data	A	No	B	5	N/A	N/A
	b. Intended use for each piece of equipment	A	No	B	5	N/A	N/A

A = Pennsylvania Electric Company
1001 Broad Street
Johnstown, Pennsylvania 15907
Attn: T.J. Simunich

B = One month prior to beginning the Work

C = Soils Testing firm as directed by the OWNER

APPENDIX B

SUBSURFACE DATA

The following Data is attached for information only:

1. Test pit logs (TP1 to TP5) excavated on January 25, 1984 in Stage I and II Storage Piles.

2. Laboratory test data from test pits (TP1 to TP5).

3 Test boring logs (42, 43, 48, 49, 50, 54, and 55) drilled December 1965 and March 1966.

4. Drawing D-746-010, Subsurface Exploration - Test Boring Location Plan.

It is required that the users of this subsurface data understand that the information on the logs apply to the conditions encountered on the date, at the location, and to the depth to which the borings and test pits were made.

GILBERT ASSOCIATES, INC.
TEST PIT LOG

PROJECT CONEMAUGH STATION
CLIENT PENELEC
CONTRACTOR R & L DEV. CO.
CLASSIFIED BY D.R.ERALI
EQUIPMENT FORD 4500 BACKHOE

COORDINATES

SHEET 1 OF 1
LOG. NO. TP1
ELEVATION
DATE 1-25-84
W.O. NO. 04-4479-158

DEPTH (FT)	SOIL OR ROCK DESCRIPTION (INCLUDING REMARKS)
	SANDY AND SILTY CLAY, MODERATELY PLASTIC, SOME GRAVEL, OCCASIONAL ROOTS AND COBBLES, BROWN, (CL)
5	
7.5	BOTTOM OF PIT AT 7.5 FT
10	NOTE : 1. LOCATION OF PIT IS NORTHEAST CORNER OF STAGE 2 STORAGE PILE. 2. TOP 2 FT IS FROZEN. 3. BAG SAMPLE OBTAINED.
15	
20	

GILBERT ASSOCIATES, INC.
TEST PIT LOG

PROJECT CONEMAUGH STATION
CLIENT PENELEC
CONTRACTOR R & L DEV. CO.
CLASSIFIED BY D.R.ERALI
EQUIPMENT FORD 4500 BACKHOE

COORDINATES

SHEET 1 OF 1
LOG. NO. TP2
ELEVATION
DATE 1-25-84
W.O. NO. 04-4479-158

DEPTH (FT)	SOIL OR ROCK DESCRIPTION (INCLUDING REMARKS)
	SANDY AND SILTY CLAY, MODERATELY PLASTIC, SOME GRAVEL, BROWN, (CL)
5	
8	BOTTOM OF PIT AT 8 FT
10	
	NOTE : 1. LOCATION OF PIT IS SOUTHWEST CORNER OF STAGE 2 STORAGE PILE.
	2. TOP 2 FT IS FROZEN.
15	3. BAG SAMPLE OBTAINED.
20	

GILBERT ASSOCIATES, INC.
TEST PIT LOG

PROJECT CONEMAUGH STATION
CLIENT PENELEC
CONTRACTOR R & L DEV. CO.
CLASSIFIED BY D.R.ERALI
EQUIPMENT FORD 4500 BACKHOE

COORDINATES

SHEET 1 OF 1
LOG. NO. TP3
ELEVATION
DATE 1-25-84
W.O. NO. 04-4479-158

DEPTH (FT)	SOIL OR ROCK DESCRIPTION (INCLUDING REMARKS)
	SANDY AND SILTY CLAY, MODERATELY PLASTIC, SOME GRAVEL, BROWN (CL)
5	
7	BOTTOM OF PIT AT 7 FT
10	NOTE : 1. LOCATION OF PIT IS CENTER OF STAGE 2 STORAGE PILE.
	2. TOP 2 FT IS FROZEN.
	3. NO SAMPLE OBTAINED.
15	
20	

GILBERT ASSOCIATES, INC.
TEST PIT LOG

PROJECT CONEMAUGH STATION
CLIENT PENELEC
CONTRACTOR R & L DEV. CO.
CLASSIFIED BY D.R.ERALI
EQUIPMENT FORD 4500 BACKHOE

COORDINATES

SHEET 1 OF 1
LOG. NO. TP4
ELEVATION
DATE 1-25-84
W.O. NO. 04-4479-158

DEPTH (FT)	SOIL OR ROCK DESCRIPTION (INCLUDING REMARKS)
	SANDY AND SILTY CLAY, MODERATELY PLASTIC, SOME GRAVEL, OCCASIONAL COBBLES AND ROOTS, BROWN, (CL)
5	
7	BOTTOM OF PIT AT 7 FT
10	NOTE : 1. LOCATION OF PIT IS NORTH SIDE OF STAGE 1 STORAGE PILE.
	2. TOP 2 FT IS FROZEN.
	3. BAG SAMPLE OBTAINED.
15	
20	

GILBERT ASSOCIATES, INC.
TEST PIT LOG

PROJECT CONEMAUGH STATION
CLIENT PENELEC
CONTRACTOR R & L DEV. CO.
CLASSIFIED BY D.R.ERALI
EQUIPMENT FORD 4500 BACKHOE

COORDINATES

SHEET 1 OF 1
LOG. NO. TP5
ELEVATION
DATE 1-25-84
W.O. NO. 04-4479-158

DEPTH (FT)	SOIL OR ROCK DESCRIPTION (INCLUDING REMARKS)
	SANDY AND SILTY CLAY, MODERATELY PLASTIC, SOME GRAVEL, OCCASIONAL COBBLES AND ROOTS, BROWN, (CL)
5	
7	BOTTOM OF PIT AT 7 FT
10	
	NOTE : 1. LOCATION OF PIT IS CENTER OF STAGE 1 STORAGE PILE.
	2. TOP 2 FT IS FROZEN.
	3. NO SAMPLE OBTAINED.
15	
20	

TABLE 1
LABORATORY TEST RESULTS (6)

Test Pit No.	Atterberg Limits	Natural Moisture Content (%)	Maximum Density and Optimum Moisture Content (PCF and %) (1)	Permeability Sample Percent Compaction and Percent Over Optimum Moisture	Permeability (cm/sec) (2)
TP-1	LL = 39.4; PI = 16.0	20.4	110.8 @ 18.6	95.1 @ 3.3	1.1×10^{-7}
TP-2	LL = 49.7; PI = 19.7	22.8	112.6 @ 18.8	94.7 @ 1.6	2.3×10^{-7}
TP-4	LL = 35.6; PI = 12.1	21.4	114.5 @ 16.9	95.4 @ 2.4	Impervious (3)
TP-2 - 1% (4)	(5)	(5)	(5)	95.8 @ 1.3	2.0×10^{-7}
TP-4 - 2% (4)	(5)	(5)	(5)	95.3 @ 2.5	8.0×10^{-9}

NOTES:

(1) Determined by ASTM D-1557 (Modified Proctor).

(2) Falling head test conducted in Brainard-Kilman Triaxial Cell with backpressure of 80 - 110 psi and confining pressure of 3 psi.

(3) Sample could not be saturated after 8 days in cell with backpressure up to 110 psi; thus, essentially impervious.

(4) Samples treated with 1% and 2% (by dry weight) of PLS-50 bentonite.

(5) These tests not rerun for treated samples.

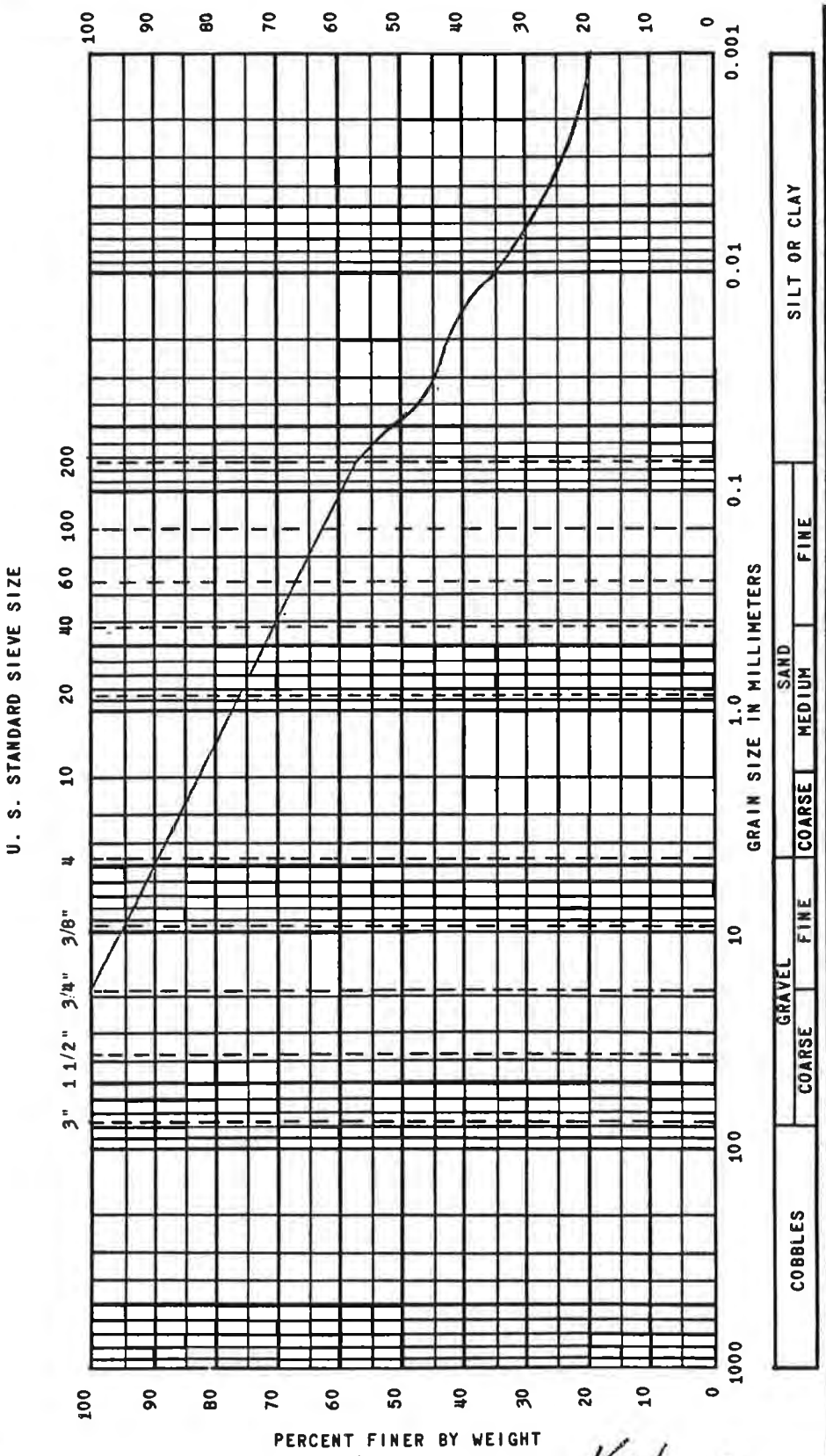
(6) See following pages for gradation analyses.

GRADATION CURVE

DATE 1-31-84

CLIENT PENELEC PROJECT CONEMAUGH STA

JOB NUMBER 04-4479-158 BORING NUMBER TP-1 SAMPLE NUMBER BAG



BORING	DEPTH	CLASSIFICATION	NAT. WC	LL	PL	PI
TP-1		SC SANDY CLAY w/LITTLE GRAVEL	19.7	39	23	16

TECHNICIAN [illegible] COMPUTED BY [illegible] CHECKED BY [illegible]

REMARKS

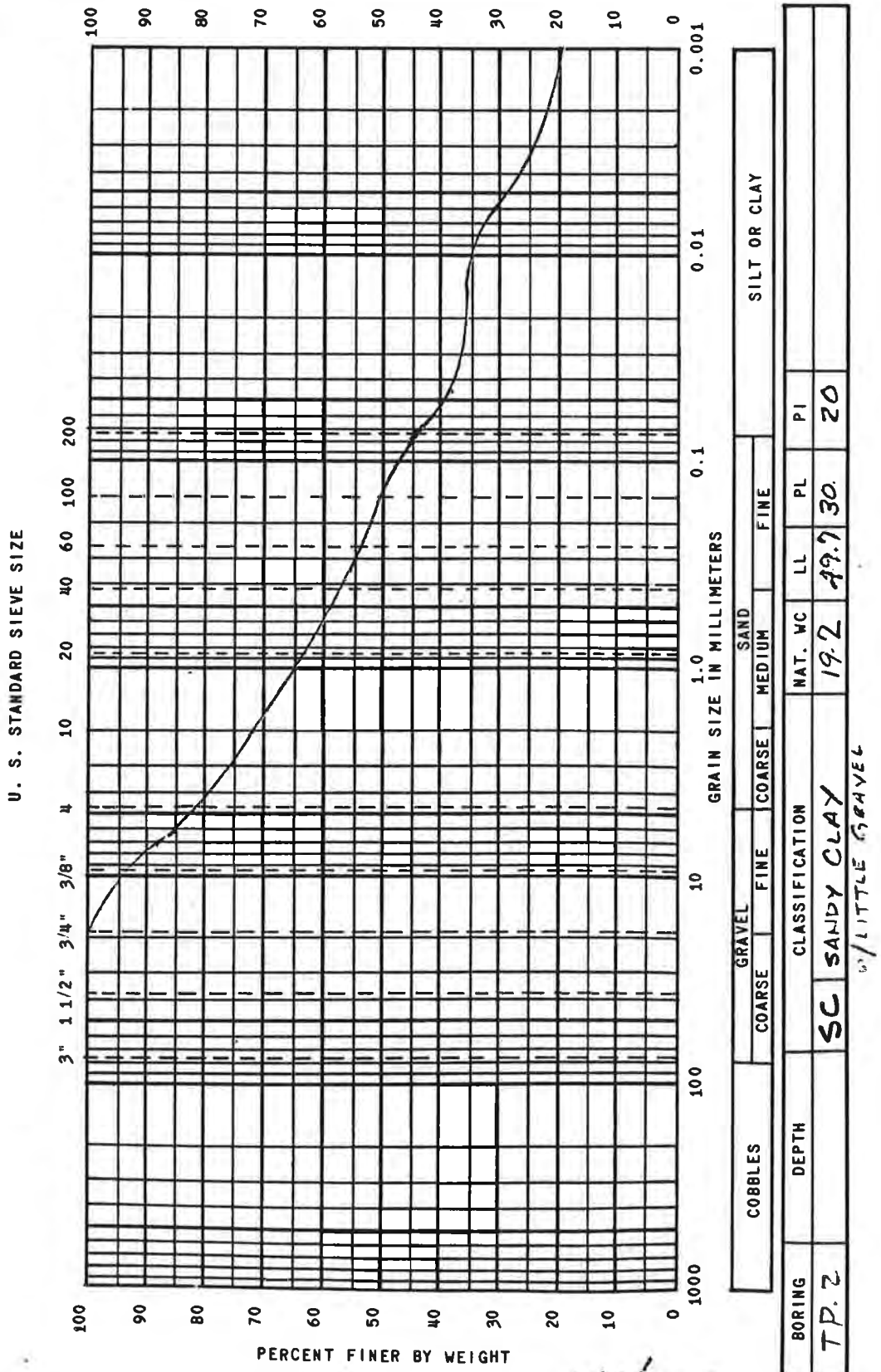
Gilbert/Commonwealth
ENGINEERS/CONSULTANTS Reading PA/Jackson MI

GRADATION CURVE

DATE 1-31-84

CLIENT PENELEC PROJECT CONEMAUGH STA

JOB NUMBER 04-4479-158 BORING NUMBER TP-2 SAMPLE NUMBER BAG



TECHNICIAN [illegible] COMPUTED BY [illegible] CHECKED BY KCline

REMARKS

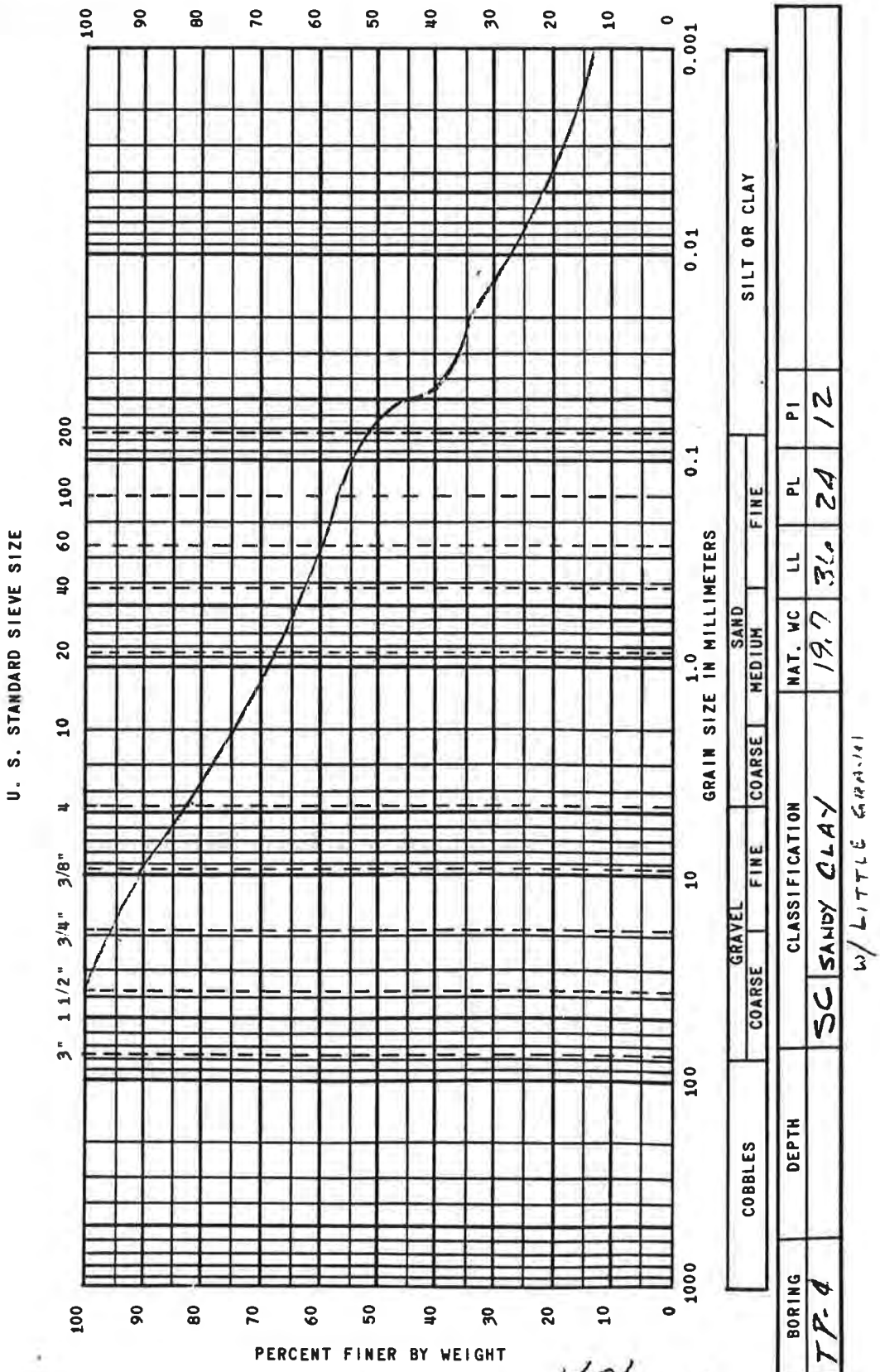
Gilbert/Commonwealth
ENGINEERS/CONSULTANTS Reading,PA/Jackson MI

SOILS 5 (8-78)

GRADATION CURVE

CLIENT PENELEC PROJECT CONEMAUGH STA DATE 1-30-84

JOB NUMBER 04-4479-158 BORING NUMBER TP-4 SAMPLE NUMBER BAG



TECHNICIAN [illegible] COMPUTED BY [illegible] CHECKED BY K Chmel

REMARKS

SOILS 5 (8-78)

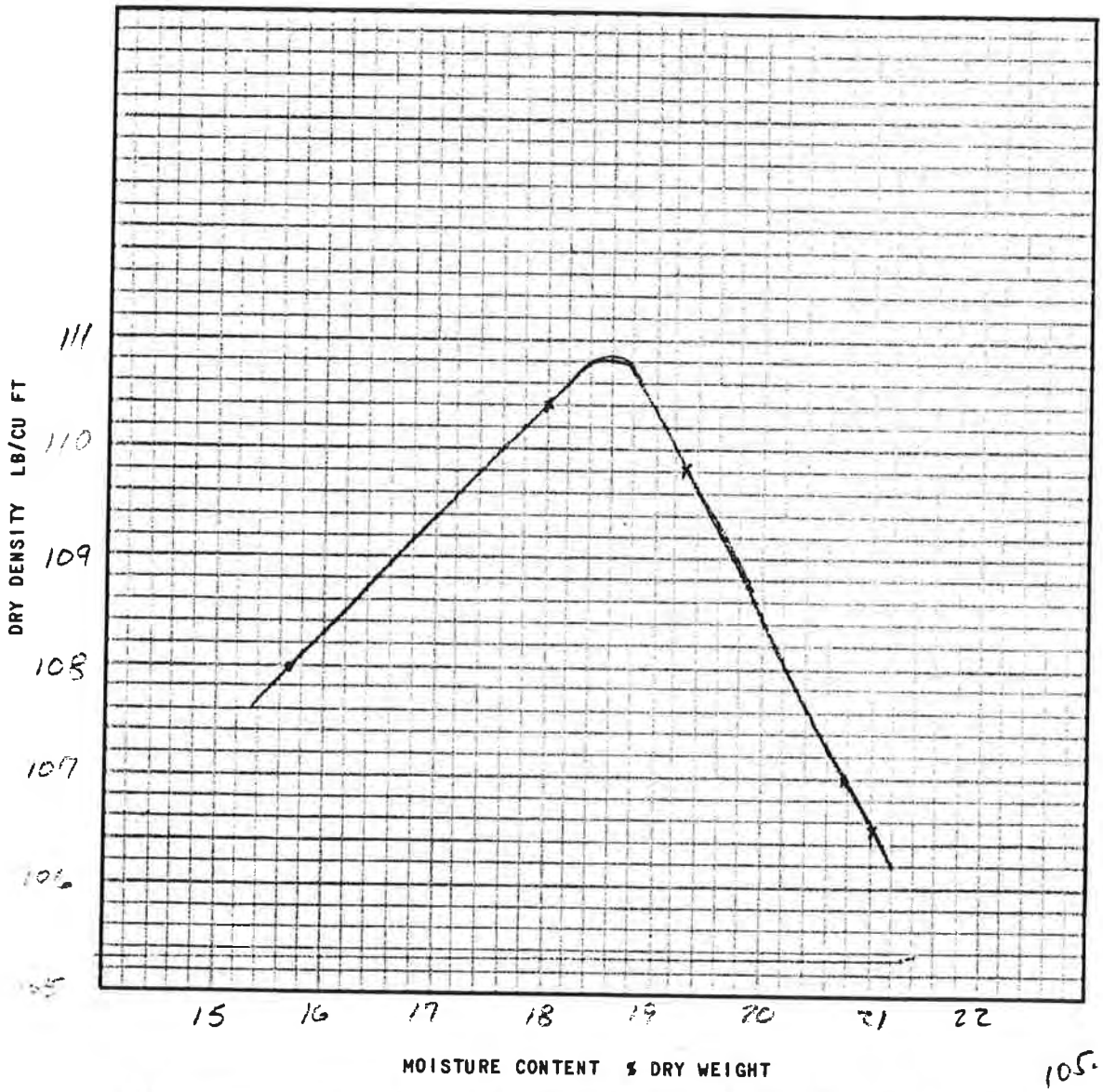
Gilbert/Commonwealth
ENGINEERS/CONSULTANTS Reading,PA/Jackson,MI

MOISTURE - DENSITY RELATIONS CURVE

DATE 2-1-84

CLIENT _____ PROJECT CONEMAUGH STA

JOB NUMBER _____ BORING NUMBER TP-1 SAMPLE NUMBER BAG



105.8 pcf

21%

SAMPLE NUMBER	TP-1					
NATURAL MOISTURE CONTENT %	19.7					
OPTIMUM MOISTURE CONTENT %	18.6					
MAXIMUM DRY DENSITY LB/CU FT	110.8					

COMPACTION METHOD _____ CYLINDER - CU FT 1/30

RAMMER - LBS 10 DROP - INCHES 18 LAYERS 5 BLOWS PER LAYER 25

TECHNICIAN Beanjr COMPUTED BY Beanjr CHECKED BY KCheap

REMARKS _____

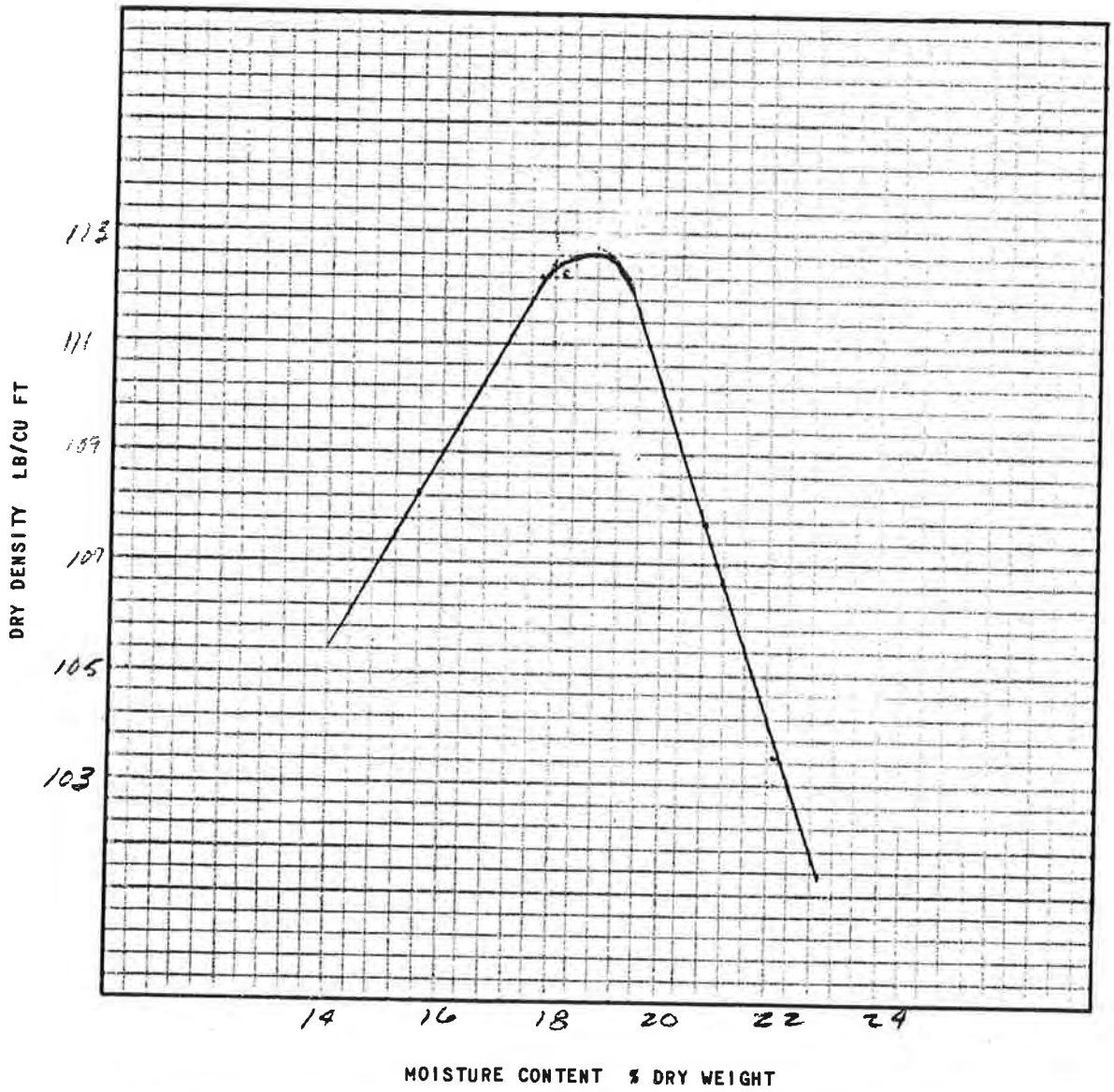
Gilbert/Commonwealth
ENGINEERS/CONSULTANTS Reading,PA/Jackson,MI

SOILS 1 (8-78)

MOISTURE - DENSITY RELATIONS CURVE

CLIENT Gilbert PROJECT CONEMAUGH STA- DATE 2-2-83

JOB NUMBER _____ BORING NUMBER TP-2 SAMPLE NUMBER _____



SAMPLE NUMBER	TP-2					
NATURAL MOISTURE CONTENT %	17.4					
OPTIMUM MOISTURE CONTENT %	18.8					
MAXIMUM DRY DENSITY LB/CU FT	112.6					

COMPACTION METHOD ASTM 1557 CYLINDER - CU FT 1/30

RAMMER - LBS 10 DROP - INCHES 18 LAYERS 5 BLOWS PER LAYER 25

TECHNICIAN Bauman COMPUTED BY Bauman CHECKED BY K Chung

REMARKS _____

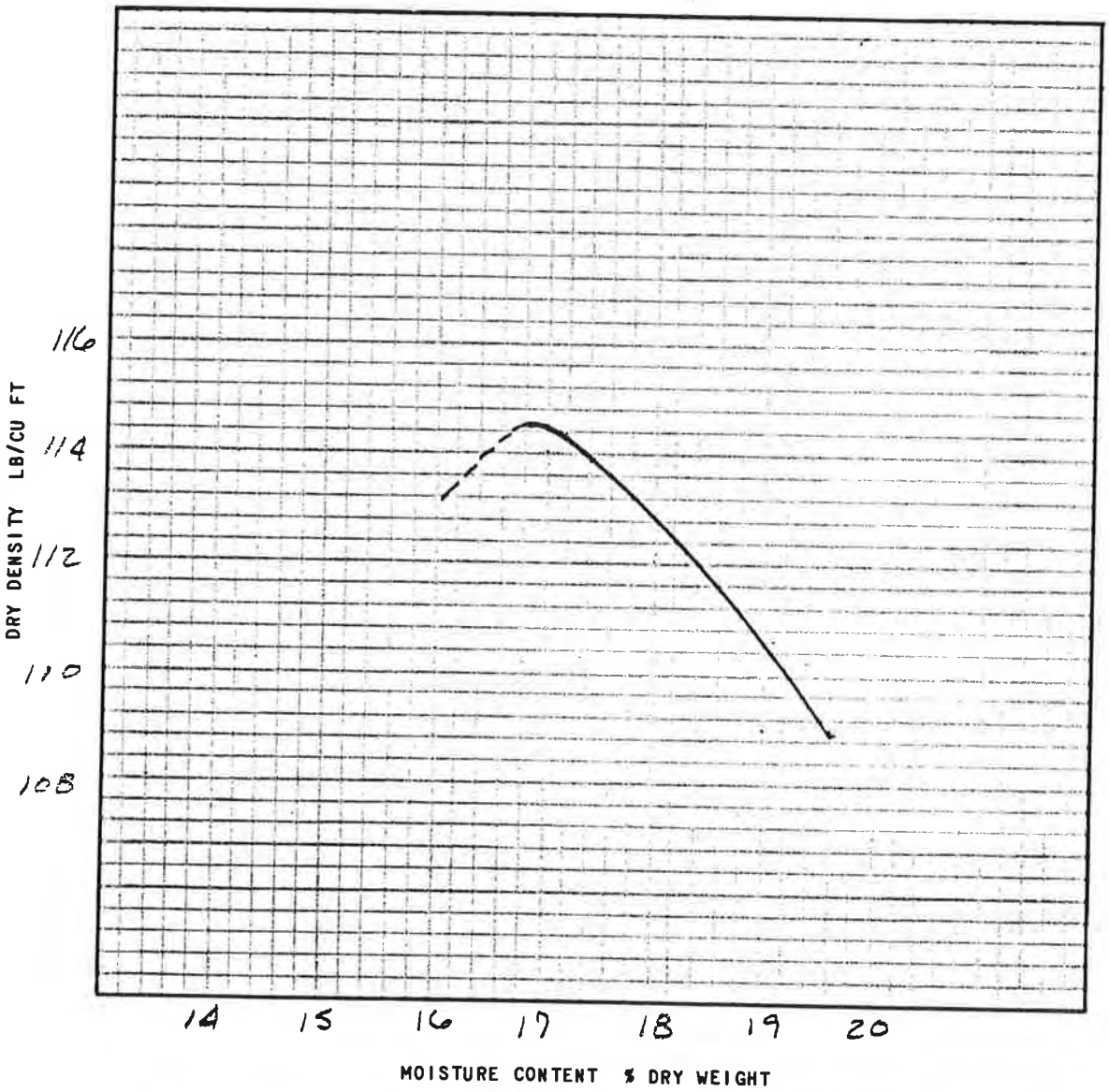
Gilbert/Commonwealth
ENGINEERS/CONSULTANTS Reading, PA/Jackson, MI

SOILS 1 (8-78)

MOISTURE - DENSITY RELATIONS CURVE

CLIENT Gilbert PROJECT CONEMAUGH Sta DATE 2-9-84

JOB NUMBER _____ BORING NUMBER TP-4 SAMPLE NUMBER _____



SAMPLE NUMBER						
NATURAL MOISTURE CONTENT %						
OPTIMUM MOISTURE CONTENT %	16.9					
MAXIMUM DRY DENSITY LB/CU FT	114.5					

COMPACTION METHOD ASTM - 1557 CYLINDER - CU FT 1/30

RAMMER - LBS 10 DROP - INCHES 18 LAYERS 5 BLOWS PER LAYER 25

TECHNICIAN Beaver COMPUTED BY Beaver CHECKED BY K Chung

REMARKS _____

Gilbert/Commonwealth
ENGINEERS/CONSULTANTS Reading,PA/Jackson,MI

SOILS 1 (8-78)

TINNEY DRILLING COMPANY
DIAMOND CORE DRILLING
339 FAWCETT CHURCH ROAD BRIDGEVILLE, PA. 15017

TEST BORING RECORD

Hole No. 42 Sheet 1 of 1

Sta. No.

Driller J. Bell, Sr.
Helper J. Eger
Surface Elevation 1083.76
Water Depth 13.0' 24 hrs. 14.5
Hammer Wt. Sa. 140 lbs. Drop 30 in.
Hammer Wt. Ca. 300 lbs. Drop 30 in.
Casing Size 4 in. Sam. Size 2 in.

For Gilbert Associates
Conemaugh Project
Location Huff, Pa.
12/3/65 Completed 12/6/65

ELEVATION	DEPTH	Hammer Blows Sample	Hammer Blows Casing	LOG OF HOLE	Condition	Depth Drilled	Ft. Tnts. Rec'v'd
1083.06				0 to 0.7' Br. clay, top soil	Moist		
				0.7' to 9.0' Br. silty clay, sand and gravel with rock frags.	"		
	3.5	9					
	5.0	17-30					
					"		
1074.76	8.5	6					
	10.0	9-11		9.0' to 13.5' Br. silty clay, little sand and rock frag.	"		
1070.26	13.5	12		Note: Hit water at 14.0'			
1068.26	15.0	12-17		13.5' to 15.5' Br. sand, little clay, with small gravels.	Wet		
				15.5' to 25.0' Br. sand and gravels, with rock frag. and small boulders.	Moist		
	18.5	37					
	20.0	75-89					
	23.5	73					
	24.5	115					
1058.76	25.0	71/0.5 spoon refusal, sandstone boulder					
		DRILLED		25.0' to 33.5' Gray shale	Soft to Medium		
	29.0					4.0	3.6
1050.26	34.0				"	5.0	4.9
				33.5' to 39.0' Gray sandy shale, partly broken	Hard		
1044.76	39.0				"	5.0	5.0
				BOTTOM OF HOLE			

TINNEY DRILLING COMPANY
DIAMOND CORE DRILLING
339 FAWCETT CHURCH ROAD BRIDGEVILLE, PA. 15017

TEST BORING RECORD

Hole No. 43 Sheet 1 of 1

Sta. No.

Driller J. Bell, Sr.
Helper J. Eger
Surface Elevation 1084.98
Water Depth 17.0 24 hrs. 18.5
Hammer Wt. Sa. 140 lbs. Drop 30 in.
Hammer Wt. Ca. 300 lbs. Drop 30 in.
Casing Size 4 in. Sam. Size 2 in.

For Gilbert Associates
Conemaugh Project
Location Huff, Pa.
12/1/65 Completed 12/2/65

ELEVATION	DEPTH	Hammer Blows Sample	Hammer Blows Casing	LOG OF HOLE	Condition	Depth Drilled	Ft. Tnts. Rec'v'
1084.38	1.5	2-2 3-4		0 to 0.6' Dark br. silty clay	Moist		
	3.0	6-7		0.6' to 7.0' Br. and gray silty clay, a few rock frags.	"		
	4.5	7-9 23-31					
	6.0	27-25			"		
1077.98	7.5	5-10 12-14		7.0' to 12.0' Br. silty clay with rock frags.	"		
	9.0	16-17					
	10.5	11-15 18-13					
1072.98	12.0	21-25		Note: Hit water at 12.0'.	"		
	13.5	23-24 27-15		12.0' to 16.5' Br. silty clay, with rock frags.	Wet Moist		
	15.0	15-13					
1068.48	16.5	19-15 14-31			"		
	18.0	25-18		16.5' to 23.5' Br. sand and gravels, little clay and rock frag., and small boulders	Moist		
	19.5	15-25 22-14					
	21.0	19-27					
	22.5	17-29 107-23					
1061.48 1060.98	24.0	51-67		23.5' to 24.0' Gray weathered shale	Soft		
		DRILLED		24.0' to 32.0' Gray shale, broken	Medium to Soft		
	29.0				"	5.0	4.9
1052.98	32.0			32.0' to 35.0' Gray shale, broken	" Med.Hard	3.0	2.8
1049.98				35.0' to 40.0' Gray sandy shale	Hard		
	37.0					5.0	4.8
1044.98	40.0				"	3.0	3.0
				BOTTOM OF HOLE			
				Note: Put 40.0' of plastic pipe in hole.			

TINNEY DRILLING COMPANY
DIAMOND CORE DRILLING
339 FAWCETT CHURCH ROAD BRIDGEVILLE, PA. 15017

TEST BORING RECORD

Hole No. 48 Sheet 1 of 1

Driller J. Schiffbauer
Helper D. Spiker
Surface Elevation 1080.48
Water Depth 4.0 24 hrs. 4.0
Hammer Wt. Sa. 140 lbs. Drop 30 in.
Hammer Wt. Ca. 300 lbs. Drop 30 in.
Casing Size 4 in. Sam. Size 2 in.

Sta. No.
For Gilbert Associates
Conemaugh Project
Location Huff, Pa.
3/11/66 Completed 3/14/66

ELEVATION	DEPTH	Hammer Blows Sample	Hammer Blows Casing	LOG OF HOLE	Condition	Depth Drilled	Ft. Tnts Rec'v
1079.48		1-3	5	0 to 1.0' Top soil	Moist		
1078.48	1.5	5-12	7	1.0' to 2.0' Br. sandy silt	"		
	3.0	13-18	12	2.0' to 4.5' Br. sandy silt with rock frags.	"		
1075.98	4.5	25-28	29				
		30-68	47				
	6.0	69-72	59	4.5' to 9.0' Br. sandy silt with sandstone cobbles	"		
		69-73	120				
	7.5	82-13	142		"		
1071.48	9.0	25-36	156				
1069.98	10.5	20-10	165	9.0' to 10.5' Br. sandy silt with some gravel	"		
		24-18	172				
	12.0	17-18	100	10.5' to 18.0' Br. sandy silt with some sandstone	"		
	13.5	10-11	79	Note: Hit water at 13.5'			
		11-14	63				
	15.0	17-21	52		"		
	16.5	23-36	57				
		41-31	132				
1062.48	18.0	45-72	192	Hit gray shale at 18.0'	"		
		DRILLED		18/0' to 22.0' Gray shale with soft seams	Soft to Hard		
1058.48	22.0				"	4.0	1.7
				22.0' to 27.0' Gray shale, badly broken	Hard		
1053.48	27.0				"	5.0	5.0
1052.48				27.0' to 28.0' Gray shale	Soft		
				28.0' to 32.0' Gray shale, broken	Hard		
1048.48	32.0				"	5.0	5.0
				BOTTOM OF HOLE			

TINNEY DRILLING COMPANY
DIAMOND CORE DRILLING
339 FAWCETT CHURCH ROAD BRIDGEVILLE, PA. 15017

TEST BORING RECORD

Hole No. 49 Sheet 1 of 1

Driller J. Schiffbauer
Helper D. Spiker
Surface Elevation 1080.79
Water Depth 10.0 24 hrs. 2.0
Hammer Wt. Sa. 140 lbs. Drop 30 in.
Hammer Wt. Ca. 300 lbs. Drop 30 in.
Casing Size 4 in. Sam. Size 2 in.

Sta. No.
For Gilbert Associates
Conemaugh Project
Location Huff, Pa.
3/14/66 Completed 3/15/66

ELEVATION	DEPTH	Hammer Blows Sample	Hammer Blows Casing	LOG OF HOLE	Condition	Depth Drilled	Ft. Tnts Rec'v
1079.79			5	0 to 1.0' Top soil	Moist		
			15	1.0' to 21.4' Br. sandy silt with sandstone cobbles			
			20				
	3.5	7	22	Note: Hit water at 2.0'	"		
	5.0	12-17	37				
			42				
			47				
	8.5	15	53		"		
			69				
	10.0	25-46	72				
			100				
			125				
	13.5	32	142		"		
			233				
	15.0	49-52	245				
			266		"		
			273				
	18.5	47	300				
			233				
	20.0	56-71	220		"		
1059.39	21.4		210		"		
1058.79	22.0	DRILLED	190	21.4' to 22.0' Gray sandstone	Hard	0.6	0.6
		DRILLED		22.0' to 32.0' Gray shale	Soft		
	27.0				"	5.0	3.2
1048.79	32.0				"	5.0	4.0
				32.0' to 37.0' Gray sandstone with some small clay seams.	Hard		
1043.79	37.0				"	5.0	4.6
				BOTTOM OF HOLE			

TINNEY DRILLING COMPANY
DIAMOND CORE DRILLING
339 FAWCETT CHURCH ROAD BRIDGEVILLE, PA. 15017

TEST BORING RECORD

Hole No. 50 Sheet 1 of 1

Driller J. Schiffbauer
Helper D. Spiker
Surface Elevation 1082.40
Water Depth 10.0 24 hrs. 10.0
Hammer Wt. Sa. 140 lbs. Drop 30 in.
Hammer Wt. Ca. 300 lbs. Drop 30 in.
Casing Size 4 in. Sam. Size 2 in.

Sta. No.
For Gilbert Associates
Conemaugh Project
Location Huff, Pa.
2/22/66 Completed 2/23/66

ELEVATION	DEPTH	Hammer Blows Sample	Hammer Blows Casing	LOG OF HOLE	Condition	Depth Drilled	Ft. Tnts. Rec'v'd
1080.90	1.5	2-3 4-5	9 4	0 to 1.5' Top soil	Moist		
1079.40	3.0	5-10	15	1.5' to 3.0' Brown silt	"		
	4.5	15-27 31-27	27 47	3.0' to 6.0' Br. sandy silt with rock frags.	"		
1076.40	6.0	33-40	65				
	7.5	20-30 42-25	69 73	6.0' to 9.0' Br. sand silt with sandstone cobbles.	"		
1073.40	9.0	20-26	57	1073.4			
	10.5	15-20 22-12	63 67	9.0' to 11.5' Br. silty sand with sandstone cobbles. Note: Hit water at 10.5'.	"		
1070.90	12.0	18-20	72				
	13.5	40-22 18-40	79 45	11.5' to 18.0' Br. sandy silt with sandstone cobbles.	"		
	15.0	47-52	57				
	16.5	47-43 37-24	66 105				
1064.40	18.0	32-37	175	1064.4			
		DRILLED		18.0' to 22.5' Gray and brown sandstone with soft seams.	Hard to Soft	4.0	1.9
1059.90	22.0						
				22.5' to 29.0' Soft gray clay shale	Soft		
	27.0				"	5.0	2.3
1053.40							
				29.0' to 35.0' Gray shale, Broken.	Med.Hard to Hard	5.0	5.0
	32.0						
1047.40	35.0				"	3.0	2.7
				BOTTOM OF HOLE			

TINNEY DRILLING COMPANY
DIAMOND CORE DRILLING
339 FAWCETT CHURCH ROAD BRIDGEVILLE, PA. 15017

TEST BORING RECORD

Hole No. 54 Sheet 1 of 1

Driller J. Schiffbauer
Helper D. Spiker
Surface Elevation 1074.56
Water Depth 4.0 24 hrs. 4.0
Hammer Wt. Sa. 140 lbs. Drop 30 in.
Hammer Wt. Ca. 300 lbs. Drop 30 in.
Casing Size 4 in. Sam. Size 2 in.

Sta. No.
For Gilbert Associates
Conemaugh Project
Location Huff, Pa.
3/3/66 Completed 3/4/66

ELEVATION	DEPTH	Hammer Blows Sample	Hammer Blows Casing	LOG OF HOLE	Condition	Depth Drilled	Ft. Tnts Rec'v
1073.56			5	0 to 1.0' Top soil	Moist		-
			7	1.0' to 3.0' Br. sandy silt	"		-
1071.56			12				-
	3.5	7	25	3.0' to 23.5' Br. sandy silt with sandstone cobble	"		-
	5.0	12-17	37				-
			74		"		—
			83				-
			89		"		-
	8.5	21	94	Note: Hit water at 8.5'.	Wet		-
	10.0	33-37	127				-
			159				—
			177		"		-
			198				-
	13.5	39	207				-
	15.0	45-52	225				-
			233				—
			200				-
			179		"		-
	18.5	37	192				-
	20.0	61-67	203				-
			233				—
			245		"		-
			267				-
1051.06	23.5		207		"		-
		DRILLED		23.5' to 27.0' Gray shale, badly broken.	Hard		-
							—
1047.56	27.0				"	3.5	3.5
				27.0' to 32.0' Gray samdy shale with some clay seams.	Soft to Hard		-
							—
1042.56	32.0				"	5.0	4.2
				32.0' to 37.0' Gray sandy shale, with a few clay seams.	"		-
							—
1037.56	37.0				"	5.0	4.8
				BOTTOM OF HOLE			-

TINNEY DRILLING COMPANY
DIAMOND CORE DRILLING
339 FAWCETT CHURCH ROAD BRIDGEVILLE, PA. 15017

TEST BORING RECORD

Driller J. Schiffbauer
Helper D. Spiker
Surface Elevation 1074.77
Water Depth 4.0 24 hrs Top of hole
Hammer Wt. Sa. 140 lbs. Drop 30 in.
Hammer Wt. Ca. 300 lbs. Drop 30 in.
Casing Size 4 in. Sam. Size 2 in.

Hole No. 55 Sheet 1 of 1
Sta. No.
For Gilbert Associates
Conemaugh Project
Location Huff, Pa.
3/2/66 Completed 3/2/66

ELEVATION	DEPTH	Hammer Blows Sample	Hammer Blows Casing	LOG OF HOLE	Condition	Depth Drilled	Ft. Tnts Rec'd
1074.27	1.5	1-3	5	0 to 0.5' Top soil	Moist		
1071.77	3.0	5-2	7	0.5' to 3.0' Br. sand silt	"		
	4.5	5-7	15	3.0' to 6.0' Br. sandy silt with sandstone cobbles	"		
1068.77	6.0	10-17	24				
	7.5	21-19	27	6.0' to 11.5' Br. silty sand	Wet		
	9.0	25-32	39	Note: Hit water at 6.0'.	"		
	10.5	21-35	45				
1063.27	12.0	37-7	59		"		
1071.77	13.5	9-11	72	11.5' to 13.0' Br. sandy silt	Moist		
	15.0	8-11	79	13.0' to 16.0' Br. sandy silt with sandstone cobbles.	"		
1058.77	16.5	13-9	84				
1056.27	18.0	14-19	89	16.0' to 18.5' Gray silt	"		
.77	19.0	17-29	79	18.5' to 19.0' Gray clay shale	Soft		
		37-12	65	19.0' to 22.0' Gray clay shale	"		
		14-17	72				
		13-17	92				
		19-13	100				
		17-19	142				
		59-75	175				
		DRILLED					
1052.77	22.0			22.0' to 32.0' Gray shale badly broken, with many clay seams.	" Soft to Med.Hard	3.0	3.0
	27.0				" "	5.0	2.5
1042.77	32.0			32.0' to 37.0' Gray shale with some streaks of gray sandstone.	" " Hard	5.0	2.7
1037.77	37.0				"	5.0	5.0
				BOTTOM OF HOLE			

ATTACHMENT 6C

Testing and Inspection Specification GDE-CON-983 –
Soils, Concrete, and Grout Testing and Inspection, April 1985

Note: This document presents specifications for the testing program that was implemented during the installation of the engineered clay liners.

SPECIFICATION #GDE-CON-983

SPECIFICATION TITLE: SOIL, CONCRETE & GROUT TESTING AND INSPECTION

STATION: CONEMAUGH

DATE: APRIL 9, 1985

WORK ORDER: C344 - PHASE I - 1985 CONSTRUCTION
C423 - PHASE II - 1986 CONSTRUCTION

PROJECT: ASH FILTER PONDS AND ASH SILO PONDS

Pennsylvania Electric Company
Johnstown, Pennsylvania

Prepared by: (Lead Engr.) F. L. Straw F. L. Straw Date: 4/10/85

Reviewed by: (Sect. Mgr.) R. T. Gallery Date: 4/11/85

(Q.A. Manager) RRBaumbach Date: 4/11/85

Approved by: (Dept. Manager) John Henry Date: 4/15/85

GDE4065E

TABLE OF CONTENTS

SECTION II

SOIL TESTING AND INSPECTION

SECTION CONTENTS

SECTION II

SOIL TESTING AND INSPECTION

2.01 Scope

2.01.1 Description of Work:

This Section includes technical requirements for soil testing and inspection of excavation and fill.

2.01.2 Items Included:

This section includes the following:

1. Furnishing a testing laboratory and equipment.
2. Providing qualified personnel in the testing laboratory.
3. Providing laboratory testing.
4. Submitting test and inspection reports.

2.01.3 Items Not Included:

The following items are not included in this section:

1. Providing excavation and fill.
2. Providing roadway construction.
3. Concrete and grout testing and inspection.
4. Providing material and field testing.

2.02 Applicable Codes and Standards

The following are referenced in this Section:

1. American Society for Testing and Materials (ASTM):
   a. C 127-84, "Test Method for Specific Gravity and Absorption of Coarse Aggregate."
   b. D 420-69 (1979), "Recommended Practice for Investigating and Sampling Soil and Rock for Engineering Purposes."
   c. D 422-63 (1972), "Methods for Particle-Size Analysis of Soils."

d. D 854-83, "Test Method for Specific Gravity of Soils."

e. D 1140-54 (1971), "Test Method for Amount of Material in Soils Finer than the No. 200 (75-Cm) Sieve."

f. D 1556-82, "Test Method for Density of Soil in Place by the Sand-Cone Method."

g. D 1557-78, "Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54- kg) Rammer and 18-in. (457-mm) Drop."

h. D 1587-83, "Thin-Walled Tube Sampling of Soils."

i. D 2167-66 (1977), "Test for Density of Soil in Place by the Rubber-Balloon Method."

j. D 2216-80, "Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures."

k. D 2487-83, "Classification of Soils for Engineering Purposes.

l. D 2488-69 (1975), "Recommended Practice for Description of Soils (Visual-Manual Procedure)."

m. D 2922-81, "Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)."

n. D 3017-78, "Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)."

o. D 4318-83, "Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils."

2. Commonwealth of Pennsylvania, Department of Transportation, Field Test Manual, PDT Pub. 19, July 1977 edition and updates:

Pa. Test Method No. 123-1968 (PTM-123), "Test for Determination of Moisture in Soils by Means of a Calcium Carbide Gas Pressure Meter."

2.03 Facility and Personnel Requirements

1. An offsite laboratory shall be provided within an approved distance from the site. This facility shall be equipped with all items required to perform specified tests.

2. The test laboratory shall have its procedures and equipment inspected at intervals of not more than 3 years by a qualified national authority. A copy of the certification shall be submitted. The Material Reference Laboratories of the National Bureau of Standards are such qualified national authorities.

3. The testing or inspection services shall be under the direction of a person charged with an engineering-managerial responsibility. The person shall be a registered engineer and a full-time employee. He shall have at least 5 years experience in the inspection and testing of construction and materials.

4. The testing laboratory staff shall be supervised by a laboratory technician who shall have at least 5 years experience performing tests on soil and rock and be able to demonstrate the ability to perform the tests required in the manner stipulated by ASTM or other governing procedure.

5. The supervising field technician shall have a minimum of 2 years experience in soil and rock inspection. He shall be able to demonstrate either by oral or written examination, or both, the ability to correctly perform the duties required.

6. The onsite supervising field technician and on-site supervising laboratory technician may be the same person.

7. Inspection and testing personnel shall be qualified to Level I technician (in accordance with subparagraph 8. below), unless performing tests or inspections or preparing samples under the direct supervision of a Level II technician (in accordance with subparagraph 9. below).

8. A Level I technician shall be capable of performing the inspections, examinations, and tests that are required to be performed in accordance with documented procedures and/or industry practices. The individual shall be familiar with the tools and equipment to be employed and shall have demonstrated proficiency in their use. The individual shall also be capable of determining that the calibration status of inspection and measuring equipment is current, that the measuring and test equipment is in proper condition for use, and that the inspection, examination, and test procedures are approved. The educational and experience requirements shall be as follows:

   a. Two years of related experience in equivalent inspection, examination, or testing activities, or

   b. High school graduation and six months of related experience in equivalent inspection, examination, or testing activities, or

   c. Completion of college level work leading to an Associate Degree in a related discipline plus three months of related experience in the equivalent inspection, examination, or testing activities.

9. A Level II technician shall have all of the capabilities of a Level I technician for the inspection, examination or test category or class in question. Additionally, a Level II technician shall have demonstrated capabilities in planning inspections, examinations, and tests; in setting up tests including preparation and set-up of related equipment, as appropriate; in supervising or maintaining surveillance over the inspections, examinations, and tests; in supervising and certifying lower level personnel; in reporting inspection, examination, and testing results; and in evaluating the validity and acceptability of inspection, examination, and test results. The educational and experience requirements shall be, as follows:

   a. One year of satisfactory performance as Level I in the corresponding inspection, examination or test category or class, or

   b. High school graduation plus three years of related experience in equivalent inspection, examination, or testing activities, or

   c. Completion of college level work leading to an Associate Degree in a related discipline plus one year related experience in equivalent inspection, examination, or testing activities, or

   d. Four-year college graduation plus six months of related experience in equivalent inspection, examination, or testing activities.

10. All necessary sampling, sample making, and inspection equipment shall be provided in sufficient quantities to support the Work.

2.04 Testing Requirements

1. The number of personnel maintained at the site office per working shift shall be sufficient for the construction operation.

2. Tests shall be conducted in accordance with the methods and frequencies indicated in Table 1, and submitted in accordance with the requirements of Table 2 of this Section. The frequencies indicated are a minimum and are subject to change.

3. The test reports shall include the following information, as a minimum:

   a. Project description and Job No.

   b. Sample or Test No.

c. Description of material.

d. Location of sample or test (horizontal-within 5.0 feet, elevation-within 0.5 feet).

e. Tested by.

f. Date of testing.

g. Temperature and weather conditions.

h. References to any other tests used in the analysis.

i. Results of the test.

j. Any deviations from specified testing procedure.

k. Any difficulties in performing test.

l. Whether material or test passes or fails, if applicable.

4. All samples shall be transported to the onsite or offsite laboratory and stored prior to testing in accordance with the applicable codes and standards.

2.05 Submittals

Submittals required by this Section are given in Table 2 herein.

TABLE 1

REQUIRED TESTS

Item	Requirement	Test Method	Test Frequency
1.	Subgrade Inspection:		
	Verification of subgrade preparation, including list of compaction equipment utilized	Visual*	All subgrades
	Proctor Test	ASTM D 1557 (Method as per Section 5 of ASTM Specification)	One test for each 50,000 square feet of subgrade, and one test for each type of material
	Field Density Test	Sand-Cone Method ASTM D 1556 or Nuclear Method ASTM D 2922, D 3017 or Rubber-Balloon Method ASTM D 2167	One test for each 1000 square feet of subgrade or at least one test at the bottom of each excavation, whichever is more frequent
	Soil Description	ASTM D 2488	Every time a test/ inspection is performed on the subgrade
	NOTE: *A report or summary form shall be prepared on the observations made for the subgrade preparation.		
2.	Random Fill:		
	Gradation and Material Quality	Visual	As material is placed or excavated
	Proctor Test	ASTM D 1557 (Method as per Section 5 of ASTM Specification, or modification to this standard as per Appendix A)	One test for each 2000 cubic yards of fill material placed, and each time the type or source of fill material is changed

TABLE 1 (Cont'd)

REQUIRED TESTS

Item	Requirement	Test Method	Test Frequency
	Field Density Test	Sand-Cone Method ASTM D 1556 or Nuclear Method ASTM D 2922, D 3017 or Rubber-Balloon Method ASTM D 2167	One test for each 250 cubic yards of fill material placed or one test per lift, whichever is more frequent, and whenever it appears that a problem exists in the moisture content or density of the fill material
	Soil Description	ASTM D 2488	Every time a test is performed on the fill material
	Speedy Moisture Test	PTM-123	As required to verify the moisture content of the fill
	Lift Thickness	Visual/Manual	One test per lift
	Type of Compaction Equipment	Visual	Continuous during compaction work
3.	Structural Fill:		
	Gradation	ASTM D 422 (w/o Hydrometer)	One test for each 2000 cubic yards of fill material placed, and each time the type or source of material is changed, and whenever it appears that a problem exists in the gradation of the material
	Material Quality	Visual	As the material is received at the jobsite

REQUIRED TESTS

Item	Requirement	Test Method	Test Frequency
	Proctor Test	ASTM D 1557 (Method as per Section 5 of ASTM Specification or modification to this standard as per Appendix A)	One test for each 2000 cubic yards of fill material placed, and each time the type or source material is changed
	Specific Gravity	ASTM C 127	Whenever necessary as part of modification to Proctor test as per Appendix A
	Field Density Test	Sand-Cone Method ASTM D 1556 or Nuclear Method ASTM D 2922, D 3017 or Rubber-Balloon Method ASTM D 2167	One test for each 250 cubic yards of fill material placed or one test per lift, whichever is more frequent, and whenever it appears that a problem exists in the moisture content or density of the fill material
	Lift Thickness	Visual/Manual	One test per lift
	Type of Compaction Equipment	Visual	Continuous during compaction work
4.	Sand Fill:		
	Gradation	ASTM D 422 (w/o Hydrometer)	One test for each 2000 cubic yards of fill material placed, and each time the type or source of material is changed, and whenever it appears that a problem exists in the gradation of the material
	Material Quality	Visual	As the material is received at the jobsite

TABLE 1 (Cont'd)

REQUIRED TESTS

Item	Requirement	Test Method	Test Frequency
	Proctor Test	ASTM D 1557 (Method C)	One test for each 2000 cubic yards of fill material placed, and each time the type or source of material is changed
	Field Density Test	Sand-Cone Method ASTM D 1556 or Nuclear Method ASTM D 2922, D 3017 or Rubber-Balloon Method ASTM D 2167	One test of each 250 cubic yards of fill material placed or one test per lift, whichever is more frequent, and whenever it appears that a problem exists in the moisture content or density of the fill material
	Lift Thickness	Visual/Manual	One test for each lift
	Type of Compaction Equipment	Visual	Continuous during compaction work
5.	Impervious Fill:		
	Atterberg Limits	ASTM D 4318	One test for each 500 cubic yards of fill material placed, and whenever it appears that a problem exists in the quality of the fill material
	Percent Fines	ASTM D 1140	One test for each 500 cubic yards of fill material placed, and whenever it appears that a problem exists in the grain size of the fill material
	Classification of Soils	ASTM D 2487	One test for each 500 cubic yards of fill material placed

TABLE 1 (Cont'd)

REQUIRED TESTS

Item	Requirement	Test Method	Test Frequency
	Proctor Test	ASTM D 1557 (Method as per Section 5 of ASTM Specifications)	One test for each 1000 cubic yards of fill material placed, and each time the type or source of fill material is changed
	Field Density Test	Sand-Cone Method ASTM D 1556 or Nuclear Method ASTM D 2922, D 3017 or Rubber-Balloon Method ASTM D 2167	One test for each 250 cubic yards of fill material placed or one test per lift, whichever is more frequent, and whenever it appears that a problem exists in the moisture content or density of the fill material
	Soil Description	ASTM D 2488	Every time a test is performed on the fill material
	Speedy Moisture Test	PTM-123	As required to verify the moisture content of the fill
	Lift Thickness	Visual/Manual	One test for each lift
	Type of Compaction Equipment	Visual	Continuous during compaction work
6.	Uniformly Graded Coarse Aggregate:		
	Gradation and Material Quality	Visual	As the material is received at the jobsite
	Gradation	ASTM D 422	Whenever it appears that a problem exists in the gradation of the material
	Lift Thickness	Visual/Manual	One test for each lift

TABLE 1 (Cont'd)

REQUIRED TESTS

Item	Requirement	Test Method	Test Frequency
	Type of Compaction Equipment and number of passes	Visual	Continuous during compaction work
7.	Rock Lining:		
	Gradation and Material Quality	Visual	As the material is received at the jobsite
	Specific Gravity	ASTM C 127	Whenever it appears that a problem exists in the material quality
	Thickness Placed	Visual/Manual	One test per area
8.	Bottom Ash:		
	Gradation	ASTM D 422	One test for each 250 cubic yards of fill placed and whenever it appears that a problem exists in the gradation of the fill material.
	Lift Thickness	Visual/Manual	One test for each lift.
	Type of Compaction Equipment and number of passes	Visual	Continuous during compaction work
9.	Bentonite:		
	Application rate	Visual/Manual	Continuous during spreading operations.
	Mixing with impervious fill	Visual	Continuous during spreading operations
10.	Filter Fabric:		
	Placement procedure (including overlaps and pinning)	Visual/Manual	Continuous during placement of filter fabrics

TABLE 2

DATA REQUIREMENTS AND SUBMITTAL SCHEDULE

Paragraph Number/ Submittal Requirements		Submittal Address	With Proposal	For Approval Date	For Approval Copies	For Record Date	For Record Copies
Special conditions/ Resumes of responsible personnel		A	Yes	B	5	N/A	N/A
Special conditions/Sample forms and documentation sheets		A	Yes	B	5	N/A	N/A
Special conditions/Test equipment data		A	Yes	B	5	N/A	N/A
2.03-1	Location of Laboratory	A	Yes	B	5	N/A	N/A
2.03-2	Inspection certification	A	Yes	N/A	N/A	B	5
2.04	Alternative test procedures	A	No	B	5	N/A	N/A
2.03 and 2.04	Test results	C	No	N/A	N/A	D	5

A Pennsylvania Electric Company
1001 Broad Street
Johnstown, PA 15907
Attn: T. J. Simunich

B One month prior to beginning the work.

C Verbal reports to the Penelec site representative or the Penelec office in Johnstown, whichever is fastest. Written reports to the address in *A above.

D For test results which meet project requirements, written report within 2 days following completion of the test. For test results which do not meet project requirements, verbal report immediately following completion of the test, followed by a written report within 2 days.

APPENDIX A

MODIFICATION TO MODIFIED PROCTOR TEST (ASTM D 1557)

For structural or random fills having more than 30 but less than 50 percent (by weight) of material greater than 3/4 inch, the maximum dry density of the fill shall be determined by the following formula:

$$W = \frac{ww'}{Ow' + Cw}$$

W = maximum dry density (lb/ft3)

w = density of the material coarser than 3/4 inch, given by its bulk specific gravity (determined by ASTM C 127) multiplied by 62.4 (lb/ft3)

w' = maximum dry density for the material passing the 3/4-inch sieve as determined by the Modified Proctor Test, Method C (ASTM D 1557) (lb/ft3)

O = fraction by dry weight of the material coarser than the 3/4-inch sieve

C = fraction by dry weight of the material finer than the 3/4-inch sieve

ATTACHMENT 6D

Correspondence – Letter from PaDER Regarding Requirements for AFPs Engineered Liner System, January 1984

Note: This letter documents the design requirements established by the State Permitting Agency regarding construction of the Ash Filter Ponds.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF WATER QUALITY MANAGEMENT
600 Highland Building
121 South Highland Avenue
Pittsburgh, Pennsylvania 15206-3988 (412) 665-2900

January 4, 1984

James L. Greco
Environmental Licensing Manager
Pennsylvania Electric Company
1001 Broad Street
Johnstown, PA 15907

RE: Industrial Waste Application 3283201
Conemaugh Generating Station
West Wheatfield Township
Indiana County

Dear Mr. Greco:

We have had several conversations regarding the above-referenced permit application. You have expressed concerns regarding the Department's permitting requirements for this facility. In particular, your concern has focused on the liners which are required for the ash filter ponds. You had indicated that the ponds at the Conemaugh facility should be subject to the same requirements for permitting as were similar ponds at the Homer City Station. You also indicated that the Homer City ponds were permitted without liners.

I have reviewed, with Hydrogeologist Harold Miller, the permit application for the Homer City facility (Industrial Waste Permit 3281205). That application was prepared by Gilbert Associates, Inc. and described numerous waste treatment and runoff control systems.

Of particular relevance to the issue at hand at Conemaugh are those systems described as the "Industrial Waste Treatment System" and the "Ash Recycle System". A review of the Homer City permit application reveals the following:

1. The Industrial Waste Treatment System consists in part of several earthen settling or equalization basins. Each of these basins was described, within the narrative and the appended drawings, as having a clay liner, viz:

   -Neutralization/Equalization Ponds Nos. 1 and 2 each have 2' clay liners throughout. Ref. Dwg. D-783-003. See also applicable Module Page 5-2 elsewhere in the application.

   -Desilting Basins Nos. 1 and 2 each have clay liners of 3' thickness on the bottom and 2' thickness on the sides. Ref. Dwg. RDB-061179 and RDB-061479. See also applicable Module Page 5-2 elsewhere in the application.

2. The Ash Recycle System also has component ponds. Ash Settling Ponds 1 and 2 are described on Dwg. D-739-256. That drawing indicates that each of these ponds has a clay liner of 2' thickness throughout. These two ponds are also described elsewhere in the application in narrative and on modules. Ponds Nos. 3 and 4 are likewise described in narrative and module. The narrative and Module 5-2 discloses that all four ponds have 2' clay liners throughout.

There are several other ponds which are components of various other discharge treatment and control systems that are described in the Homer City application. Several of these ponds are lined; two are not. I don't believe further consideration of the merits of those ponds which do not have liners is warranted or will serve a useful purpose since the existence of liners on the two systems described above concludes the issue raised on the Conemaugh application. In particular, the Homer City Ash Recycle System, which from my understanding appears to serve a function similar to the ash system at Conemaugh, has clay lined ponds.

I trust that this letter has resolved the outstanding issue on the Conemaugh permit application. So that there be no confusion about what sort of liner is necessary for the ash ponds at Conemaugh station, I will reiterate the liner requirements that I have previously discussed with you and Jim King. The liners, of suitable material, must have a design specific discharge rate of 5×10^{-7} cm/sec or less. The "specific discharge" is the product of the hydraulic conductivity, expressed in cm/sec, and the hydraulic gradient. For the purposes of design the hydraulic gradient may be determined by dividing the normal water depth in the pond by the liner thickness, both expressed in identical units. If a clay or similar material is selected, groundwater monitoring wells must be established up and down gradient. If a synthetic liner is chosen groundwater monitoring for the ponds will not be necessary.

In addition, the revised application should propose a schedule for retro-fitting the ~~two~~ THREE existing ponds in the Conemaugh Station Ash Filtration System with appropriate liners. Both existing ponds need not be lined at the same time and the retro-fit may take place at reasonable future dates during anticipated maintenance periods.

If you have any further questions please feel free to contact me at 412/665-2983.

Sincerely,

Ralph W. Waechter
Environmental Engineer

RWW/ld: c r t

cc: T. C. Callaghan
H. Miller
Operations

ATTACHMENT 6E

Preliminary Engineering Report #335-83, Rev 2

Note: This document provides a summary of the original design of the engineered clay liners for the Ash Filter Ponds and identifies the measures taken to evaluate the suitability of impervious fill available for the construction.

PRELIMINARY ENGINEERING REPORT #335-83 - REV. 2

PROJECT: WASTE FILTER POND IMPROVEMENTS

STATION: CONEMAUGH

DATE: MARCH 30, 1984

WORK ORDER: C344 & C423

Pennsylvania Electric Company
Johnstown, Pennsylvania

Prepared by: (Lead Engr.) F. L. STRAW F. L. Straw Date: 3/30/84

Reviewed by: (Sect. Supv.) RT Gallus by LC Smith Date: 3/30/84

Approved by: (Dept. Mgr.) [illegible] Date: 4-3-84

(Dept. Director) T. P. [illegible] Date: 4/3/84

FLS
3/30/84
PER #335-83
REV. 2

CONEMAUGH STATION
WORK ORDER C344

Item: Waste Filter Pond Improvements

Cost: Phase I Proposed 1985 Construction $1,800,000
Phase II Proposed 1986 Construction $700,000

Cost Estimate

Phase I Proposed 1985 Construction	Material	Labor	Total Phase I
#4 Waste Filter Pond Construction	$100,200	$360,200	$ 460,400
#3 Waste Filter Pond Construction	51,100	130,100	181,200
Ash Silo Drainage Ponds Construction	103,200	177,800	281,000
Sub Total	$254,500	$668,100	$ 922,600
Gilbert Associates Engineering, Design & Drafting			$ 208,600
Penelec Engineering and Construction Supervision			$ 117,800
Sub Total			$1,249,000
Escalation (In-Service Date October 1985)			$ 170,000
Contingency			$ 340,200
Total Phase I 1985 Cost Excluding Demolition and Removals			$1,759,200
Demolition and Removals			$ 40,800
Total Phase I 1985 Cost			$1,800,000

Phase II Proposed 1986 Construction	Material	Labor	Total Phase II
#2 Waste Filter Pond Construction	$ 53,400	$136,300	$ 189,700
#1 Waste Filter Pond Construction	40,400	119,300	159,700
Sub Total	$ 93,800	$255,600	$ 349,400
Penelec Engineering and Construction Supervision			24,500
Sub Total			$ 373,900

GDE0330E

Escalation (In-Service Date October 1986)	137,100
Contingency	181,100
Total Phase II 1986 Cost Excluding Demolition and Removals	$ 692,100
Demolition and Removals	$ 7,900
Total Phase II 1986 Cost	$ 700,000

Description

Preliminary Engineering Report #335-83, Rev. 1, has been revised to reflect the additional requirement for lining the ash filter ponds with an impervious liner. Furthermore, due to the Pa. DER requirement for lining all earthen ponds containing process wastewater, the existing ash silo area drainage ponds must also be clay lined. PER #335-83, Rev. 2 is then required due to the change in the project scope.

An engineering study was performed in 1981 to project BAT and BCT effluent limitations and the probability of compliance with these limitations. The study concluded that the present waste treatment facilities were able to meet the current NPDES permit limits, as well as projected BCT limits, provided two ash filter ponds were operated in parallel, and additional improvements were implemented to the ash filter pond system. Additionally, due to the recent Pa. DER requirement for placing an impervious liner in all earthen ponds containing process wastewater, the four ash filter ponds and the ash silo area drainage ponds must be clay lined.

Investigations by Gilbert Associates and General Analytics, Inc. have shown that clay material, suitable to meet Pa. DER liner requirements, is sufficiently available in the Stage II development area of the Conemaugh Station ash/mine refuse disposal site. (Some clay material, however, may have to be supplemented with bentonite to meet Pa. DER permeability requirements.)

This PER covers the total project scope and includes the following:

1. Ash Filter Pond Improvements

   a. Addition of fourth ash filter pond. The fourth pond will enable two ash filter ponds to be operated in parallel continuously; provide sufficient time to drain, clean, and restore the ash ponds for service; and help to prevent operating a pond beyond its effective service time. The design will include improvements noted by the following items.

   b. Addition of slide gates at the inlet distribution box and replacement of inlet piping. The slide gates will enable a manual operation and will prevent leakage into the ash pond during cleaning. The inlet steel piping has corroded away and will be replaced with corrosion resistant polyethylene piping which will prevent leakage to the groundwater

c. Addition of two double-sided weir troughs across the width of each pond. The weirs will prevent short circuiting; enable the entire surface of the pond to be used for settling; and significantly reduce velocities over the weir, which will reduce carryover of solids.

d. Addition of a weir gate in place of stop logs at each discharge tower. The weir gate will allow the proper method of slowly decanting an ash pond; prevent major leakage into the discharge tower; and reduce the carryover of solids into the discharge structure.

e. Replace the filter media and underdrain pipe in each existing ash pond. New filter media and underdrain piping is necessary due to the PaDER requiring the installation of an impervious liner in all earthen ponds.

f. Addition of clay liner and protective stone cover. The addition of a two-foot clay liner will prevent leaching of process waste water into the groundwater and will meet Pa. DER lining criteria. The protective stone cover will protect the clay liner from being damaged during cleaning of the ponds by a drag line.

g. Installation of four (4) groundwater monitoring wells upgradient and downgradient of the ash filter ponds. The monitoring wells are required by the PaDER whenever clay is used as a pond liner material.

2. Ash Silo Area Drainage Ponds Modifications

a. Addition of clay liner, protective stone cover, and subdrain system. The ash silo area drainage ponds will be redesigned to include a two-foot clay liner which is required to prevent leakage of process wastewater into the underground. The stone cover will protect the liner from being damaged during cleaning of the ponds by a drag line or Gradall. The subdrain system beneath the clay liner will protect the liner from being damaged by high groundwater pressures.

b. Addition of concrete separating wall. The concrete separating wall is required to enable full use of the limited width available for the ponds considering the required side slopes for clay stability of 2 H:1V.

c. Addition of filter media and underdrain piping. The filter media and underdrain piping system are required to enable the ponds to be drained for more efficient cleaning.

All the modifications and additions described above will be funded under a capital work order. The work will be performed in two phases. Phase I will be performed in 1985 and will consist of the following:

1. Addition of 4th ash filter pond including clay lining, weirs, etc.

2. Modifications to ash filter pond No. 3 including discharge weir troughs, weir gate, filter media replacement, and clay lining.

3. Modifications to inlet distribution box to include slide gates for ponds Nos. 3 and 4, and new inlet piping for ponds Nos. 3 and 4.

4. Installation of four (4) groundwater monitoring wells upgradient and downgradient of the ash filter ponds.

5. Construction of modifications to both ash silo area drainage ponds to include clay lining, concrete separating wall, discharge structure, inlet modifications, and filter media.

(Note: Total clay quantity required will be 12,000 cy. - assuming 50% contingency.)

Phase II will be performed in 1986 and will consist of the following:

1. Modifications to ash filter ponds No. 2 and No. 1 including discharge weir troughs, weir gates, filter media replacement, and clay lining.

2. Modifications to inlet distribution box to include slide gates for ponds Nos. 1 and 2, and new inlet piping for ponds Nos. 1 and 2.

(Note: Total clay quantity required will be 10,000 c.y. - assuming 50% contingency.)

Reasons and Benefits

The installation and modifications are required to enhance compliance with current NPDES permit limits for TSS and to comply with Pa. DER criteria for lining earthen impoundments with an impermeable liner.

Also, the present ash filter pond system (3 ponds) does not allow for guaranteed operation with two ponds in service. Due to unit outages and time required for cleaning, there are times when only one pond is available for service. This condition allows for overloading and resultant carry-over of solids. The existing design of the ponds accelerates carry-over possibilities especially in this case, but also during normal operation. Data also indicates that discharge limits are not consistently being met during decanting of the ponds for cleaning. The revisions to the existing ponds are designed to minimize this situation.

It is important to note that the loading of the waste filter system has been increased with the installation of the clarifier since the clarifier sludge is pumped to the ponds. The clarifier project originally called for a fourth pond, but it was delayed to observe the effects of increased loading on the existing ponds.

This increased loading, along with the design deficiencies and the need to have two ash filter ponds operating in parallel continuously, requires the addition of the fourth pond and the design modifications of the existing ponds to consistently meet NPDES discharge limits.

GDE0330E

Additional Manhours and Work

The PaDER requires that a groundwater monitoring program be established and implemented when clay is used as a pond liner. Additional manpower and costs will be incurred by the station for collecting and analysing water samples obtained from the four groundwater monitoring wells to be installed as a part of this project. These samples must be obtained per PaDER regulations.

kml
I.D. 0330E

ATTACHMENT 6F

1984 Water Quality Management Permit Application
for AFP Improvements, April 1984

Note: This document is the permit application that was submitted to the State Permitting Agency to support construction of the Ash Filter Ponds. It includes a Design Engineer's Report identifying the design criteria that was utilized for the engineered clay liners.

Pennsylvania Electric Company
1001 Broad Street
Johnstown, Pennsylvania 15907
814 533-8403

Eugene R. Cathcart
Vice President -
Generation Engineering
and Support

April 12, 1984

C-344

Ms. Deborah L. McDonald
Bureau of Water Quality Management
Department of Environmental Resources
Region V
121 S. Highland Avenue
Pittsburgh, PA 15206-3988

Dear Ms. McDonald:

SUBJECT: Industrial Waste Application 3823201
Conemaugh Generating Station
Wastewater Treatment System Improvements

Enclosed is a complete application, with duplicate, for improvements to the existing wastewater treatment system discharging from NPDES Discharge 007 to the Conemaugh River from the Conemaugh Generating Station.

The table of contents describes which portions have been revised from the original application of March 1, 1983, in accordance with Department requests to include pond liners in the design. Where appropriate, pages that have not been revised have been duplicated and included in this package, as you requested, including a copy of the check for the original filing fee.

Matters concerning this application should be directed to Mr. James King at the above address or call (814) 533-8568. For material purchasing and design/contractural arrangements to proceed on schedule, we request approval prior to September 28, 1984.

Sincerely,

E. R. Cathcart

trl

Enclosures

cc: Messrs: R. T. Gallus
J. L. Greco/J. R. King
T. J. Simunich
C. C. Stutzman
J. J. Wagner

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Date Prepared

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

APPLICATION FOR PART II
WATER QUALITY MANAGEMENT PERMIT

INDUSTRIAL WASTES

For Department Use Only

A. TO BE COMPLETED BY THE APPLICANT:

1. Applicant Information
Name: Pennsylvania Electric Co.
Mailing Address: 1001 Broad Street
Johnstown, PA 15907
Telephone: (814) 533-8568
AC
Nature of Business: SIC CODE 4911
Electric services
(Steam electric power plant)

2. Facility/Project Location
Name: Mr. John E. Gritzer, Superintendent
Mailing Address:* Conemaugh Generating Station
P. O. Box K
New Florence, PA 15944
Telephone: (412) 235-2711
AC
*If different from item 1.

County	Municipality	City / Twp / Boro
Indiana	West Wheatfield	Twp X

3. Description of project for Which Permit is Requested

Wastewater treatment system improvements, see Engineer's Report attached.

4. Applicant Affidavit Applicant or Responsible official R. L. Wise
I hereby certify that I am authorized to make this application and that the accompanying report and all supporting documentation designated therein and attached thereto are true and correct to the best of my knowledge and belief.

Signature R. L. Wise Date 2-11-83
Title Vice President-Generation Engineering & Support

SWORN AND SUBSCRIBED TO BEFORE ME THIS
11th Day of February 1983

JOHN A. DALEY, Notary Public
Johnstown, Cambria County, Pa.
My Commission Expires Jan. 29, 1987

John A. Daley
Notary Public

NOTARY SEAL

B. THIS SECTION TO BE COMPLETED BY THE REGISTERED PROFESSIONAL ENGINEER WHO PREPARES THIS APPLICATION, ACCOMPANYING REPORT AND SUPPORTING DOCUMENTATION:

This is to certify that I have personally reviewed all engineering information contained in the accompanying modules, drawings, specifications, and other documents which are part of this application and that I have found it to be good engineering quality, true and correct, and is in conformance with the requirements of the Department of Environmental Resources, and it does not, to the best of my knowledge, withhold information that is pertinent to a determination of compliance with the requirements of the Department.
NOTICE: It is an offense under Pennsylvania Crimes Code to affirm a false statement in documents submitted to the Department.

Name of Design Engineer: Thomas P. Wolff
Design Firm: Pennsylvania Electric Co.
Mailing Address: 1001 Broad Street
Johnstown, PA 15907

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER SEAL
THOMAS P. WOLFF
3079-E

Telephone: 814 533-8300
AC

T. P. Wolff
Signature of Professional Engineer

(See Reverse Side For Application Checklist for Submittal)

ER-BWQ-51.2 Rev 7/82

Date Prepared
Date Revised

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUAILTY MANAGEMENT

INDUSTRIAL WASTE APPLICATION

CHECKLIST FOR SUBMITTAL

For Department Use Only

Accompanying materials and documentation (See General Instructions)	ATTACHED YES	ATTACHED N/A	COMPLETE YES	COMPLETE NO
1. $500.00 application fee (less than 15 days old)	X			
2. Two (2) copies of application, design engineer's report, and accompanying drawings and plans.	X			
a. Affidavit and proper signatures				
b. Engineer's professional seal				
c. Properly notarized				
3. _____ additional copies of application, design engineer's report and accompanying drawings and plans, for review by DRBC or ECHD.		X		
4. Schematic flow diagram	X			
5. Other plans and drawings				
a. General layout				
b. Outfall/headwall/encroachment				
6. Topographic map with appropriate details	X			
7. Soil Erosion and Sedimentation Control Plan	X			
a. County Conservation District Comments (optional)	X			
8. Two (2) copies of Preparedness Prevention and Contingency (PPC) Plan		X		
9. Proof of Public Notice (Non-NPDES Cases)		X		
10. Other:				
11. Other:				

238022

Pennsylvania Electric Company is a Member of the General Public Utilities System

VENDOR NO.	VOUCHER NO.	INVOICE NUMBER	DATE			AMOUNT	DEDUCTIONS	NET AMOUNT
13[illegible]03	0204543		02	22	83	500.00		500.00

PLEASE DETACH THIS MEMORANDUM BEFORE DEPOSITING CHECK

CR-CREDIT MEMO C-CORRECTED INVOICE D-DISCOUNT F-FREIGHT R-RETENTION
T-PA SALES TAX (DIRECT PAY PERMIT 00127) P-PMT. DELAYED (DISPUTED INVOICE)

238022 238022

Pennsylvania Electric Company
1001 Broad Street
Johnstown Pennsylvania 15907

8 26
430

VOID AFTER 90 DAYS

DATE MO.	DAY	YR.	AMOUNT
02	25	83	*******500.00

PAY TO THE ORDER OF

PA DEPT OF ENVIRONMENTAL RESOURCES
BUREAU OF WATER QUALITY MANAGEMENT
600 KUSSMAN BLDG 100 FORBES AVE
PITTSBURGH PA 15222

PENNSYLVANIA ELECTRIC COMPANY

Mellon Bank N.A.
Pittsburgh, Pennsylvania 15230

⑈238022⑈ ⑆043000261⑆ 101⑈1406⑈

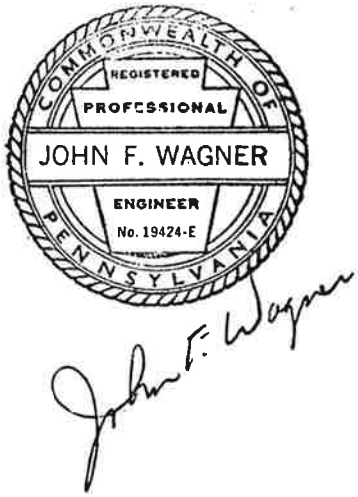
CS-48 REV 681

Revised 4/84

PENNSYLVANIA ELECTRIC COMPANY

CONEMAUGH STATION

APPLICATION FOR PART II WATER QUALITY MANAGEMENT PERMIT
WASTEWATER TREATMENT SYSTEM IMPROVEMENTS
DESIGN ENGINEER'S REPORT



PREPARED BY:

JOHN F. WAGNER, P.E.

Gilbert Associates, Inc.

P.O. Box 1498

Reading, Pennsylvania 19603

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WASTEWATER TREATMENT SYSTEM IMPROVEMENTS
DESIGN ENGINEER'S REPORT

I. General Information

A. Plant Status

This application is submitted by Pennsylvania Electric Company which operates, on behalf of the owners, the Conemaugh Generating Station. The nature of business of this facility is the generation of electric power. The facility contact and mailing address is: Mr. John E. Gritzer, Superintendent, P.O. Box K, New Florence, PA 15944. The facility is located on LR 32008, West Wheatfield Township, Indiana County, PA.

Matters concerning this application should be directed to Mr. James R. King, Pennsylvania Electric Company, 1001 Broad Street (PT-4), Johnstown, PA 15907.

The facility operates under a variety of environmental permits including NPDES 0005011 and Industrial Waste Permit 3269202.

B. General Facility Layout Diagram

See attached Drawing D-746-010, Rev. 2.

C. General Project Description

This application is for a project which will improve the efficiency of the existing wastewater treatment system at Conemaugh Station and will prevent the seepage of ponded wastewater into groundwater.

The system improvements are divided into two parts: the addition of a fourth ash filter pond and improvements to the three existing ash filter ponds; and modifications to the ash silo area drainage ponds. Both sets of ponds discharge through discharge monitoring point 007. These facilities are shown schematically on the attached plant wastewater flow diagram, Drawing 42D-0053 (Rev. 2).

Ash Filter Ponds

The ash filter ponds receive waste for final clarification from the neutralization facility, overflow from the bottom ash dewatering bins, and intake water clarifier sludge. Currently, there are three ponds. Two of the three ponds are in service at one time. The ponds are presently constructed of earthen materials, partially above grade, and contain a filter media and underdrain system for dewatering before cleaning. The discharge structure presently consists of a concrete discharge tower located at the end of the pond at the center. Discharge from the pond is over a 3.5 foot weir consisting of stop logs which are also raised for decanting before cleaning. The overflow and underdrain underflow are collected in this structure and piped to a common discharge line from all ash filter ponds which discharge in a drainage ditch through NPDES discharge point 007. Additionally, each pond is equipped with a containment boom for retaining floating particulate matter and an oil absorbent boom across the effluent end.

Ash Silo Area Drainage Ponds

The ash silo area drainage ponds receive waste for final clarification from drainage around the bottom ash dewatering bins and the fly ash storage silos. Currently, there are two drainage ponds with one pond being in service at a time. The ponds are constructed as excavations into natural ground with the high water level being 3-4 feet below grade. There is no filter media or underdrain system and the ponds are cleaned by a drag line with the ponds filled with water. The discharge is through a 12-inch overflow pipe which

empties into the same drainage ditch which receives the discharge from the ash filter ponds and flows through NPDES discharge point 007.

Proposed Facilities

The proposed facilities for the ash filter pond improvements project will include the following:

- clay lining all four ash filter ponds, including a protective stone layer
- modifications to the inlet distribution box to facilitate maintenance
- replacement of filter media and underdrain pipe
- addition of weir troughs and weir gates at the discharge end of each pond.

The proposed facilities for the modification to the ash silo area drainage ponds will include the following:

- clay lining the two ash silo area drainage ponds including a protective stone layer
- addition of filter media and underdrain pipe
- addition of concrete separating wall
- modification to inlet configuration.

All work will be on station property above the 100-year flood plain elevation.

The water balance will not be affected.

Module A - See attached Module A.

Module B - See attached Module B.

D. Flow Diagram

See attached Drawing 42D-0053, Rev. 2.

E. Treatment Facility Size

See attached Drawing D-782-018, (Rev. B) and D-782-023, (Rev. C), which show sizes of ash filter ponds and ash silo area drainage ponds.

II. Description of Proposed Modifications

A. Basis for Design

Ash Filter Pond Improvements

An engineering study was performed in 1981 to project BAT and BCT effluent limitations and the probability of compliance with those limitations. The study concluded that the present waste treatment facilities were able to meet the current NPDES permit limits, as well as projected BCT limits, provided two ash filter ponds are operated in parallel, and additional improvements are implemented to the ash filter system. The proposed project is based on changes necessary to comply with BCT limits.

Additionally, the Pa. DER has required that these ponds be lined with a impervious liner capable of meeting a permeability requirement of 1×10^{-7} cm/sec. The proposed project will comply with this recent directive.

The present system of three ponds does not allow for guaranteed operation with two ponds in service. Due to unit outages and time required for cleaning, there are times when only one pond is available for service. This condition allows for overloading the resultant carryover of solids. The proposed modifications to the existing ponds are designed to minimize carryover and ensure

compliance with effluent limitations during decanting of the ponds for cleanout.

The loading of the waste filter system has been increased with the installation of the clarifier, since clarifier sludge is pumped to the ponds. The clarifier project originally called for the addition of a fourth pond, but that was delayed to observe the effects of increased loading to the existing ponds.

The scope of the proposed project includes:

1) Addition of a fourth ash filter pond. The fourth pond will enable two ash filter ponds to be operated in parallel continuously; provide sufficient time to drain, clean, and restore the ash ponds for service; and help to prevent operating a pond beyond its effective service time.

2) Addition of two double-sided weir troughs across the width of each ash filter pond. The weirs will prevent short circuiting; enable the entire surface of the pond to be used for settling; and significantly reduce velocities over the weir, which will reduce carryover of solids.

3) Addition of slide gates at the inlet distribution box. The slide gates will permit manual operation and prevent leakage into the ash pond during cleaning.

4) Addition of a weir gate in place of the stop logs at each discharge tower. The weir gate will allow slow decanting of the ash pond; prevent major leakage into the discharge tower; and reduce the carryover of solids into the discharge structure.

5) Addition of clay liner and protective layer of stone. The liner will be constructed of a minimum of two feet of clay from on-site. A present study is being conducted on the suitability of on-site clay materials. If the study shows that the on-site

clay material does not meet the permeability requirements, then sufficient bentonite material will be mixed with the clay to obtain the required permeability of 1×10^{-7} cm/sec. The addition of the clay liner will meet the Pa. DER permeability requirement.

A stone layer above the clay will be required to prevent erosion and cracking of the clay liner and to protect the liner during cleaning operations.

6) Replacement of filter media and underdrain. The filter media and underdrains must be replaced to allow installation of the clay liner beneath the media. In addition, a 1981 study showed that some portions of the filter media in the ash ponds had become plugged with sludge due to overexcavation of the bottom ash filter layer. Therefore, the filter media and underdrain system will be replaced to prevent leaching of ash sludge through the filter media and to facilitate dewatering for cleaning.

Modifications to Ash Silo Area Drainage Ponds

The present ash silo area drainage ponds are not lined with an impermeable liner and are not constructed to allow efficient dewatering and cleaning. The modifications necessary to meet these requirements include the following:

1) Clay liner, protective stone layer, and subdrain system. The liner will be constructed of a minimum of two feet of clay from on-site. A present study is being conducted on the suitability of on-site clay materials. If the study shows that on-site clay material does not meet the permeability requirements, then sufficient bentonite material will be mixed with the clay to obtain the required permeability of 1×10^{-7} cm/sec. The addition of the clay liner will meet the Pa. DER permeability requirement.

A stone layer above the clay will be required to prevent erosion and cracking of the clay liner and to protect the liner during cleaning operations.

The subdrain system beneath the clay liner is provided to protect the liner from being damaged by high groundwater while the pond is empty.

2) Concrete separating wall. A concrete separating wall is furnished to enable full use of the limited width available for the ponds considering the required side slopes for clay stability of 2 H:1V.

3) Addition of filter media and underdrain piping. A filter media and underdrain piping system is provided to enable the ponds to be dewatered so that the ponds can be cleaned more efficiently. Also, the continuous flow of water through the underdrain system will reduce the TSS levels in the discharge from the ponds.

4) Inlet distribution modifications. The ash silo area concrete drainage trench will be modified to include inlet shut off gates to enable diversion of flow to either pond in service. The trench will be extended to the center of the inlet end to each pond.

B. Supplemental Chemical Addition or Treatment

The proposed modifications to either the ash filter ponds or the ash silo area drainage ponds will not involve additional chemical treatment.

C. Pumping Equipment

The proposed modifications to either the ash filter ponds or the ash silo area drainage ponds will not require new pumping facilities.

D. Monitoring and Control Equipment

The proposed modification to either the ash filter pond or the ash silo area drainage ponds will not require new monitoring or control equipment for the discharge of treated wastewater to the receiving stream. Existing NPDES discharge point 007 will continue to be used as the monitoring point for discharge from both sets of ponds.

Since clay earthen materials are being used to prevent seepage of ponded wastewater to the groundwater, upgradient and downgradient wells are required to monitor any groundwater contamination. The proposed locations for the upgradient and downgradient monitoring wells are shown on Drawing D-782-023, (Rev. C). Four monitoring wells are shown, two upgradient of all six ponds, and two downgradient below the new fourth ash filter pond.

E. Handling, Storage, and Conditioning of Residual Materials

Residuals (sludge) from the ash filter ponds and the ash silo area drainage ponds will be handled and disposed of in the same manner as previously. Two ash filter ponds and one ash silo area drainage pond are in service at one time. When the ponds are to be cleaned, flow is diverted to the out of service pond or ponds. The ash filter ponds are decanted through the proposed weir gate and allowed to drain through the filter media until dry. The ash silo area ponds are drained through the filter media. The ponds are then cleaned by a drag line from the service roadways. The ash silo area drainage pond can also be cleaned by a Gradall moving into the pond from the discharge end. The sludge (mostly ash) is transported to the ash disposal area for disposal.

The nature and quantity of sludge will not change. An analysis of the waste filter pond sludge has been conducted. The results are:

EP Toxicity (Metals)

Arsenic	<0.001*
Barium	0.076
Cadmium	0.0015
Chromium	0.0060
Lead	0.001
Mercury	<0.0002*
Selenium	<0.001*
Silver	<0.001*

*Represents less than detection limit used.

III. Operational Flexibility and Reliability of the Treatment Units

Supplemental information on the operational flexibility and reliability of the treatment works can be found in the PPC Plan for Conemaugh Station, prepared for the NPDES permit renewal application and filed October 6, 1982.

IV. Preliminary and Supplemental Ground Water, Soils and Geology Information

Drilling logs, representative of the area and identified on Drawing D-746-010, are attached.

V. Soil Erosion and Control Plan

An SE&C Plan was presented to the Indiana County Conservation District. See attached letters dated December 16, 1982 and January 6, 1983. Approval of this plan by Indiana County Conservation District was granted under the attached letters dated January 12, 1983 and January 18, 1983.

Since this plan was presented and approved, additional new work will be performed at the site which includes clay lining the four ash filter ponds and clay lining the ash silo area drainage ponds. Clay lining

inside slopes of the ash filter ponds will not affect the SE&C Plan. Modifications to the ash silo area drainage ponds will take place in and excavation below grade with no outlet. Therefore, this construction will also not affect the SE&C Plan.

Therefore, additional approval from the Indiana County Conservation District was not deemed necessary.

VI. CONSTRUCTION SCHEDULE

Construction of the fourth ash filter pond, modifications to the existing three ash filter ponds, and reconstruction of the ash silo area drainage ponds is proposed as follows:

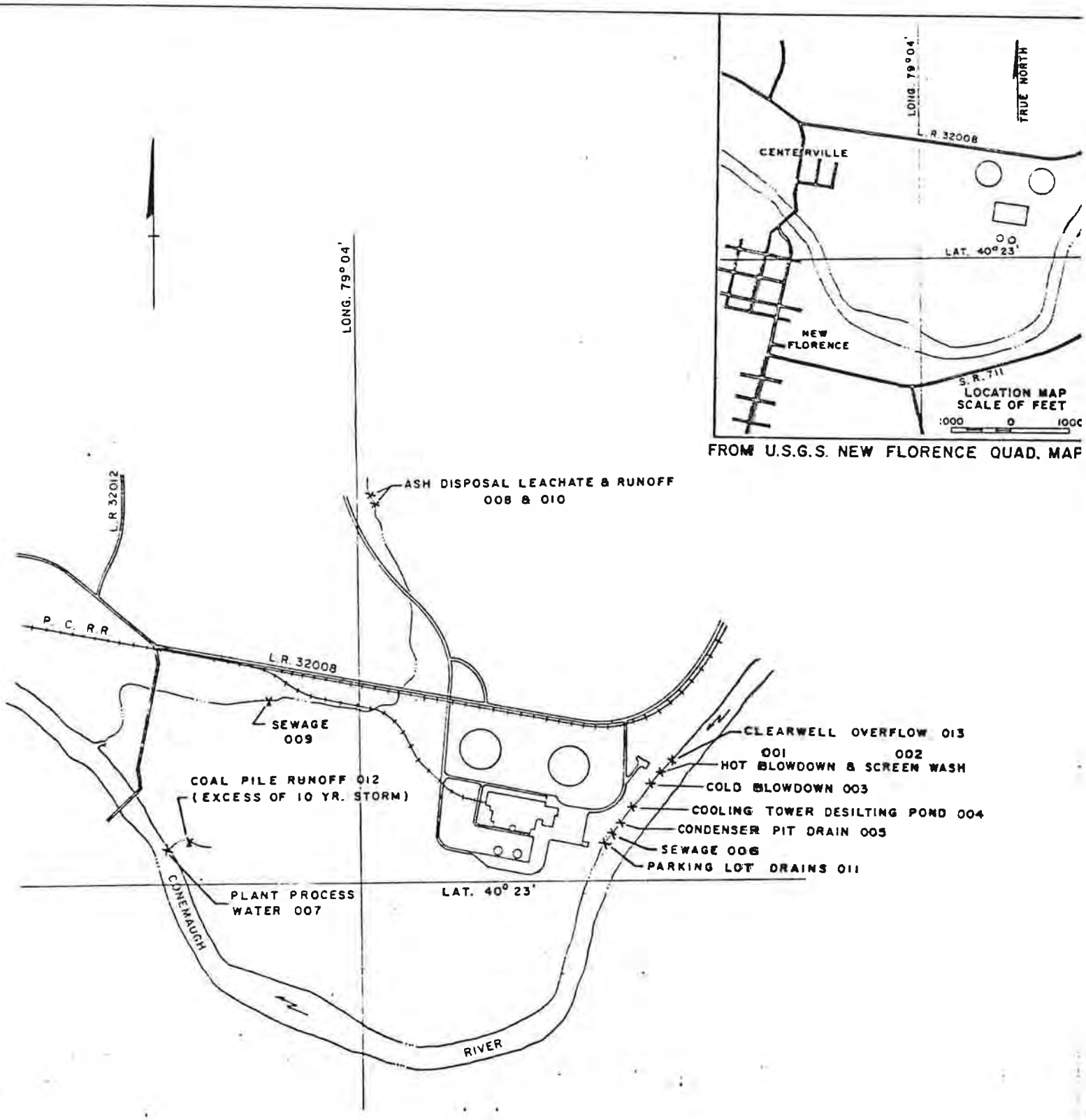
1985
- Construction of fourth ash filter pond
- Modifications to ash filter pond No. 3 including clay lining, filter media and underdrain replacement, and installation of weir troughs and weir gate
- Modifications to the inlet distribution line and installation of new inlet piping for ash filter ponds Nos. 3 and 4.
- Reconstruction of ash silo area drainage ponds Nos. A and B including:

  - clay lining and subdrain system
  - installation of concrete separating wall
  - installation of filter media and underdrain piping
  - modification to inlet configuration

1986
- Construction of modifications to ash filter ponds Nos. 1 and 2 including clay lining, filter media and underdrain replacement, and installation of weir troughs and weir gates.
- Modifications to inlet distribution box and installation of new inlet piping for ash filter ponds Nos 1 and 2.

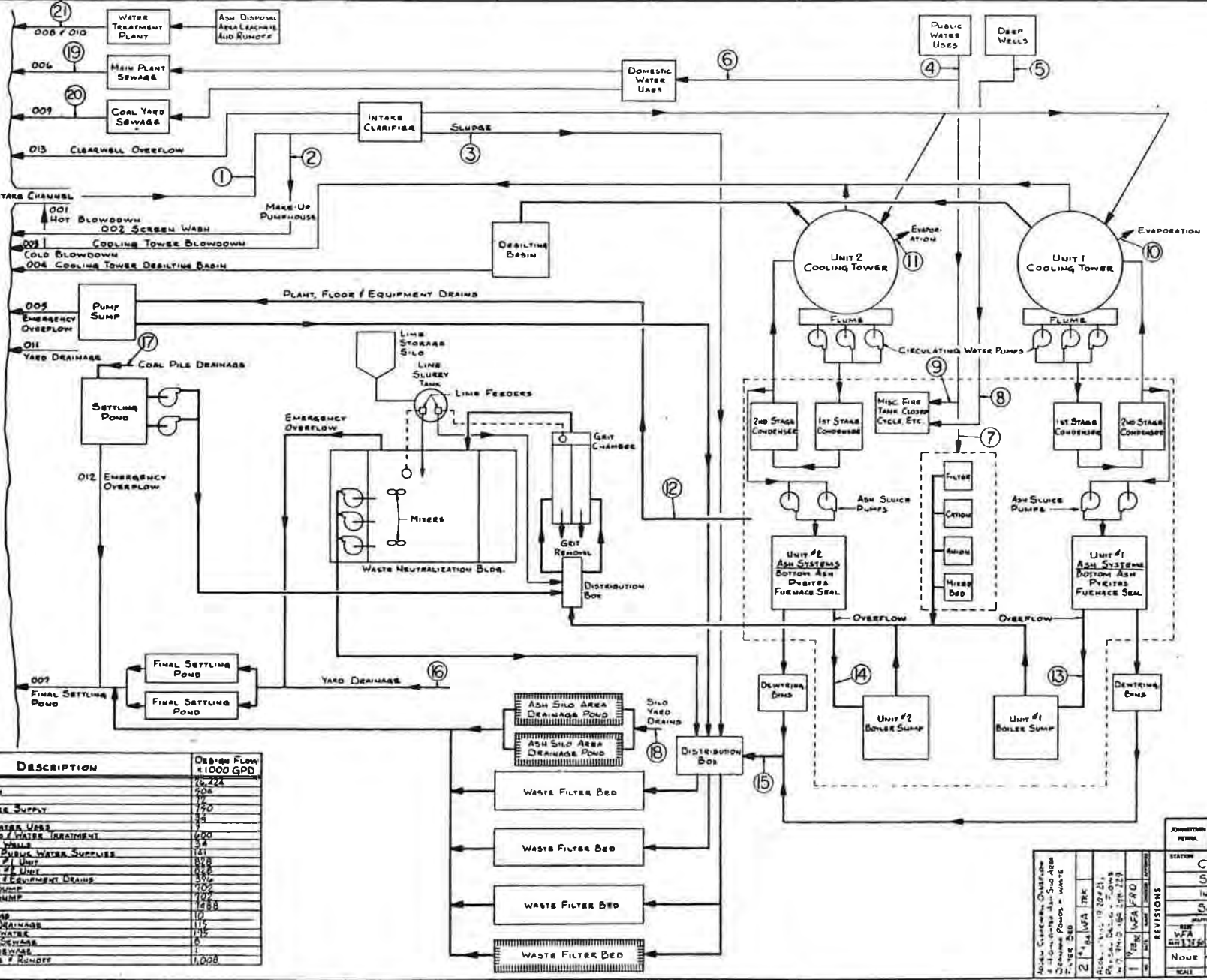
Note: During construction of modifications to the ash filter ponds during each time period, the flow will be diverted to the remaining two ash filter ponds. However, these ponds will have to be operated alternately so that all flow will pass through one pond so that the remaining pond can be cleaned. Some reduction in TSS removals will be noted during this period, however, every effort will be made to minimize this reduction by cleaning the ponds as often as necessary to reduce carryover of solids.

During construction of modifications to the ash silo area drainage ponds, the inlet flow will be diverted to the yard drainage ditch (as shown on Drawing D-782-023, Rev. C). This ditch flows through the two final settling ponds where adequate removal of TSS will take place during this construction period.



PLAN
SCALE OF FEET
1000 0 1000 2000

DISCHARGE IN CONEMAUGH RIVER
AT CONEMAUGH STATION, COUNTY OF INDIANA, PA.
PENNSYLVANIA ELECTRIC CO.
JOHNSTOWN, PA.



Item No.	Description	Design Flow ≈ 1000 GPD
1	Intake	16,424
2	Screen Wash	504
3	Sludge	17
4	Public Water Supply	150
5	Deep Wells	34
6	Domestic Water Uses	7
7	Boiler Feed / Water Treatment	600
8	Misc. From Wells	34
9	Misc. From Public Water Supplies	181
10	Evaporation #1 Unit	828
11	Evaporation #2 Unit	828
12	Plant Floor & Equipment Drains	396
13	#1 Boiler Sump	102
14	#2 Boiler Sump	102
15	Ash Sluice	1808
16	Yard Drainage	10
17	Coal Pile Drainage	115
18	Washdown Water	175
19	Main Plant Sewage	6
20	Coal Yard Sewage	1
21	Ash Leachate & Runoff	1,008

Ash Silo Area Drainage Pond & Silo Yard Drains Pumps - Waste Filter Bed

Rev.	Date	Drawn	Checked	Approved
2	1-14-74	WFA	TRK	
1	1-19-73	WFA	FRO	

REVISIONS

Johnstown Penna.

Pennsylvania Electric Company
Generation Div. Eng'g.

Station: Conemaugh Station Units 1 & 2
Schematic Flow Diagram
Industrial Waste Water
Sources And Treatment

Drawn	Checked	Date	Checked	Approved	Date
WFA	RFG			FRO	
1-13-73	1-15-73			1-19-73	

Scale	Work Order	Drawing Number	Rev.
None	42-302-C178	42-D-0053	2

ATTACHMENT 6G

Engineering Scope of Services for Ash Filter Ponds Construction, August 1983

Note: This document presents record of the engineering services that were performed to support design and permitting for construction of the Ash Filter Ponds.

RELEASE NO. _____

PENELEC CONTINUING DESIGN SERVICES PROJECT

TASK SCOPE

Date of Original Authorization 8/1/83
Nature of Job Fourth Ash Filter Pond

Station Conemaugh
Penelec W.O. C344
GAI W.O. 04-4479-158
Date Prepared 2/7/84

GAI FUNCTION	DATE AUTHORIZED
Study	1/16/84
Estimate	1/16/84
Schedule	8/1/83
Design	8/1/83
Expedite	8/1/83
Drafting	8/1/83

GAI IS TO PREPARE:

- Specifications ☐
- Bills of Material ☐
- Penelec Purchase Reqs. ☐
- Material List ☐
- Drawing List ☐
- ☐
- ☐

MATERIAL TO BE PURCHASED BY:

PENELEC ☐ CONTRACTOR ☐ OTHER ☐

GAI LEAD ENGINEER J. F. Wagner
PENELEC DESIGN ENGINEER F. Straw
PENELEC PROJECT ENGINEER T. J. Simunich

Scope: Change No. 1 (Revised)

This change covers additional engineering necessary for the following items:

- lining all four ash filter ponds with suitable clay materials (synthetic liner was ruled out due to 3:1 slope requirements)
- protective stone cover over clay liner
- field investigation of soil stockpile for suitable clay and fill materials
- field installation of four monitoring wells
- preliminary engineering study on design of two ash silo area drainage ponds including:
  - ponds to include filter underdrain
  - clay lining and stone protective cover
  - flow control on discharge and inlet to ponds and method of decanting ponds
  - enlargement of existing ponds to obtain sufficient volume of ash storage
  - investigation into alternate methods of treating this source of waste other than modifications to the existing ponds as described
- revise Penelec PER #335-83 for the subject project including a preliminary cost estimate for lining all ponds and modifications to existing ash silo area drainage ponds
- revise Pa. DER Water Quality Management Part II permit application for these changes

The revised PER, cost estimate, and preliminary design of the ash silo area drainage ponds are required by 2/29/84. The preliminary permit design package is required by 4/9/84.

APPROVED: GAI E. J. Zeno Jr. Date 2/8/84

APPROVED:
Penelec Technical _____
Date _____
Penelec Project _____
Date _____
Penelec Materials Mgt. _____
Date _____

USE SEPARATE SHEET FOR EACH CHANGE OR SCOPE

RELEASE NO. _____

PENELEC CONTINUING DESIGN SERVICES PROJECT

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Date of Original Authorization 8/1/83
Nature of Job Fourth Ash Filter Pond

Station Conemaugh
Penelec W.O. C344
GAI W.O. 04-4479-158
Date Prepared 2/7/84

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PENELEC ☐ CONTRACTOR ☐ OTHER ☐

GAI LEAD ENGINEER J. F. Wagner
PENELEC DESIGN ENGINEER F. Straw
PENELEC PROJECT ENGINEER T. J. Simunich

Scope:

Existing Penelec plan and topographic drawings of this area will be used as background.

Specific Tasks

I. Process Engineering

1.	Additional coordination as lead engineer	40
2.	Assist Civil in preliminary design of ash silo area drainage ponds	20
3.	Assist Civil and Soils in final design of clay liner and stone cover for all four ash filter ponds	10
4.	Investigation into alternate treatment method for this waste source	20
5.	Revise Penelec PER #335-83	20
6.	Preparation of revised Water Quality Management Part II Permit Appl.	40
	Total	150

APPROVED: GAI E J Zeme, Jr. Date 2/8/84

APPROVED:
Penelec Technical _____
Date _____
Penelec Project _____
Date _____
Penelec Materials Mgt. _____
Date _____

USE SEPARATE SHEET FOR EACH CHANGE OR SCOPE

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PENELEC ☐ CONTRACTOR ☐ OTHER ☐

GAI LEAD ENGINEER J. F. Wagner
PENELEC DESIGN ENGINEER F. Straw
PENELEC PROJECT ENGINEER T. J. Simunich

Scope:

II. Soils Engineering

1.	Design of clay liner and details for all four (4) ash filter ponds	60
2.	Input to construction specification for clay and stone liner matls.	60
3.	Field installation of monitoring wells including subcontracting for driller	60
4.	Preparation of final well logs	25
5.	Preliminary design of clay liner and details for ash silo area drainage ponds	20
6.	Preliminary design of filter media and details for ash silo area drainage pond	20
7.	Input to Civil for preliminary design of separating wall between ponds	10
		255

APPROVED: GAI [signature] Date 2/8/84

APPROVED:
Penelec Technical _____
Date _____
Penelec Project _____
Date _____
Penelec Materials Mgt. _____
Date _____

USE SEPARATE SHEET FOR EACH CHANGE OR SCOPE

RELEASE NO. _____

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GAI LEAD ENGINEER J. F. Wagner

PENELEC DESIGN ENGINEER F. Straw
PENELEC PROJECT ENGINEER T. J. Simunich

Scope:

III. Civil Engineering

1.	Preliminary design of details for installation of clay liner and cover material for four ash filter ponds	20
2.	Final design of details for installation of clay liner and cover material including input to construction specification	30
3.	Preliminary design of ash silo area drainage ponds	20
4.	Preliminary design of wall between ponds	15
5.	Preliminary design of modifications to existing concrete inlet structure to distribute flow to ponds	10
6.	Develop temporary diversion during construction	10
7.	Preliminary design of discharge structure	10
8.	Preliminary design of filter underdrain and discharge piping to bypass ditch	20
9.	Input to preliminary report, design review, and client review	40
10.	Administration	20
	Total	195

APPROVED: GAI E. J. Grimm, Jr. Date 2/8/84

APPROVED:
Penelec Technical _____
Date _____
Penelec Project _____
Date _____
Penelec Materials Mgt. _____
Date _____

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RELEASE NO. _____

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PENELEC ☐ CONTRACTOR ☐ OTHER ☐

GAI LEAD ENGINEER J. F. Wagner
PENELEC DESIGN ENGINEER F. Straw
PENELEC PROJECT ENGINEER T. J. Simunich

Scope:

IV. Civil Drafting

1. Modifications to design drawings to show clay liner and protective cover materials including additional sections for details — 60
2. Plot monitoring wells on plot plan — 25
3. Preparation of preliminary drawings for ash silo area drainage ponds including plan, sections and details — 60
4. Modification to permit drawings to reflect new work for submittal to Pa. DER — 20
5. Administration — 20

Total 185

V. Cost Engineering

1. Preparation of preliminary cost estimate for installation of clay liner and cover material for ash filter ponds and escalation of construction costs for work in these ponds for construction in 1985 and 1986. — 40
2. Preparation of preliminary cost estimate for construction of two clay lined ash silo area drainage ponds — 60

Total 100

APPROVED: GAI [signature] Date 2/8/84

APPROVED:
Penelec Technical _____
Date _____
Penelec Project _____
Date _____
Penelec Materials Mgt. _____
Date _____

USE SEPARATE SHEET FOR EACH CHANGE OR SCOPE

RELEASE NO. _____

PENELEC CONTINUING DESIGN SERVICES PROJECT

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- ☐
- ☐

MATERIAL TO BE PURCHASED BY:

PENELEC ☐ CONTRACTOR ☐ OTHER ☐

GAI LEAD ENGINEER J. F. Wagner
PENELEC DESIGN ENGINEER F. Straw
PENELEC PROJECT ENGINEER T. J. Simunich

Manhour Summary

		Present Authorization	Additional	Total
0214	Project Support	30	10	40
0218	Planning & Scheduling	40	20	60
0219	Cost Engineering	-	100	100
0241	Expediting	20	-	20
0242	Specs/Bills of Material	80	-	80
0409	Soils Engineering	140	255	395
0413	Civil Engineering	240	195	435
0424	Project Manager	20	-	20
0426	Electrical Engineering	20	-	20
0445	Civil Drafting	230	185	415
0455	Vendor Print Services	30	-	30
0719	Process Engineering	150	150	300
		1,000	915	1,915

Out-of-Pocket Expenses:

Present Authorization -	$3,000
Additional (driller, travel, material testing)	5,000
	$8,000

APPROVED: GAI [signature] Date 2/8/84

APPROVED:
Penelec Technical _____
Date _____
Penelec Project _____
Date _____
Penelec Materials Mgt. _____
Date _____

USE SEPARATE SHEET FOR EACH CHANGE OR SCOPE

ATTACHMENT 6H

Purchase Requisition for Lab and Field Testing, April 1985

Note: This document presents record of the testing services that were performed during construction of the Ash Filter Ponds.

PREV. P O NO _____ PREV REQ NO _____

PREVIOUS OR SUGGESTED VENDOR
Kimball Engineering or

ADDRESS
P.T. Labs

Penelec / GPU

PURCHASE REQUISITION

(FOR INTERNAL USE ONLY)

BLD

REQ NO	BUYER	D	LN	ITEM	DATE REQUIRED	REQUISITION NO	TERMS
						GSP5108	

VENDOR NO	C.C.	T.P.	TXN CD	F.O.B.	SHIP VIA	BUYER	
						C. C. STUTZMAN	0921

FOR PURCHASING USE ONLY

ORDER ISSUED TO

TO BE SHIPPED TO:
PENNSYLVANIA ELECTRIC COMPANY
Attn: T. J. Simunich (GSP5108)
Conemaugh Station
New Florence, PA 15944
(W.O. C344)

LOCATION CODE / STOCK SYMBOL / ACCOUNT OR W.O. NO	ITEM NO	QUANTITY	UNIT OF ISSUE	SECURE THE FOLLOWING MATERIALS OR SERVICES	TO BE USED FOR
41-0420-2C344-0	1			Furnish the necessary laboratory and field testing services for various concrete and soil tests as requested by the Owner for the Fourth (4th) Waste Filter Pond and modifications at Conemaugh Station. Term: 4/12/85 to 12/30/86 Estimated Cost: $24,000 Note to Contracts: Work will be assigned as required during the course of construction activities as outlined in GAI Specification #140-4479-158 dated 12/26/84. Note: Advance copy sent to L. N. Thompson	Conemaugh Station Fourth (4th) Waste Filter Pond Addition and Modifications to Existing Ponds

RECEIVED
APR 17 1985
PENNSYLVANIA ELECTRIC
CONEMAUGH STATION

REQUISITIONER SIGNATURE	DATE	TOTAL EST COST
T. J. SIMUNICH TJS	4/15/85	$24,000

APPROVED BY	APPROVAL AUTHORITY NO	DATE
C. C. Flynn	6080-3	4/15/85

ATTACHMENT 6I

Ash Filter Ponds Liner Certification Report, August 2016

Note: This document presents the evaluations and testing completed to demonstrate that the engineered clay liners for the Ash Filter Ponds were in compliance with the 2015 CCR Rule.

CCR RULE COMPLIANCE

ASH FILTER PONDS
LINER CERTIFICATION REPORT

Prepared for:

GenOn Northeast Management Company
Conemaugh Generating Station
New Florence, Pennsylvania

Prepared by:

CB&I Environmental & Infrastructure, Inc.
Pittsburgh, Pennsylvania 15235

August 2016

Table of Contents

1.0 Introduction

On December 19, 2014, the administrator of the United States Environmental Protection Agency signed the Disposal of Coal Combustion Residuals (CCR) from Electric Utilities final rule (the Rule). The Rule was published in the Federal Register on April 17, 2015, became effective on October 19, 2015, and is contained within amended portions of Title 40, Part 257 of the Code of Federal Regulations (CFR). The Rule establishes a comprehensive set of requirements for the disposal/management of CCR in landfills and surface impoundments at coal-fired power plants under Subtitle D of the Resource Conservation and Recovery Act. These requirements include compliance with location restrictions, design criteria, operating criteria, groundwater monitoring and corrective action criteria, and closure and post-closure care aspects. The design criteria include requirements for documenting the presence of an appropriate liner system in new/expanded CCR landfills and in new/existing CCR surface impoundments. Specific to existing surface impoundments, §257.71(a)(1)(i-iii) of the Rule obligates the owner/operator of such CCR units to document (no later than October 17, 2016) whether or not the unit was constructed with a liner system that satisfies one of the following:

- A liner consisting of a minimum of two feet of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} centimeters per second (cm/sec);
- A composite liner that meets the requirements of §257.70(b); or
- An alternative composite liner that meets the requirements of §257.70(c).

Per §257.71(b) of the Rule, documentation generated in this regard must be certified by a registered professional engineer. In addition to being placed in the facility's operating record, this documentation must be noticed to the State Director per §257.106(f)(3) and posted on the publicly accessible website per §257.107(f)(3).

The Conemaugh Generating Station, which is operated by GenOn Northeast Management Company (a subsidiary of NRG Energy, Inc. [NRG]), is a coal-fired power plant located in New Florence, Pennsylvania. At the Station, four Ash Filter Ponds (Ponds "A", "B", "C", and "D" [see Figure 1]) are utilized as part of bottom ash management operations, receiving ash transport water via gravity flow from the adjacent hydrobins. The Ponds facilitate settling of ash particles from the transport water, and are periodically cleaned out to remove the accumulated bottom ash, which is then taken to the Station's on-site CCR landfill for disposal. Having been deemed as existing CCR surface impoundments, the Ponds are thus subject to the requirements of §257.71 of the Rule pertaining to liner system design criteria.

Accordingly, NRG engaged the services of CB&I Environmental & Infrastructure, Inc. (CB&I) to conduct a review of available design/construction information for the Ponds, and for the development and implementation of a field investigation program to visually examine the liner system and gather samples for geotechnical testing. These efforts were undertaken during August through September 2015, with the field investigation component focused on Pond "B", which had been taken out of service for maintenance and afforded the ability to bring the necessary personnel, resources, and equipment into the "empty" footprint of the pond.

This Report has been prepared to summarize the activities performed as part of the Pond "B" liner system investigation, and to provide documentation required by the Rule, including certification of the findings by a professional engineer. Beyond this introductory section, Section 2.0 provides a description of the field investigation, Section 3.0 details the results of the geotechnical laboratory testing program, and Section 4.0 presents overall conclusions. Section 5.0 contains the professional engineer certification, and Section 6.0 lists the references that were consulted during performance of the work.

2.0 Field Investigation

2.1 Historical Information/Basis for Field Investigation

From review of available historical information, design modifications to the ponds were approved by the Pennsylvania Department of Environmental Resources (PADER) with issuance of Water Quality Management Permit No. 3283201 on November 5, 1984. These modifications included installation of an upgraded liner system in each of Ponds #1, #2, and #3 (presently designated as Ponds "A", "B", and "C"), along with the new construction of Pond #4 (presently designated as Pond "D") also to include this same upgraded liner system. Design and subsequent as-built drawings (see "As-Built" Reference Drawing D-782-008 in Attachment A) further elaborated on this upgraded liner system, which was shown to consist (from top to bottom) of a 2.5-feet thick protective bottom ash layer; a 1.5-feet thick layer of American Association of State Highway and Transportation Officials (AASHTO) No. 8 coarse aggregate for pond dewatering; 1.5 feet of impervious fill in which the pond dewatering pipes are located and imbedded with AASHTO No. 8 coarse aggregate; and 2 feet of soil liner comprised of a 0.67-foot (8-inch) bentonite-amended compacted soil layer underlain by an additional 1.33 feet (16 inches) of compacted soil. The total liner system thickness was designed to be 7.5 feet, of which the thickness of the compacted soil component was to be 2 feet. The upgraded liner system on the interior slopes of the Ponds was represented by 2 feet of bentonite-amended soil overlain by a 1.5-feet thick layer of AASHTO R-3 riprap as a protective rock lining. The construction of Pond #4 (Pond "D") and the liner system retro-fit for Pond #3 (Pond "C") were completed during the latter half of 1985, followed by completion of the liner system retro-fits in Ponds #1 and #2 (Ponds "A" and "B") in 1986.

Taking the above into consideration, CB&I developed a field investigation/testing program intended to confirm that the liner system in Pond "B" had been constructed as designed, specifically evaluating the compacted soil layer in terms of satisfying the CCR Rule's criteria for thickness (2 feet) and hydraulic conductivity (no greater than $1x\ 10^{-7}$ cm/sec). Moreover, the findings from the Pond "B" investigation were intended for extrapolation over the remaining ponds to provide a collective demonstration of compliance for the remaining Ponds "A", "C", and "D".

2.2 August 2015 Field Investigation

As part of an August 27, 2015 walk-over, preliminary boring/sampling locations were marked within the Pond "B" footprint, and identified as borings GT-1 through GT-5 (see Figure 1). Borings GT-1, GT-2, and GT-3 were located across the base of the pond, with borings GT-4 and GT-5 located on the southern and northern interior slopes, respectively. Following clearance of

the locations, CB&I's field geologist and a drilling crew (with a geotechnical drilling rig) from Terra Testing, Inc. of Washington, Pennsylvania mobilized to the Station on August 31, 2015.

Before drilling at any of the identified boring locations, a pilot test boring (TB-1, also shown on Figure 1) was advanced through the base of the pond, and continuous split-barrel samples were collected in order to confirm the components of the liner system as discussed above. Split-barrel samples were collected over the entire depth of TB-1 using the standard penetration test (SPT) in accordance with American Society for Testing and Materials (ASTM) Method D 1586. The SPT consists of raising and dropping a 140-pound hammer 30 inches and counting the number of blows required to advance the split-barrel sampler three successive 6-inch intervals. The number of blows required to drive the split-barrel sampler through the second and third 6-inch intervals is designated as the Penetration Resistance. The Penetration Resistance is a qualitative measure of the in-place consistency of cohesive soils or the in-place relative density of granular soils. Soils collected from each split-barrel sample were logged by CB&I's geologist to note color, grain size and density/consistency. The samples did serve to confirm the various layers of the liner system (aligning with those from the design drawings and spanning over an approximate 7.5-feet depth), with the consistency of the bottom-most soil layer (identified as a two-foot thick clay layer) being classified as medium-stiff to stiff, suggesting that the material was compacted when it was originally placed. A copy of the boring log for TB-1 is included in Attachment B. Upon completion, TB-1 was backfilled by R&L Development Company with materials to match the component layers encountered within the boring. Hydrated bentonite (CETCO® 30-50 mesh granular) was utilized to replace the impervious fill and clay liner layers.

Using the information derived from TB-1, efforts were then directed to drilling of borings GT-1, GT-2, and GT-3 located along the base of the pond in an east-west transect. At each boring location, a hollow-stem auger was advanced to a depth of 5.5 feet below ground surface (corresponding to the top of the clay layer), at which point a Shelby tube was pushed through the entire two-foot thickness of the clay layer from a depth of 5.5 feet to 7.5 feet below ground surface. Shelby tube samples were collected in accordance with ASTM Method D 1587. Drilling of borings GT-4 and GT-5 (located on the interior slopes) utilized similar protocols, with clearing/augering through the rip-rap protective cover down to a depth of 1.5 feet below ground surface (corresponding to the top of the clay layer on the side slopes), followed by Shelby tube sampling down to 3.5 feet below ground surface to encompass the two-foot thick clay layer. A copy of the boring logs for GT-1 thru GT-5 are included in Attachment B. Upon completion, each boring was backfilled with materials to match the component layers encountered. As intended, the Shelby tube sampling provided for the collection of relatively undisturbed samples of the clay liner that were then subjected to laboratory testing for determination of physical properties, including in-situ hydraulic conductivity, unit weight, natural moisture content, and grain-size distribution.

From the boring logs, two cross-sections were developed to depict the liner system components encountered, and are shown on Figure 2. Cross-section A-A' is an east-west profile of Pond "B" through borings GT-1, GT-2, and GT-3, while Cross-section B-B' is a north-south profile through borings GT-2, GT-4, and GT-5. Both of these cross-sections again provide confirmation that the layers encountered during the drilling match those depicted on the original design drawings. Photographs taken during performance of the field investigation program are contained in Attachment C.

3.0 Geotechnical Laboratory Testing Results

The Shelby tube samples collected during the Pond "B" investigation were hand-delivered to Geotechnics, Inc. of East Pittsburgh, Pennsylvania for laboratory analyses. The laboratory testing program was performed using standard ASTM methods and consisted of the following analyses:

- Natural moisture content (ASTM Method D 2216)
- Classification tests to determine the routine index properties of the soils, including grain-size distribution (sieve and hydrometer analysis, ASTM Method D 422), and Atterberg Limits (ASTM Method D 4318)
- Unit weight (ASTM Method D 7263)
- Hydraulic conductivity (ASTM Method D 5084)

Analytical results from the laboratory testing program are summarized on Table 1, with the complete laboratory report (prepared by Geotechnics) contained in Attachment D. As shown on Table 1, analyses were performed on Shelby tube samples collected from each of the borings, but the intervals tested were varied in order to determine the geotechnical properties throughout the entire thickness of the two-foot clay layer, and to identify any potentially significant differences in characteristics. The results of the above-listed analyses are discussed in the following sections.

3.1 Natural Moisture Content

The natural moisture content of the soil comprising the liner for Pond "B" varied from 14.1 to 19.3 percent, and offers information relative to soil plasticity and compaction. Since the natural moisture contents were all below the values reported for the liquid limit tests (Table 1), this provides indication that the soil materials behave as a plastic solid. The natural moisture content values are also reasonable (neither excessively wet nor dry) with respect to the recognized moisture content of clayey soil that is purposely placed and compacted as fill.

3.2 Soil Classification

The soil samples were assigned designations in accordance with the Unified Soil Classification System (USCS). As shown in Table 1, five of the six samples are designated as clay of low plasticity (USCS symbol CL), with the remaining sample being designated as a clayey sand (USCS symbol SC) due to a slightly increased percentage of coarse-grained materials.

3.3 Unit Weight

As-received unit weights ranged from 129.9 to 140.2 pounds per cubic foot (pcf), as bracketed by the samples collected from the upper and lower eight inches of the clay liner in boring GT-1.

3.4 Hydraulic Conductivity

The hydraulic conductivities of the soil samples ranged from 1.6×10^{-8} to 4.1×10^{-8} cm/sec, with all values meeting the Rule criteria of being no greater than 1×10^{-7} cm/sec.

4.0 Conclusions

The geotechnical investigation/testing program performed on the Pond "B" liner was conducted using field protocols and ASTM methods which are recognized and generally accepted engineering practice. The program included drilling a pilot boring (TB-1) to confirm the as-designed/as-built liner system, and subsequent drilling of five additional borings (GT-1 through GT-5) from which undisturbed Shelby tube samples of the soil liner (clay layer) were collected. Laboratory evaluation of each sample provided the results necessary for comparing the in-situ hydraulic conductivity of the soil liner with the requirements of the Rule.

Based on the field observations and the results of the laboratory testing, the soil comprising the Pond "B" liner is represented by two feet of compacted sandy clay/clayey sand. The in-situ hydraulic conductivity of these materials was measured and found to range from 1.6×10^{-8} to 4.1×10^{-8} cm/sec. Collectively, these findings demonstrate that the Pond "B" compacted soil liner (clay layer) fully meets the requirements of §257.71(a)(1)(i) of the Rule with regard to thickness (two feet) and hydraulic conductivity (no greater than 1×10^{-7} cm/sec).

5.0 Professional Engineer Certification

I attest to being familiar with the design standards per §257.71 of the Rule, and have personally visited and examined the Conemaugh Station Ash Filter Ponds, and further provided guidance to appropriately qualified personnel who conducted the Pond "B" Liner Investigation Program. Based on the findings/data presented herein and the performance of the program in accordance with sound/acceptable engineering practices, I hereby certify per §257.71(b) of the Rule that Pond "B" maintains a liner system compliant with the design criteria outlined in §257.71(a)(1)(i). Additionally, and based on my review/understanding of the consistent nature of construction of the remaining Ash Filter Ponds (Ponds "A", "C", and "D"), the results of the Pond "B" investigation provide ample justification to render this same certification on the liner systems of Ponds "A", "C", and "D".

Name of Professional Engineer: Laurel C. Lopez

Company: CB&I Environmental & Infrastructure, Inc.

Signature: Laurel C Lopez

Date: 8/12/16

PE Registration State: Pennsylvania

PE Registration Number: PE-055673-E

Professional Engineer Seal:

6.0 References

"Addition of Ash Filter Pond No. 4 Plan and Sections – Drawing No. D-782-018 (Rev. B)," Gilbert Associates, Inc., April 6, 1984.

"Industrial Waste Application 3823201, Wastewater Treatment System Improvements, Conemaugh Generating Station," Pennsylvania Electric Company, April 12, 1984.

"Wastewater Filter Pond Additions and Modifications, Conemaugh Station," letter correspondence from F.L. Straw (Pennsylvania Electric Company) to J.F. Wagner (Gilbert Associates, Inc.), August 21, 1984.

"Addition of 4th Ash Filter Pond Plan, Sections, and Details – Drawing No. D-782-008 (Rev. 10)," Gilbert Associates, Inc., October 10, 1995.

Table 1

Summary of Geotechnical Testing Results

Table 1
Conemaugh Generating Station
Pond "B" Liner Investigation
Summary of Geotechnical Testing Results

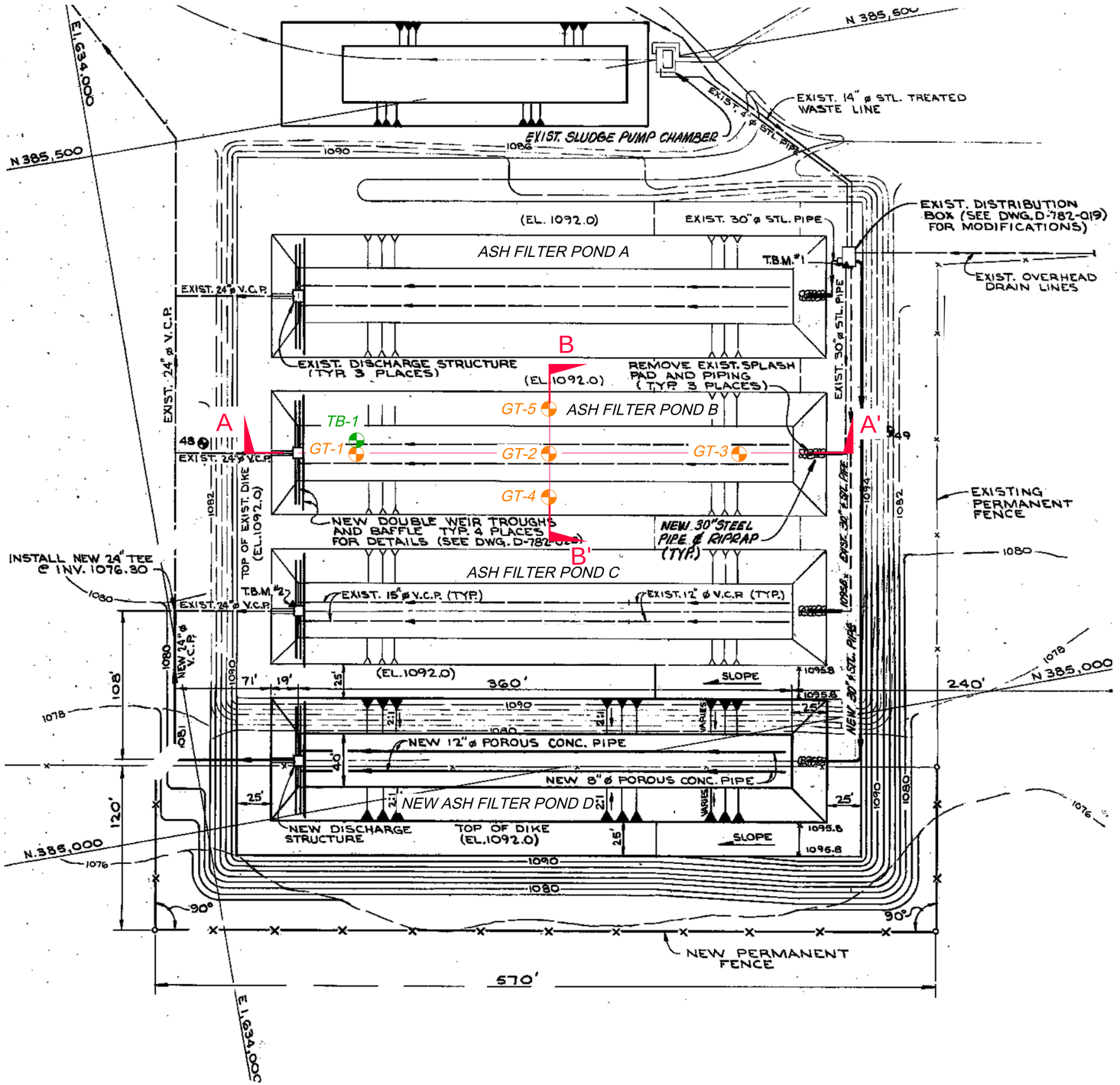
Boring No.	Location	Sample Depth (ft)	Interval Analyzed	Natural Moisture Content (%)	% Gravel	% Sand	% Silt and Clay	Liquid Limit	Plastic Limit	Plastic Index	USCS[1] Description	USCS Symbol	Hydraulic Conductivity (cm/sec)	Unit Wet Weight (pcf)
GT-1	Base	5.5-7.5	Upper 8"	18.4	7.69	20.54	71.76	41	17	24	Lean clay w/ sand	CL	2.6×10^{-8}	129.9
GT-1	Base	5.5-7.5	Lower 8"	14.9	11.68	26.77	61.55	37	18	19	Sandy lean clay	CL	2.5×10^{-8}	140.2
GT-2	Base	5.5-7.5	Lower 8"	15.7	15.61	24.17	60.22	46	16	30	Sandy lean clay w/ gravel	CL	1.8×10^{-8}	135.6
GT-3	Base	5.5-7.5	Middle 16"	14.1	6.80	25.73	67.47	39	19	20	Sandy lean clay	CL	1.6×10^{-8}	133.1
GT-4	Slope	1.5-3.5	Upper 8"	19.3	21.72	38.85	39.43	38	20	18	Clayey sand w/ gravel	SC	4.1×10^{-8}	132.2
GT-5	Slope	1.5-3.5	Lower 8"	18.2	19.48	24.62	55.90	39	20	19	Sandy lean clay w/ gravel	CL	3.9×10^{-8}	133.6

[1] USCS = Unified Soil Classification System.

cm/sec = centimeters per second

pcf = pounds per cubic foot

Figures



LEGEND:

TB-1 PILOT BORING

GT-5 GEOTECHNICAL TEST BORING

NOTE:

FOR CROSS-SECTIONS A-A' AND B-B', SEE FIGURE 2.

SCALE

0 40 80 120 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

500 Penn Center Boulevard
Monroeville, PA 15146-2792

DESIGNED BY: JAK

DRAWN BY: AKR

CHECKED BY: DJS

APPROVED BY: JAK

GENON NORTHEAST MANAGEMENT COMPANY

FIGURE 1
POND "B" BORING LOCATIONS
CCR LINER INVESTIGATION
CONEMAUGH GENERATING STATION

DATE:	SCALE:	DRAWING NO.	SHEET NO.
9/14/15	AS SHOWN	1009144001-E10	--

REFERENCE:

ADAPTED FROM DRAWING NO. D-782-018 (REV. B), GILBERT ASSOCIATES, INC., APRIL 6, 1984.

OFFICE Pittsburgh, PA

DRAWING NUMBER 1009144001-E10

VERIFY SCALE 0 1"

Xref: Image: CB&I.jpg

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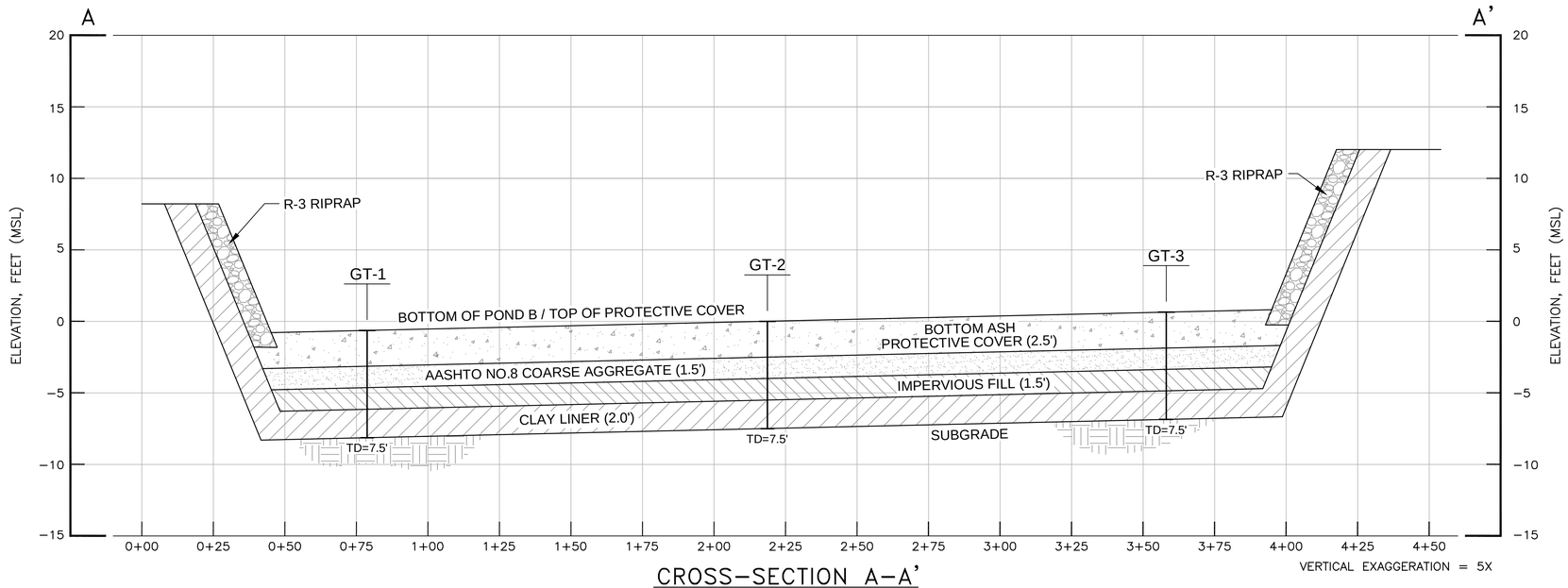
Plot Date/Time: Jun 22, 2016 - 10:08am
Plotted By: greg.jones

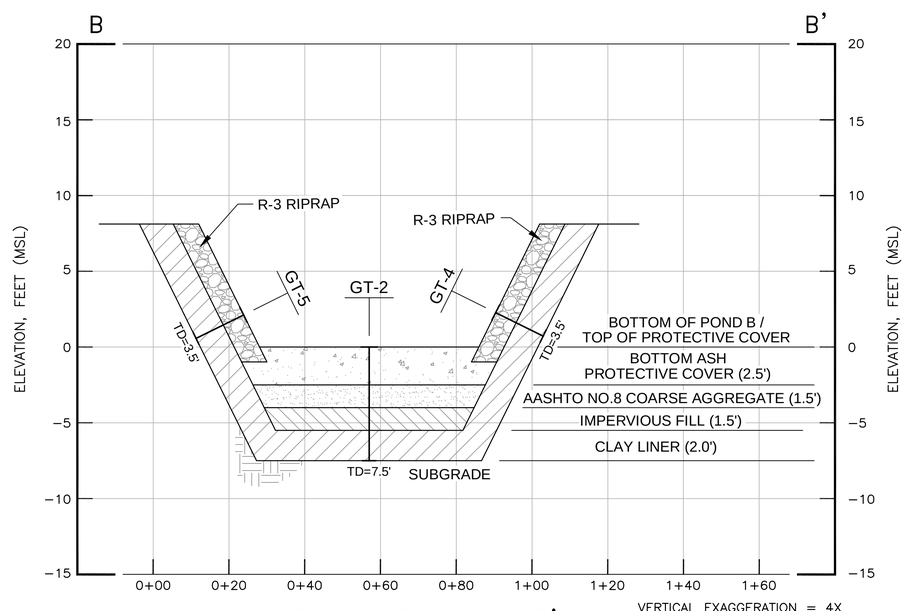


CROSS–SECTION A–A'

POND "B" LINER SYSTEM

HORIZONTAL SCALE 0 25 50 FEET

VERTICAL SCALE 0 5 10 FEET



CROSS–SECTION B–B'

POND "B" LINER SYSTEM

HORIZONTAL SCALE 0 20 40 FEET

VERTICAL SCALE 0 5 10 FEET

NOTES:

1. FOR LOCATION OF CROSS–SECTIONS A–A' AND B–B', SEE FIGURE 1.
2. THE POND BASE ELEVATIONS ARE REFRENCED TO AN ARBITRARY DATUM WITH 0 FEET MSL BEING THE ELEVATION OF THE TOP OF THE BOTTOM ASH PROTECTIVE COVER AS CORRELATED TO BORING GT–2.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

500 Penn Center Boulevard
Monroeville, PA 15146-2792

DESIGNED BY: JAK
DRAWN BY: ELS
CHECKED BY: DJS

GENON NORTHEAST MANAGEMENT COMPANY

FIGURE 2
POND "B" CROSS-SECTIONS A-A' AND B-B'
CCR LINER EVALUATION
CONEMAUGH GENERATING STATION

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	SHEET NO.
JAK	3/16/16	AS SHOWN	1009144001–E11	--

OFFICE Pittsburgh, PA
DRAWING NUMBER 1009144001-E11

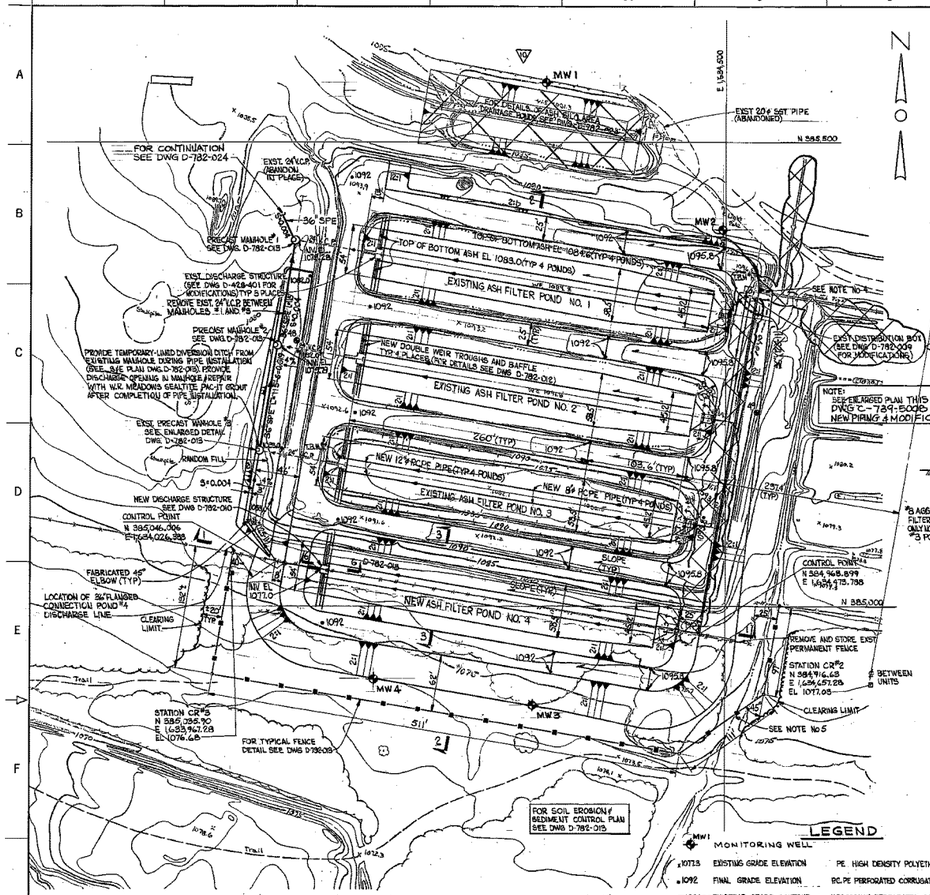
VERIFY SCALE 0 1"

Xref: Image

File: Q:\PROJECT\1009144001\1009144001-E11.dwg
Plot Date/Time: Jun 22, 2016 – 10:10am
Plotted By: greg.jones

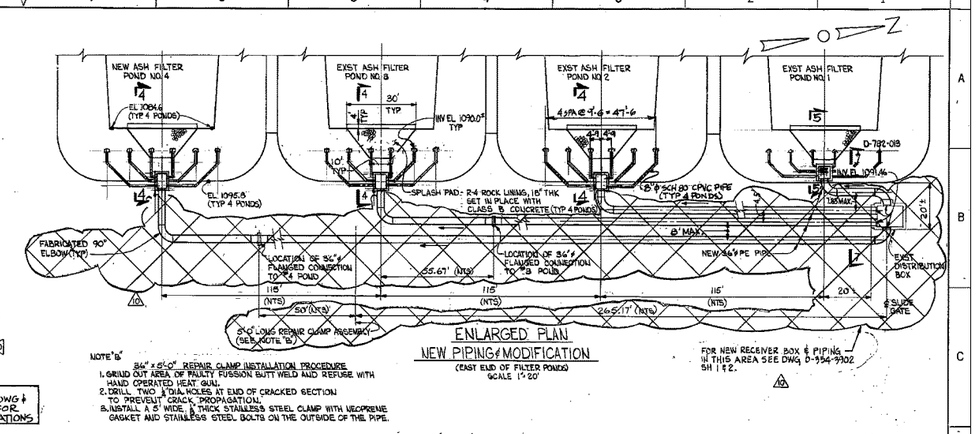
Attachment A

"As-Built" Reference Drawing No. D-782-008



LOCATION PLAN

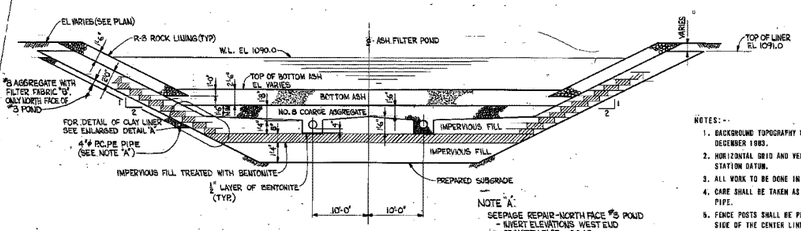
SCALE 1"=50'



ENLARGED PLAN
NEW PIPING & MODIFICATION

(EAST END OF FILTER PONDS)
SCALE 1"=20'

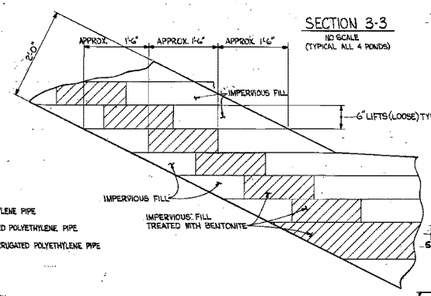
NOTE 'B'
24" ± 3'-0" REPAIR CLAMP INSTALLATION PROCEDURE
1. GRIND OUT AREA OF FAULTY FUSSION BUTT WELD AND REFUSE WITH HAND OPERATED HEAT GUN.
2. DRILL TWO 1/8" DIA. HOLES AT END OF CRACKED SECTION TO PREVENT CRACK PROPAGATION.
3. INSTALL A 5" WIDE, 1/4" THICK STAINLESS STEEL CLAMP WITH NEOPRENE GASKET AND STAINLESS STEEL BOLTS ON THE OUTSIDE OF THE PIPE.



SECTION 3-3

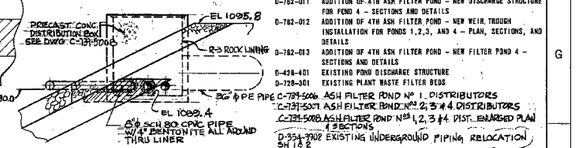
NO SCALE
(TYPICAL ALL 4 PONDS)

NOTE 'A'
SEEPAGE REPAIR - NORTH FACE #3 POND
- RIVERT ELEVATIONS WEST END OF NORTH FACE = 80.10
- EAST END OF NORTH FACE = 78.45
- TIE IN AT #4 DISCHARGE STRUCTURE = 76.91 (GROUTED SHUT AFTER COMPLETION OF POND)



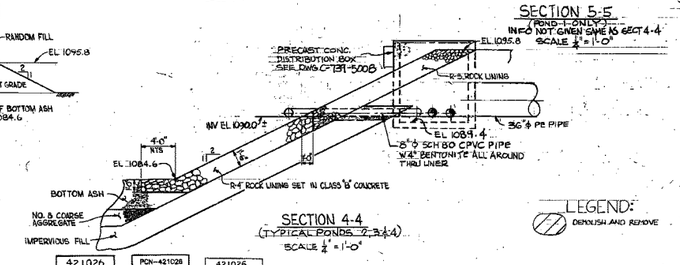
DETAIL 'A'

CLAY LINER
SCALE 1"=1'



SECTION 5-5

(POND 1 ONLY)
INFO NOT GIVEN SEE KG SECT 4-4
SCALE 1/4"=1'-0"



SECTION 4-4

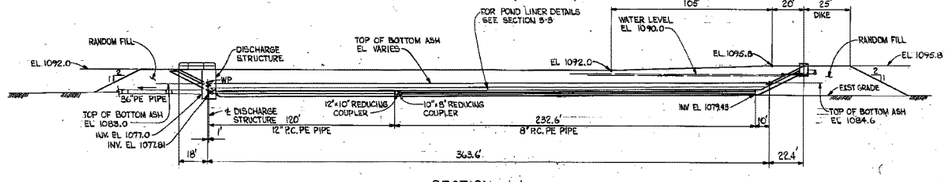
(TYPICAL PONDS 2, 3 & 4)
SCALE 1/4"=1'-0"

LEGEND:
DEMOLISH AND REMOVE

NOTES:--
1. BACKGROUND TOPOGRAPHY WAS TAKEN FROM AERIAL SURVEY FLOWN DECEMBER 1983.
2. HORIZONTAL GRID AND VERTICAL DATUM ARE BASED ON CONEMAUGH STATION DATUM.
3. ALL WORK TO BE DONE IN ACCORDANCE WITH SP-148-4476-158.
4. CARE SHALL BE TAKEN AS TO NOT DAMAGE EXISTING ABOVE GROUND PIPE.
5. FENCE POSTS SHALL BE PLACED NO CLOSER THAN 5 FEET ON EITHER SIDE OF THE CENTER LINE OF THE STREAM.
6. CARE SHALL BE TAKEN BY THE CONTRACTOR AS TO NOT DISTURB EXISTING MONUMENTS.
7. ALL PIPE PENETRATIONS THROUGH THE IMPERVIOUS FILL SHALL BE ENCASED WITH A MINIMUM 4 INCH LAYER OF TAMPED BENTONITE ALL AROUND.
8. ALL STRUCTURAL PENETRATIONS THROUGH THE IMPERVIOUS FILL SHALL BE ENCASED WITH A MINIMUM 2 INCH LAYER OF TAMPED BENTONITE ALL AROUND.

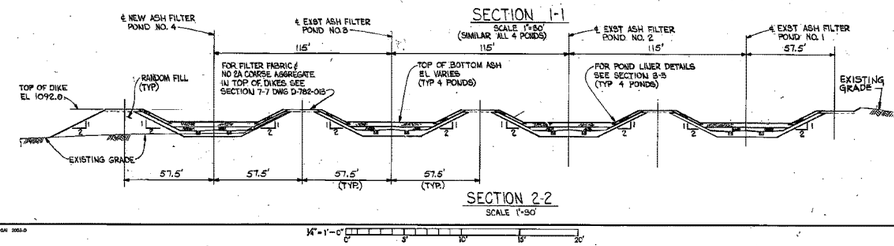
REFERENCES:-

D-782-009	ADDITION OF 4TH ASH FILTER POND - EXISTING DISTRIBUTION BOX MODIFICATION - PLAN, SECTIONS, AND DETAILS
D-782-010	ADDITION OF 4TH ASH FILTER POND - NEW DISCHARGE STRUCTURE FOR POND 4 - PLAN, SECTIONS, AND DETAILS
D-782-011	ADDITION OF 4TH ASH FILTER POND - NEW DISCHARGE STRUCTURE FOR POND 4 - SECTIONS AND DETAILS
D-782-012	ADDITION OF 4TH ASH FILTER POND - NEW WEIR TROUGH INSTALLATION FOR PONDS 1, 2, 3, AND 4 - PLAN, SECTIONS, AND DETAILS
D-782-013	ADDITION OF 4TH ASH FILTER POND - NEW FILTER POND 4 - SECTIONS AND DETAILS
D-428-401	EXISTING POND DISCHARGE STRUCTURE
D-728-301	EXISTING PLANT WASTE FILTER BEDS
C-784-5006	ASH FILTER POND Nº 1 - DISTRIBUTORS
C-731-5007	ASH FILTER POND Nº 2, 3 & 4 DISTRIBUTORS
C-731-5008	ASH FILTER POND Nº 1, 2, 3 & 4 DIST. ENLARGED PLAN & SECTIONS
D-554-9302 SH 1 & 2	EXISTING UNDERGROUND PIPING RELOCATION



SECTION 1-1

SCALE 1"=50'
(SIMILAR ALL 4 PONDS)



SECTION 2-2

SCALE 1"=50'

14" = 1'-0"

LEGEND

MONITORING WELL

1073.5	EXISTING GRADE ELEVATION	PE	HIGH DENSITY POLYETHYLENE PIPE
1092	FINAL GRADE ELEVATION	RC.PE	PERFORATED CORRUGATED POLYETHYLENE PIPE
1090	EXISTING GRADE CONTOUR	NRC.PE	NON PERFORATED CORRUGATED POLYETHYLENE PIPE
1075	FINAL GRADE CONTOUR	VCP	VITRIFIED CLAY PIPE
—x—x—	EXISTING FENCE		TEST BORING
—■—■—	NEW FENCE	▲	TEMPORARY BENCH MARK
#1-#-1-#1	EXISTING FENCE TO BE REMOVED	TBM#1	TOP OF SOUTH WALL OF DISTRIBUTION BOX ON ℄ OF BOX ELEVATION 1098.35
C.M.P.	CORRUGATED METAL PIPE	TBM#2	N.W. CORNER ON TOP OF POND #3 DISCHARGE STRUCTURE ELEVATION 1091.91
SPE	SPIROLITE POLYETHYLENE PIPE		

REV	MARC	CHKD	DS LD	APP	DATE
7					
6					
5					
4					
3					
2					
1					

REVISIONS

"AS-BUILT" 11-10-86
EXCEPT FOR REV. 6

DATE	RELEASED FOR	ENGR.
2-8-80	CONSTRUCTION	
2-8-80	PRELIMINARY NOT FOR CONSTRUCTION	
2-8-80	BIDDING PURPOSES	

CONEMAUGH STATION OWNERS GROUP
CONEMAUGH STATION — UNITS 1 & 2
ADDITION OF 4TH ASH FILTER POND

CIVIL
NEW FILTER POND 4
PLAN, SECTIONS, AND DETAILS

Gilbert Commonwealth Consultants
GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS READING, PA

DRAFTING — ENGINEERING INTERFACES
DATE 7/16/79 — CHECKED — T.C.G. — PAGE —
APPROVED R.O. Gayer 2-8-80
SCALE AS SHOWN
CONSTRUCTION APPROVAL — DATE
04 4479 D-782-008 10
344478-158
DRAWING NUMBER — REV.

REVISIONS

NO.	DATE	MADE	CHECKED	APPROVED
10	2/8/80	DH	RGG	RGG
9	1/4/80	DW	KCF	
8	11/14/79	DH	GM	
7	10/4/79	JMM	BW	KCF
6	3/6/79			
5	1/4/79	JMM		
4	11/2/78			
3	8/8/78			
2	8/4/78			
1	7/5/78			

REVISED (A15, B15) PIPING
REVISED ELEVATION TOP OF BOTTOM ASH TO BE PLACED TO 1093.0 W.A.S. 1091.25
ADDED NEW DISTRIBUTION BOX & PIPING
REVISED DWG. TO REFLECT ADDED FLANGE CONNECTION IN NOTES AND DETAILS
REVISED SECTION 5-5
ADDED MAIN DISTRIBUTION WALLS (2,3,4) IN DISTRIBUTION PLAN
ADDED REVISED SECTION 5-5 (POND 1 ONLY)
REDRAWN
ADDED SOIL EROSION & SEDIMENT CONTROL PLAN, NOTES 1 THRU 5 AND NOTES 1 THRU 5

NEW ASH FILTER POND NO. 4

Attachment B

Boring Logs

Drilling Log

Soil Boring **TB-1**

Project *Conemaugh Pond B* Owner *NRG*

Location *Conemaugh, PA* Proj. No. *1009144001*

Surface Elev. ____ Total Hole Depth *7.5 ft.* North ____ East ____

Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter ____

Screen: Dia *NA* Length *NA* Type/Size *NA*

Casing: Dia *NA* Length *NA* Type *NA*

Fill Material *Backfilled* Rig/Core *Track Mounted*

Drill Co. *Terra Testing* Method ____

Driller ____ Log By *R. Malec* Date *8/31/15* Permit # *NA*

Checked By ____ License No. ____

COMMENTS
Auger from 0' to 5.5'

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count / Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0			3, 6, 8, 10, 10			(0-2.5 feet) Dark gray fine sand to 1/4-inch BOTTOM ASH (Protective Cover Layer)
2			9, 13, 14		GM	(2.5-4 feet) AASHTO #8- silty rounded PEBBLES (Underdrain Layer)
4			6, 4, 3		CL	(4-5.5 feet) Orange-brown, firm, plastic CLAY, moist (Impervious Fill)
6			3, 5, 6, 8		CL	(5.5-7.5 feet) CLAY, moist (Liner)
8						
10						

Drilling Log

Soil Boring **GT-1**

Project *Conemaugh Pond B* Owner *NRG*

Location *Conemaugh, PA* Proj. No. *1009144001*

Surface Elev. _____ Total Hole Depth *7.5 ft.* North _____ East _____

Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter _____

Screen: Dia *NA* Length *NA* Type/Size *NA*

Casing: Dia *NA* Length *NA* Type *NA*

Fill Material *Backfilled* Rig/Core *Track Mounted Excavator*

Drill Co. *Terra Testing* Method _____

Driller _____ Log By *R. Malec* Date *8/31/15* Permit # *NA*

Checked By _____ License No. _____

COMMENTS
Auger from 0' to 5.5'

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						
2						(0-2.5 feet) Dark gray fine sand to 1/4-inch BOTTOM ASH (Protective Cover Layer)
4					GM	(2.5-4 feet) AASHTO #8- silty rounded PEBBLES (Underdrain Layer)
6		100%			CL	(4-5.5 feet) Orange-brown, firm, plastic CLAY, moist (Impervious Fill)
8					CL	(5.5-7.5 feet) CLAY, moist (Liner)
10						

Drilling Log

Soil Boring **GT-2**

Project *Conemaugh Pond B* Owner *NRG*

Location *Conemaugh, PA* Proj. No. *1009144001*

Surface Elev. _____ Total Hole Depth *7.5 ft.* North _____ East _____

Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter _____

Screen: Dia *NA* Length *NA* Type/Size *NA*

Casing: Dia *NA* Length *NA* Type *NA*

Fill Material *Backfilled* Rig/Core *Track Mounted Excavator*

Drill Co. *Terra Testing* Method _____

Driller _____ Log By *R. Malec* Date *8/31/15* Permit # *NA*

Checked By _____ License No. _____

COMMENTS
Auger from 0' to 5.5'

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						
2						(0-2.5 feet) Dark gray fine sand to 1/4-inch BOTTOM ASH (Protective Cover Layer)
4					GM	(2.5-4 feet) AASHTO #8- silty rounded PEBBLES (Underdrain Layer)
6		100%			CL	(4-5.5 feet) Orange-brown, firm, plastic CLAY, moist (Impervious Fill)
8					CL	(5.5-7.5 feet) CLAY, moist (Liner)
10						

Drilling Log

Soil Boring **GT-3**

Project *Conemaugh Pond B* Owner *NRG*
Location *Conemaugh, PA* Proj. No. *1009144001*
Surface Elev. ____ Total Hole Depth *7.5 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter ____
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Backfilled* Rig/Core *Track Mounted Excavator*
Drill Co. *Terra Testing* Method ____
Driller ____ Log By *R. Malec* Date *8/31/15* Permit # *NA*
Checked By ____ License No. ____

COMMENTS
Auger from 0' to 5.5'

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						
2						(0-2.5 feet) Dark gray fine sand to 1/4-inch BOTTOM ASH (Protective Cover Layer)
4					GM	(2.5-4 feet) AASHTO #8- silty rounded PEBBLES (Underdrain Layer)
6		100%			CL	(4-5.5 feet) Orange-brown, firm, plastic CLAY, moist (Impervious Fill)
8					CL	(5.5-7.5 feet) CLAY, moist (Liner)
10						

Drilling Log

Soil Boring **GT-4**

Project *Conemaugh Pond B* Owner *NRG*
Location *Conemaugh, PA* Proj. No. *1009144001*
Surface Elev. ____ Total Hole Depth *3.5 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter ____
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Backfilled* Rig/Core *Track Mounted Excavator*
Drill Co. *Terra Testing* Method ____
Driller ____ Log By *R. Malec* Date *8/31/15* Permit # *NA*
Checked By ____ License No. ____

COMMENTS
Auger from 0' to 1.5'

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						(0-1.5 feet) R-3 Rock Lining (Protective Cover)
2		100%			CL	(1.5-3.5 feet) CLAY, moist (Liner)
4						
6						
8						
10						

Drilling Log

Soil Boring **GT-5**

Project *Conemaugh Pond B* Owner *NRG*

Location *Conemaugh, PA* Proj. No. *1009144001*

Surface Elev. _____ Total Hole Depth *3.5 ft.* North _____ East _____

Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter _____

Screen: Dia *NA* Length *NA* Type/Size *NA*

Casing: Dia *NA* Length *NA* Type *NA*

Fill Material *Backfilled* Rig/Core *Track Mounted Excavator*

Drill Co. *Terra Testing* Method _____

Driller _____ Log By *R. Malec* Date *8/31/15* Permit # *NA*

Checked By _____ License No. _____

COMMENTS
Auger from 0' to 1.5'

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						
						(0-1.5 feet) R-3 Rock Lining (Protective Cover)
2		100%			CL	(1.5-3.5 feet) CLAY, moist (Liner)
4						
6						
8						
10						

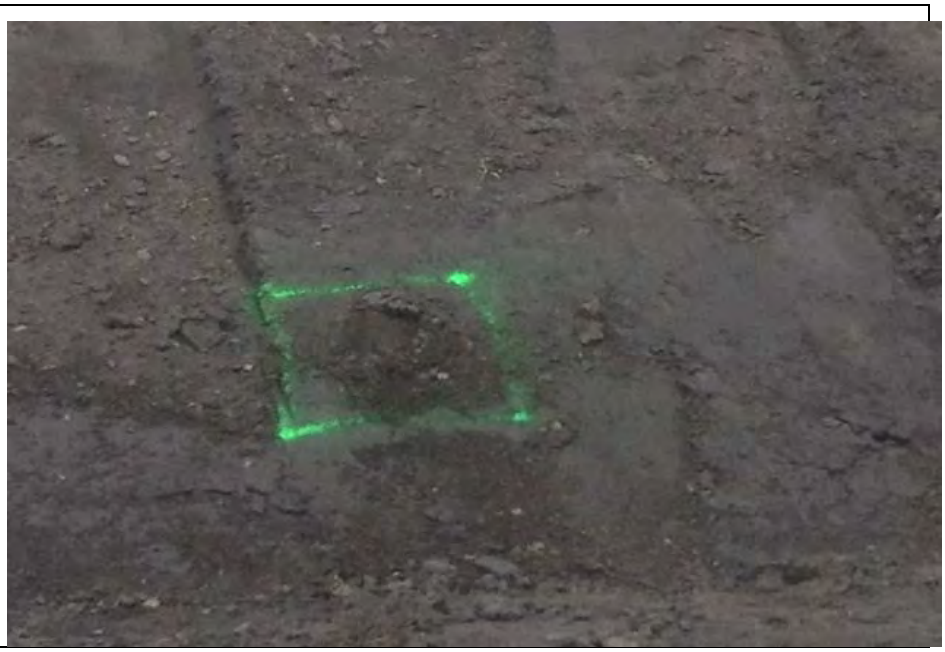
Attachment C

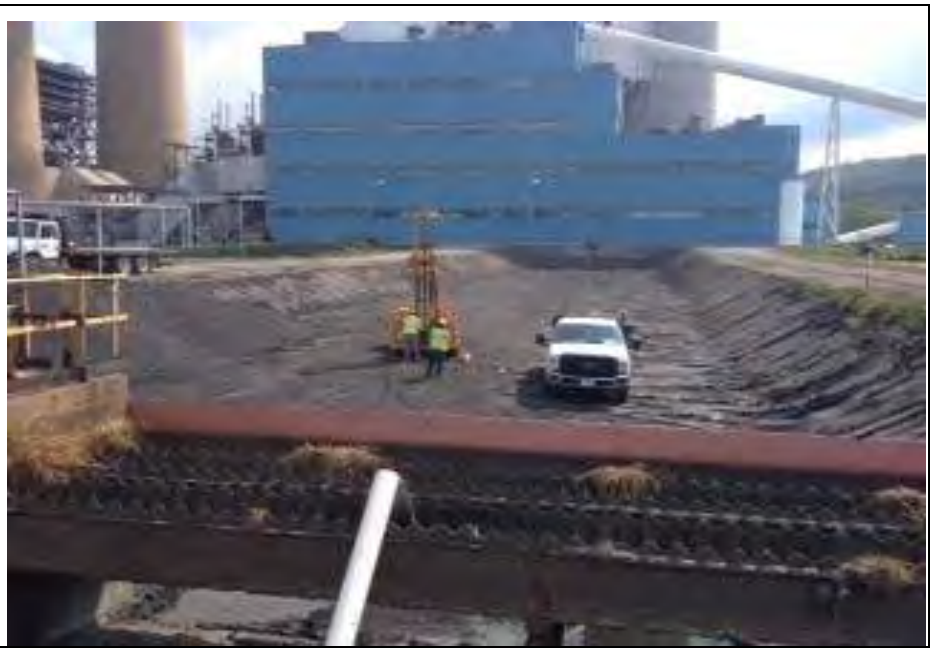
Photographs

Project: Conemaugh Pond "B" Liner Investigation ***Project No. 100914401***
Photographers: David J. Shott/Ronald T. Malec

Photograph No. 1 **Date:** August 27, 2015 **Location of Photograph:** At western end, looking east across Pond "B"	
Description: Initial walk-around of Pond "B" footprint for preliminary selection of boring locations	

Photograph No. 2 **Date:** August 27, 2015 **Location of Photograph:** Northern interior slope of Pond "B"	
Description: Close-up view of protective rip-rap layer on side slope	

Photograph No. 3 **Date:** August 27, 2015 **Location of Photograph:** Toe of southern interior slope of Pond "B"	
Description of Photograph: Preliminary markings for proposed location of Boring GT-4	

Photograph No. 4 **Date:** August 31, 2015 **Location of Photograph:** Western perimeter road adjacent to Pond "B"	
Description of Photograph: Drilling in progress at initial pilot test Boring TB-1	

Photograph No. 5 **Date:** August 31, 2015 **Location of Photograph:** At southwestern corner of Pond "B" and looking northeast	
Description of Photograph: Drilling in progress at Boring GT-5 on northern interior slope	

Attachment D

Geotechnical Laboratory Report

September 14, 2015

Project No. 2015-471-001

James Kilburg
CB&I
2790 Mosside Blvd.
Monroeville, PA 15146

Transmittal
Laboratory Test Results
NRG Conemaugh

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens that were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

David R. Backstrom
Laboratory Director

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

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SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

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Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID:	2015-471-001-001	Soil Color:	Brown

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	7.69
#4 To #200	*Sand*	20.54
Finer Than #200	*Silt & Clay*	71.76

USCS Symbol:

CL, TESTED

USCS Classification:

LEAN CLAY WITH SAND

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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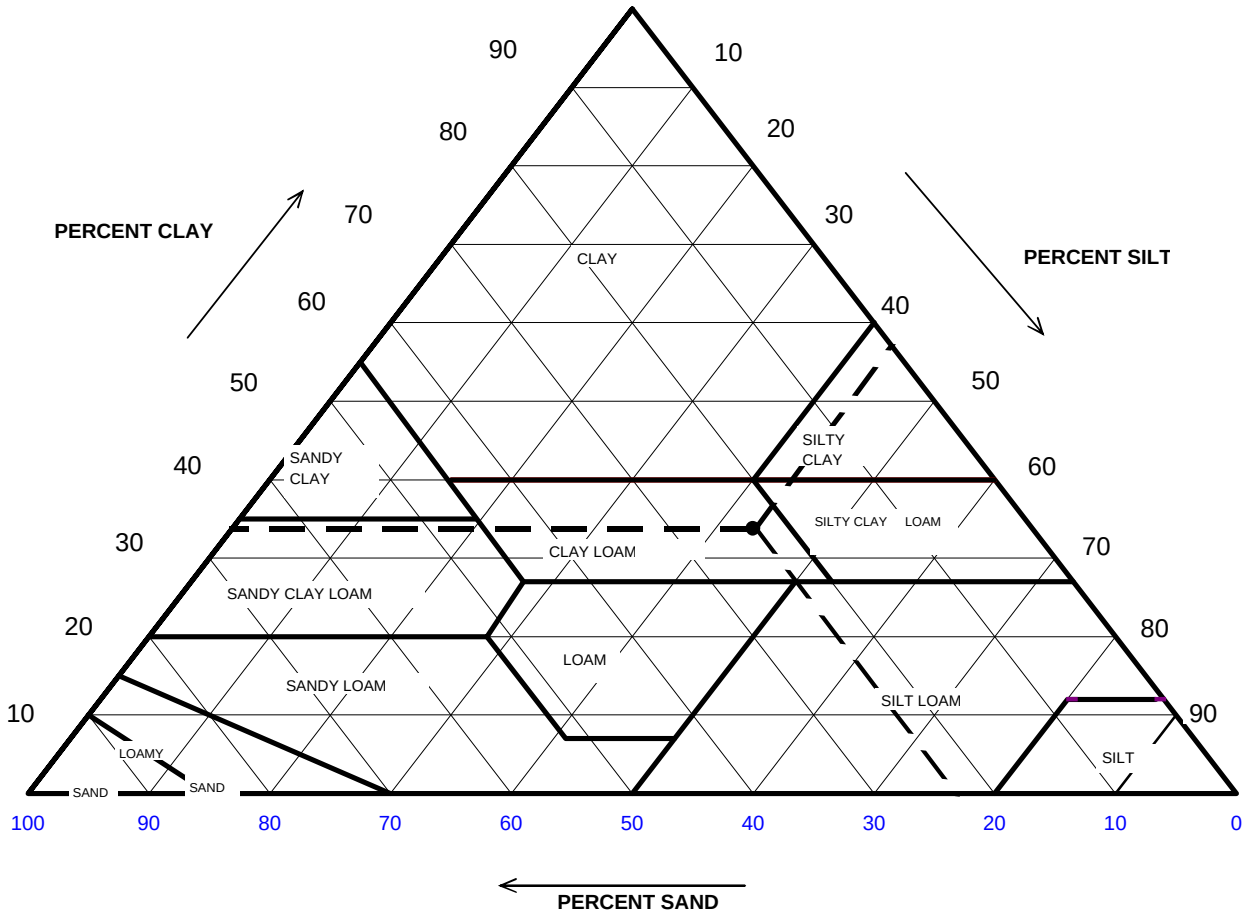
USDA CLASSIFICATION CHART

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID:	2015-471-001-001	Soil Color:	Brown



Particle Size (mm)	Percent Finer (%)	USDA SUMMARY	Actual Percentage (%)	Corrected % of Minus 2.0 mm material for USDA Classificat. (%)
		Gravel	12.94	**0.00**
2	87.06	*Sand*	20.09	**23.08**
0.05	66.96	*Silt*	37.54	**43.12**
0.002	29.42	*Clay*	29.42	**33.80**

USDA Classification: ***CLAY LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID:	2015-471-001-001	Soil Color:	Brown

Moisture Content of Passing 3/4" Materia		Water Content of Retained 3/4" Material	
Tare No.	1723	Tare No.	NA
Weight of Tare & Wet Sample (g)	789.60	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	673.30	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	83.12	Weight of Tare (g)	NA
Weight of Water (g)	116.30	Weight of Water (g)	NA
Weight of Dry Sample (g)	590.18	Weight of Dry Sample (g)	NA
Moisture Content (%)	**19.7**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	590.18
Dry Weight of -3/4" Sample (g)	166.64	Weight of - #200 Material (g)	423.54
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	166.64
Dry Weight of +3/4" Sample (g)	0.00		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	0.00	0.00	0.00		100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00		100.00	**100.00**
1/2"	12.5	12.26	2.08	2.08		97.92	**97.92**
3/8"	9.50	16.96	2.87	4.95		95.05	**95.05**
#4	4.75	16.19	2.74	7.69		92.31	**92.31**
#10	2.00	30.98	5.25	12.94		87.06	**87.06**
#20	0.85	25.11	4.25	17.20		82.80	**82.80**
#40	0.425	15.47	2.62	19.82		80.18	**80.18**
#60	0.250	12.67	2.15	21.97		78.03	**78.03**
#140	0.106	22.58	3.83	25.79		74.21	**74.21**
#200	0.075	14.42	2.44	28.24		71.76	**71.76**
Pan	-	423.54	71.76	100.00		-	**-**

Tested By	RAL	Date	9/10/15	Checked By	KC	Date	9/14/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID:	2015-471-001-001	Soil Color:	Brown

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		52.0	24.1	5.61	46.4	82.0	0.01281	0.0252	**58.9**
5		48.5	24.1	5.61	42.9	75.8	0.01281	0.0165	**54.4**
15		44.5	24.1	5.61	38.9	68.8	0.01281	0.0099	**49.4**
30		41.0	24.1	5.61	35.4	62.6	0.01281	0.0072	**44.9**
60		38.0	23.9	5.68	32.3	57.1	0.01284	0.0053	**41.0**
250		31.0	23.6	5.79	25.2	44.6	0.01288	0.0027	**32.0**
1440		25.5	23.7	5.75	19.7	34.9	0.01287	0.0012	**25.1**

Soil Specimen Data		**Other Corrections**		
Tare No.	659			
Weight of Tare & Dry Material (g)	156.59	a - Factor	0.99	
Weight of Tare (g)	95.60			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	71.76	
Weight of Dry Material (g)	56.0			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 9/10/15 Checked By KC Date 9/14/15

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ATTERBERG LIMITS

ASTM D 4318-10

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Upper 8" of tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID:	2015-471-001-001	Soil Description:	BROWN LEAN CLAY

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

(Minus No. 40 sieve material, Airdried)

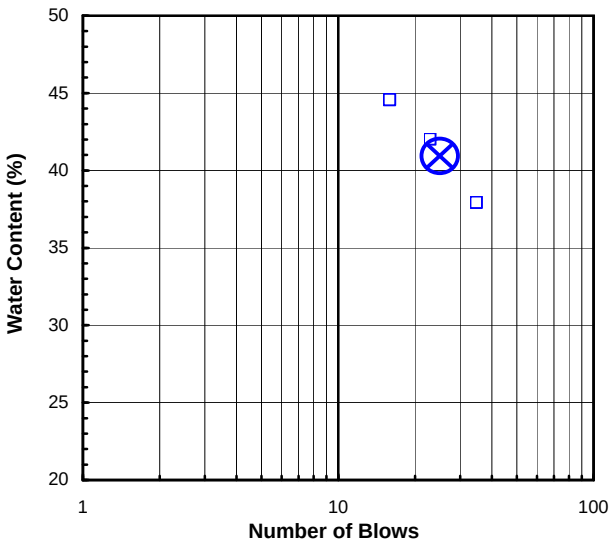
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	197	212	246	**U**
Wt. of Tare & Wet Sample (g):	37.73	39.65	37.59	**L**
Wt. of Tare & Dry Sample (g):	31.48	33.63	32.07	**T**
Weight of Tare (g):	17.44	19.29	17.50	**I**
Weight of Water (g):	6.3	6.0	5.5	**P**
Weight of Dry Sample (g):	14.0	14.3	14.6	**O**
				I
Moisture Content (%):	**44.5**	**42.0**	**37.9**	**N**
Number of Blows:	**16**	**23**	**35**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	238	449	
Wt. of Tare & Wet Sample (g):	26.33	29.42	
Wt. of Tare & Dry Sample (g):	25.43	28.53	
Weight of Tare (g):	20.18	23.29	
Weight of Water (g):	0.9	0.9	
Weight of Dry Sample (g):	5.3	5.2	
Moisture Content (%):	**17.1**	**17.0**	**0.2**

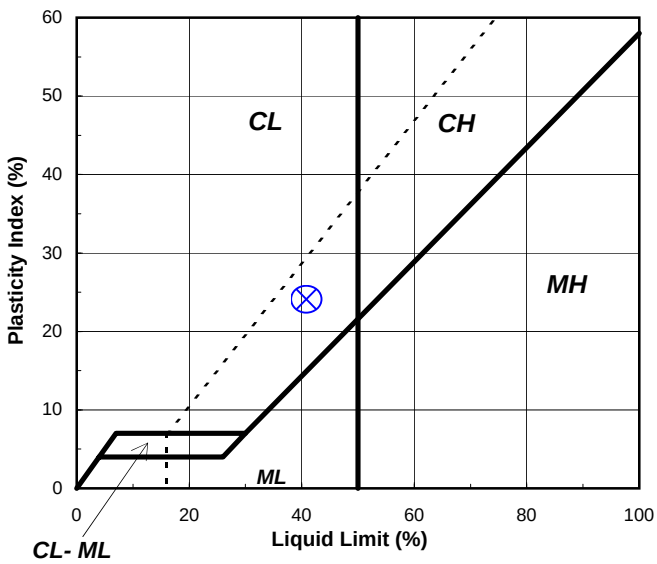
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**41**
Plastic Limit (%):	**17**
Plasticity Index (%):	**24**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By *RAL* *Date* *9/8/15* *Checked By* *KC* *Date* 9/9/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

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PERMEABILITY TEST

ASTM D 5084-10

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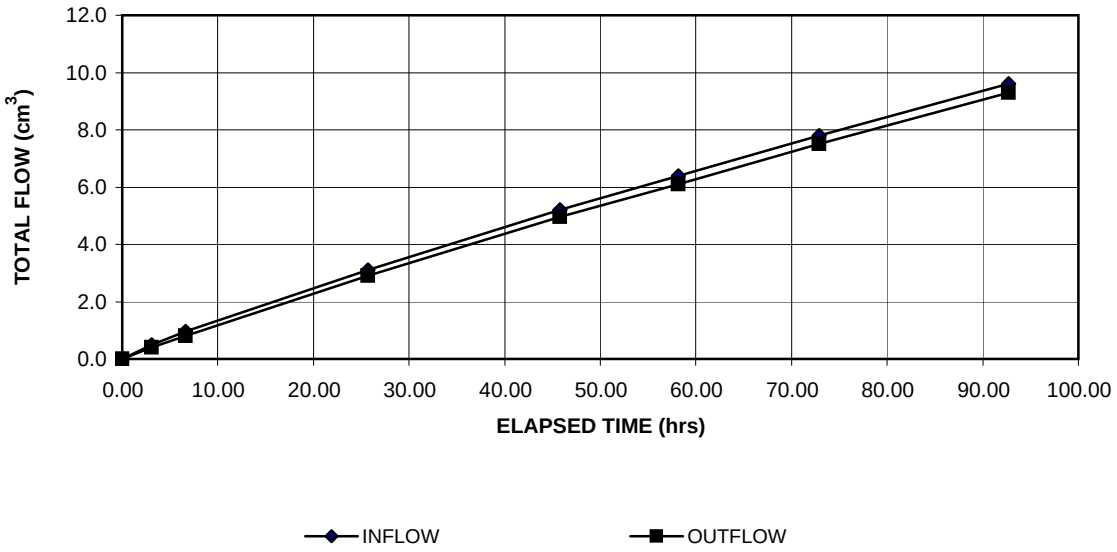
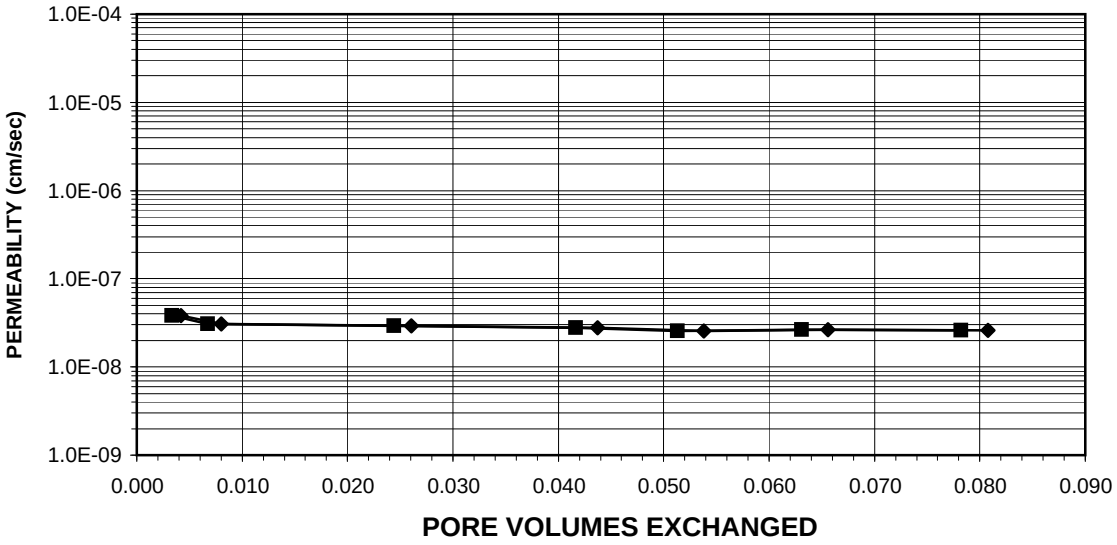
Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID No.:	2015-471-001-001		

AVERAGE PERMEABILITY = 2.6E-08 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.6E-10 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10

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PERMEABILITY TEST

ASTM D 5084-10

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Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID No.:	2015-471-001-001		

Specific Gravity:	2.70	Assumed
Sample Condition:		Undisturbed

Visual Description: Brown Clay trace to some sand

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	913	1723
Weight of Tare & Wet Sample (g)	306.91	789.60
Weight of Tare & Dry Sample (g)	276.44	673.30
Weight of Tare (g)	110.49	83.12
Weight of Water (g)	30.47	116.30
Weight of Dry Sample (g)	165.95	590.18
Moisture Content (%)	**18.4**	**19.7**

SPECIMEN:	BEFORE TEST	AFTER TEST
Weight of Tube & Wet Sample (g)	931.19	NA
Weight of Tube (g)	225.39	NA
Weight of Wet Sample (g)	705.80	713.82
Length 1 (in)	3.188	3.234
Length 2 (in)	3.193	3.204
Length 3 (in)	3.180	3.201
Top Diameter (in)	2.867	2.862
Middle Diameter (in)	2.882	2.856
Bottom Diameter (in)	2.877	2.881
Average Length (in)	3.19	3.21
Average Area (in^2)	6.49	6.45
Sample Volume (cm^3)	339.12	339.75
Unit Wet Weight (g/cm^3)	2.08	2.10
Unit Wet Weight (pcf)	129.9	131.2
Unit Dry Weight (pcf)	109.8	109.6
Unit Dry Weight (g/cm^3)	1.76	1.76
Void Ratio, e	0.54	0.54
Porosity, n	0.35	0.35
Pore Volume (cm^3)	118.3	118.9
Total Weight of Sample After Test (g)		706.7

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10 *permflow.xls*

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PERMEABILITY TEST

ASTM D 5084-10

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Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID No.:	2015-471-001-001		

Pressure Heads (Constant)		**Final Sample Dimensions**	
Top Cap (psi)	67.5	Sample Length (cm), L	8.16
Bottom Cap (psi)	70.0	Sample Diameter (cm)	7.28
Cell (psi)	75.0	Sample Area (cm^2), A	41.63
Total Pressure Head (cm)	175.8	Inflow Burette Area (cm^2), a-in	0.861
Hydraulic Gradient	21.54	Outflow Burette Area (cm^2), a-out	0.851
		B Parameter (%)	96

AVERAGE PERMEABILITY = 2.6E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 2.6E-10 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/4/15	10	46	0.000	0.0	0.0	201.3	0	22.1	NA
9/4/15	13	49	3.050	0.5	0.4	200.3	0	22.0	3.8E-08
9/4/15	17	25	6.650	1.0	0.8	199.3	0	22.0	3.1E-08
9/5/15	12	30	25.733	3.1	2.9	194.4	0	22.0	2.9E-08
9/6/15	8	33	45.783	5.2	5.0	189.5	0	22.0	2.8E-08
9/6/15	20	54	58.133	6.4	6.1	186.8	0	22.8	2.6E-08
9/7/15	11	40	72.900	7.8	7.5	183.5	0	22.0	2.6E-08
9/8/15	7	30	92.733	9.6	9.3	179.3	1	22.0	2.6E-08

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10

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SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

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Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID:	2015-471-001-002	Soil Color:	Brown

	SIEVE ANALYSIS					HYDROMETER	
USCS	cobbles	gravel		sand		silt and clay fraction	
USDA	cobbles	gravel		sand		silt	clay

USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	11.68
#4 To #200	*Sand*	26.77
Finer Than #200	*Silt & Clay*	61.55

USCS Symbol:

CL, TESTED

USCS Classification:

SANDY LEAN CLAY

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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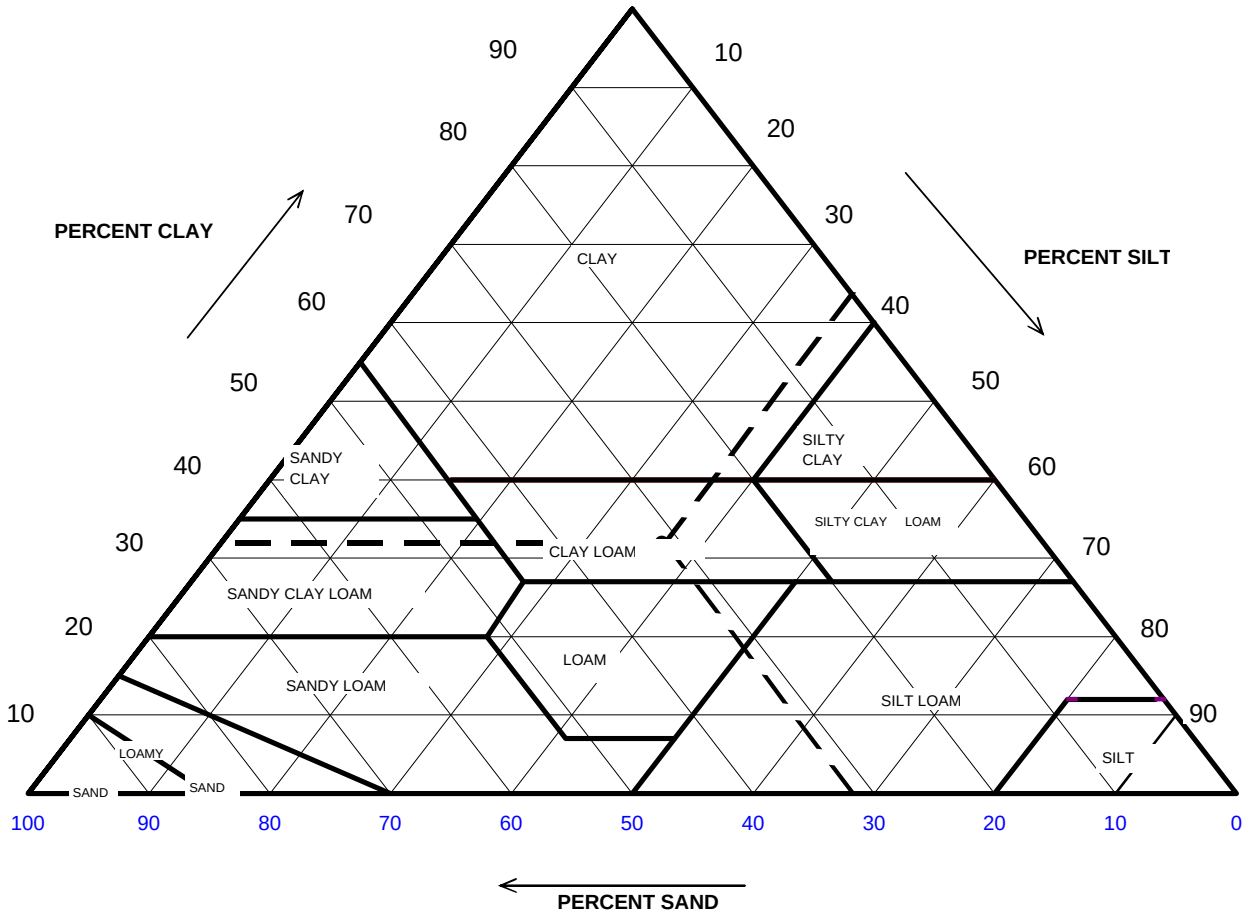
USDA CLASSIFICATION CHART

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID:	2015-471-001-002	Soil Color:	Brown



Particle Size (mm)	Percent Finer (%)	USDA SUMMARY	Actual Percentage (%)	Corrected % of Minus 2.0 mm material for USDA Classificat. (%)
		Gravel	15.67	**0.00**
2	84.33	*Sand*	26.62	**31.56**
0.05	57.72	*Silt*	30.83	**36.56**
0.002	26.89	*Clay*	26.89	**31.88**

USDA Classification: ***CLAY LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID:	2015-471-001-002	Soil Color:	Brown

Moisture Content of Passing 3/4" Materia		Water Content of Retained 3/4" Material	
Tare No.	1741	Tare No.	NA
Weight of Tare & Wet Sample (g)	827.67	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	735.30	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	83.03	Weight of Tare (g)	NA
Weight of Water (g)	92.37	Weight of Water (g)	NA
Weight of Dry Sample (g)	652.27	Weight of Dry Sample (g)	NA
Moisture Content (%)	**14.2**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	652.27
Dry Weight of -3/4" Sample (g)	208.98	Weight of - #200 Material (g)	401.45
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	250.82
Dry Weight of +3/4" Sample (g)	41.84		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	0.00	0.00	0.00		100.00	**100.00**
3/4"	19.0	41.84	6.41	6.41		93.59	**93.59**
1/2"	12.5	5.55	0.85	7.27		92.73	**92.73**
3/8"	9.50	9.45	1.45	8.71		91.29	**91.29**
#4	4.75	19.34	2.97	11.68		88.32	**88.32**
#10	2.00	26.02	3.99	15.67		84.33	**84.33**
#20	0.85	23.78	3.65	19.31		80.69	**80.69**
#40	0.425	21.99	3.37	22.69		77.31	**77.31**
#60	0.250	25.21	3.86	26.55		73.45	**73.45**
#140	0.106	49.62	7.61	34.16		65.84	**65.84**
#200	0.075	28.02	4.30	38.45		61.55	**61.55**
Pan	-	401.45	61.55	100.00		-	**-**

Tested By	RAL	Date	9/10/15	Checked By	KC	Date	9/14/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID:	2015-471-001-002	Soil Color:	Brown

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		48.0	24.1	5.61	42.4	83.9	0.01281	0.0263	**51.6**
5		45.0	24.1	5.61	39.4	78.0	0.01281	0.0171	**48.0**
15		42.0	24.1	5.61	36.4	72.0	0.01281	0.0101	**44.3**
30		38.0	24.1	5.61	32.4	64.1	0.01281	0.0074	**39.5**
60		35.0	23.9	5.68	29.3	58.0	0.01284	0.0054	**35.7**
250		30.5	23.6	5.79	24.7	48.9	0.01288	0.0027	**30.1**
1440		23.5	23.7	5.75	17.7	35.1	0.01287	0.0012	**21.6**

Soil Specimen Data		**Other Corrections**		
Tare No.	520			
Weight of Tare & Dry Material (g)	146.30	a - Factor	0.99	
Weight of Tare (g)	91.28			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	61.55	
Weight of Dry Material (g)	50.0			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 9/10/15 Checked By KC Date 9/14/15

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ATTERBERG LIMITS

ASTM D 4318-10

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID:	2015-471-001-002	Soil Description:	BROWN LEAN CLAY

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

(Minus No. 40 sieve material, Airdried)

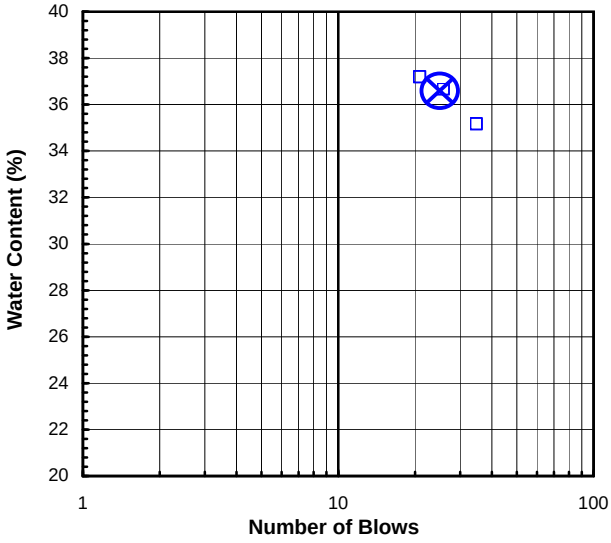
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	166	196	209	**U**
Wt. of Tare & Wet Sample (g):	38.82	38.66	40.24	**L**
Wt. of Tare & Dry Sample (g):	33.50	33.04	34.57	**T**
Weight of Tare (g):	18.36	17.70	19.31	**I**
Weight of Water (g):	5.3	5.6	5.7	**P**
Weight of Dry Sample (g):	15.1	15.3	15.3	**O**
				I
Moisture Content (%):	**35.1**	**36.6**	**37.2**	**N**
Number of Blows:	**35**	**26**	**21**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	154	185	
Wt. of Tare & Wet Sample (g):	26.05	25.48	
Wt. of Tare & Dry Sample (g):	25.07	24.54	
Weight of Tare (g):	19.78	19.41	
Weight of Water (g):	1.0	0.9	
Weight of Dry Sample (g):	5.3	5.1	
Moisture Content (%):	**18.5**	**18.3**	**0.2**

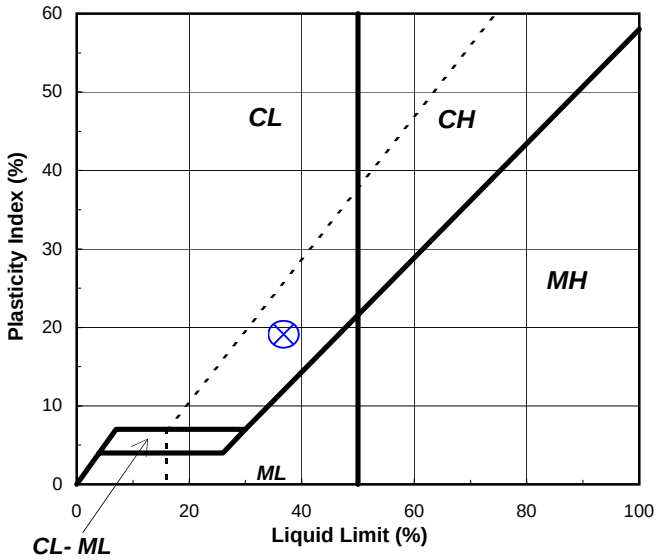
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**37**
Plastic Limit (%):	**18**
Plasticity Index (%):	**19**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By *JP* *Date* *9/8/15* *Checked By* *KC* *Date* 9/10/15

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PERMEABILITY TEST

ASTM D 5084-10

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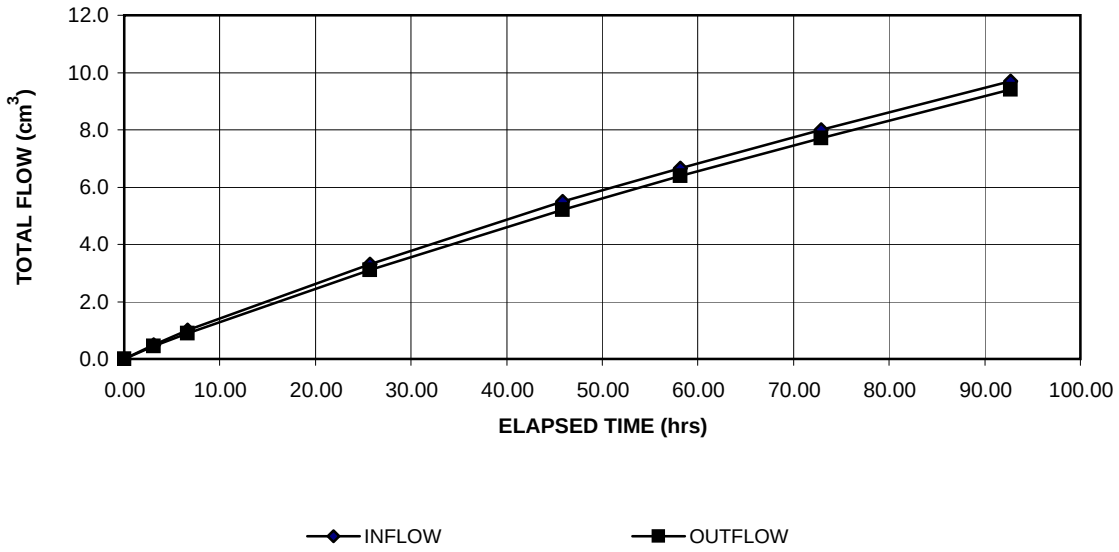
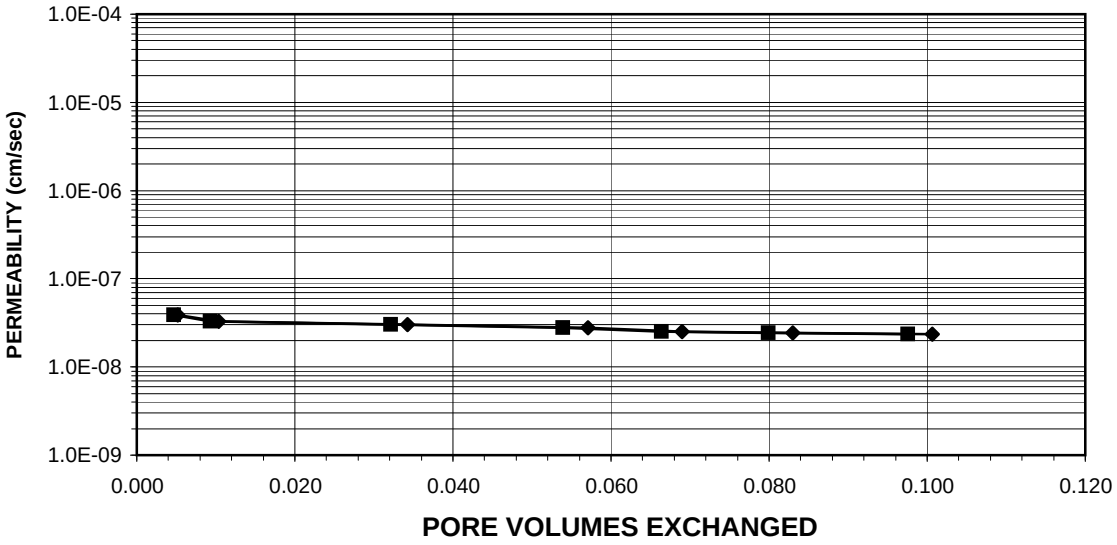
Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID No.:	2015-471-001-002		

AVERAGE PERMEABILITY = 2.5E-08 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.5E-10 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10

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PERMEABILITY TEST

ASTM D 5084-10

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Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID No.:	2015-471-001-002		

Specific Gravity:	2.70	Assumed
Sample Condition:		Undisturbed

Visual Description: Brown and Gray Sandy Clay

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	554	1741
Weight of Tare & Wet Sample (g)	378.02	827.67
Weight of Tare & Dry Sample (g)	339.54	735.30
Weight of Tare (g)	80.94	83.03
Weight of Water (g)	38.48	92.37
Weight of Dry Sample (g)	258.60	652.27
Moisture Content (%)	**14.9**	**14.2**

SPECIMEN:	BEFORE TEST	AFTER TEST
Weight of Tube & Wet Sample (g)	736.23	NA
Weight of Tube (g)	0.00	NA
Weight of Wet Sample (g)	736.23	731.62
Length 1 (in)	3.084	3.106
Length 2 (in)	3.150	3.131
Length 3 (in)	3.127	3.170
Top Diameter (in)	2.855	2.874
Middle Diameter (in)	2.857	2.876
Bottom Diameter (in)	2.860	2.877
Average Length (in)	3.12	3.14
Average Area (in^2)	6.41	6.49
Sample Volume (cm^3)	327.88	333.73
Unit Wet Weight (g/cm^3)	2.25	2.19
Unit Wet Weight (pcf)	140.2	136.8
Unit Dry Weight (pcf)	122.0	119.9
Unit Dry Weight (g/cm^3)	1.95	1.92
Void Ratio, e	0.38	0.41
Porosity, n	0.28	0.29
Pore Volume (cm^3)	90.5	96.4
Total Weight of Sample After Test (g)		745.1

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

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PERMEABILITY TEST

ASTM D 5084-10

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Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-1
Lab ID No.:	2015-471-001-002		

Pressure Heads (Constant)		**Final Sample Dimensions**	
Top Cap (psi)	67.5	Sample Length (cm), L	7.96
Bottom Cap (psi)	70.0	Sample Diameter (cm)	7.30
Cell (psi)	75.0	Sample Area (cm^2), A	41.90
Total Pressure Head (cm)	175.8	Inflow Burette Area (cm^2), a-in	0.866
Hydraulic Gradient	22.07	Outflow Burette Area (cm^2), a-out	0.855
		B Parameter (%)	96

AVERAGE PERMEABILITY = 2.5E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 2.5E-10 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/4/15	10	46	0.000	0.0	0.0	201.1	0	22.1	NA
9/4/15	13	49	3.050	0.5	0.4	200.0	0	22.0	3.9E-08
9/4/15	17	25	6.650	1.0	0.9	198.9	0	22.0	3.3E-08
9/5/15	12	30	25.733	3.3	3.1	193.7	0	22.0	3.0E-08
9/6/15	8	35	45.817	5.5	5.2	188.8	0	22.0	2.8E-08
9/6/15	20	54	58.133	6.7	6.4	186.1	0	22.8	2.5E-08
9/7/15	11	40	72.900	8.0	7.7	183.0	0	22.0	2.4E-08
9/8/15	7	30	92.733	9.7	9.4	179.1	1	22.0	2.4E-08

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10

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SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-2
Lab ID:	2015-471-001-003	Soil Color:	Brown

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	15.61
#4 To #200	*Sand*	24.17
Finer Than #200	*Silt & Clay*	60.22

USCS Symbol:

CL, TESTED

USCS Classification:

SANDY LEAN CLAY WITH GRAVEL

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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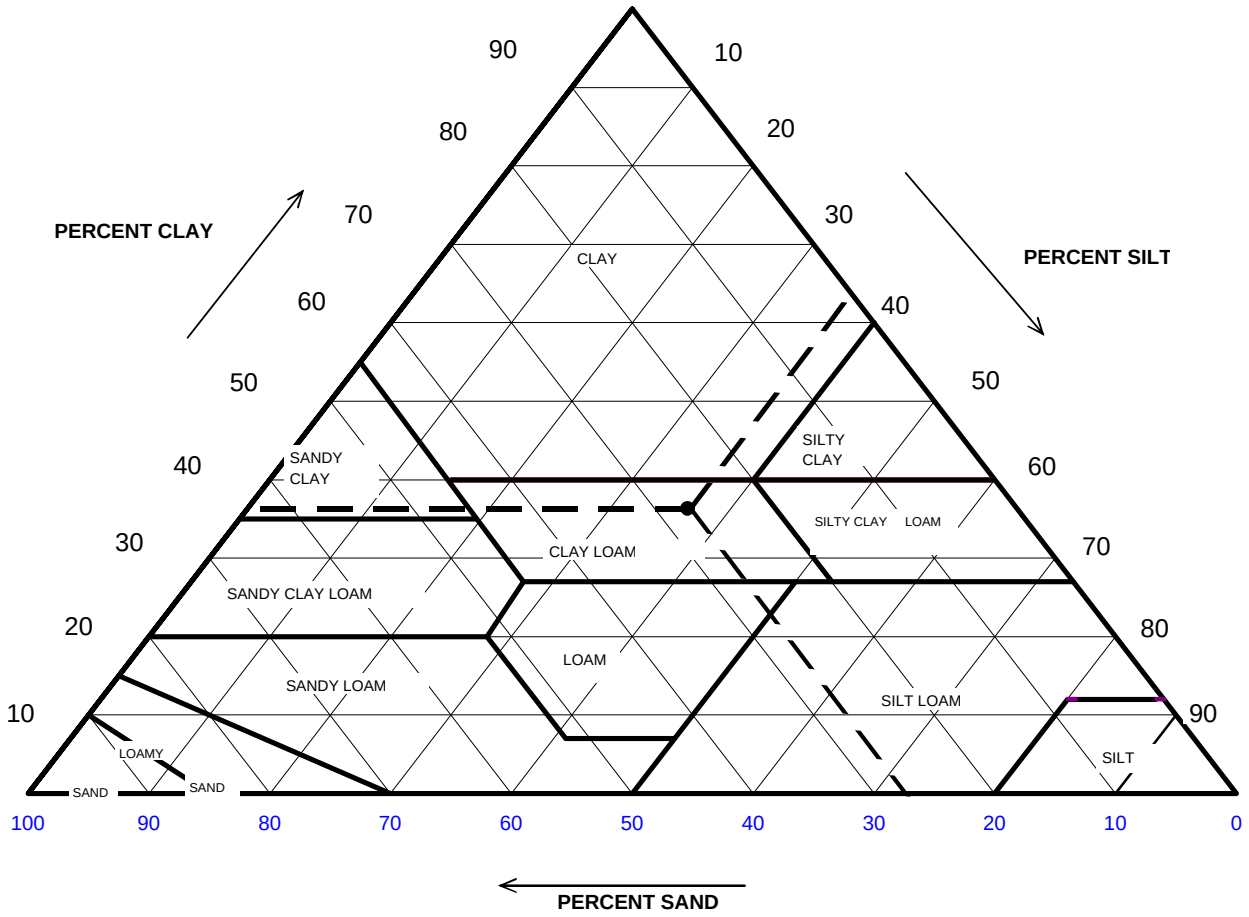
USDA CLASSIFICATION CHART

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-2
Lab ID:	2015-471-001-003	Soil Color:	Brown



Particle Size (mm)	Percent Finer (%)	USDA SUMMARY	Actual Percentage (%)	Corrected % of Minus 2.0 mm material for USDA Classificat. (%)
		Gravel	20.47	**0.00**
2	79.53	*Sand*	21.67	**27.24**
0.05	57.87	*Silt*	29.01	**36.48**
0.002	28.86	*Clay*	28.86	**36.28**

USDA Classification: ***CLAY LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-2
Lab ID:	2015-471-001-003	Soil Color:	Brown

Moisture Content of Passing 3/4" Materia		Water Content of Retained 3/4" Material	
Tare No.	516	Tare No.	NA
Weight of Tare & Wet Sample (g)	820.84	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	729.80	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	90.06	Weight of Tare (g)	NA
Weight of Water (g)	91.04	Weight of Water (g)	NA
Weight of Dry Sample (g)	639.74	Weight of Dry Sample (g)	NA
Moisture Content (%)	**14.2**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	639.74
Dry Weight of -3/4" Sample (g)	211.24	Weight of - #200 Material (g)	385.28
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	254.46
Dry Weight of +3/4" Sample (g)	43.22		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	31.14	4.87	4.87		95.13	**95.13**
3/4"	19.0	12.08	1.89	6.76		93.24	**93.24**
1/2"	12.5	20.60	3.22	9.98		90.02	**90.02**
3/8"	9.50	8.87	1.39	11.36		88.64	**88.64**
#4	4.75	27.16	4.25	15.61		84.39	**84.39**
#10	2.00	31.08	4.86	20.47		79.53	**79.53**
#20	0.85	28.43	4.44	24.91		75.09	**75.09**
#40	0.425	18.49	2.89	27.80		72.20	**72.20**
#60	0.250	18.41	2.88	30.68		69.32	**69.32**
#140	0.106	37.15	5.81	36.49		63.51	**63.51**
#200	0.075	21.05	3.29	39.78		60.22	**60.22**
Pan	-	385.28	60.22	100.00		-	**-**

Tested By	RAL	Date	9/8/15	Checked By	KC	Date	9/11/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-2
Lab ID:	2015-471-001-003	Soil Color:	Brown

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		43.5	23.7	5.75	37.7	90.3	0.01287	0.0275	**54.4**
5		41.0	23.7	5.75	35.2	84.4	0.01287	0.0178	**50.8**
15		39.0	23.7	5.75	33.2	79.6	0.01287	0.0105	**47.9**
30		36.0	23.7	5.75	30.2	72.4	0.01287	0.0076	**43.6**
61		33.0	24	5.64	27.4	65.5	0.01282	0.0054	**39.4**
250		28.0	24	5.64	22.4	53.5	0.01282	0.0028	**32.2**
1440		22.0	24.1	5.61	16.4	39.2	0.01281	0.0012	**23.6**

Soil Specimen Data		**Other Corrections**		
Tare No.	2324			
Weight of Tare & Dry Material (g)	144.12	a - Factor	0.99	
Weight of Tare (g)	97.75			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	60.22	
Weight of Dry Material (g)	41.4			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 9/9/15 Checked By KC Date 9/11/15

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ATTERBERG LIMITS

ASTM D 4318-10

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Upper 8" of tube
Project No.:	2015-471-001	Sample No.:	GT-2
Lab ID:	2015-471-001-003	Soil Description:	BROWN LEAN CLAY

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

(Minus No. 40 sieve material, Airdried)

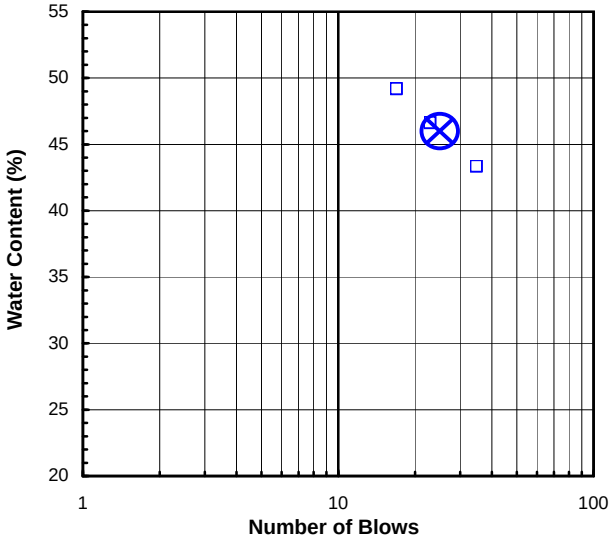
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	206	199	243	**U**
Wt. of Tare & Wet Sample (g):	39.17	39.19	38.90	**L**
Wt. of Tare & Dry Sample (g):	32.33	32.58	32.85	**T**
Weight of Tare (g):	18.41	18.39	18.88	**I**
Weight of Water (g):	6.8	6.6	6.1	**P**
Weight of Dry Sample (g):	13.9	14.2	14.0	**O**
				I
Moisture Content (%):	**49.1**	**46.6**	**43.3**	**N**
Number of Blows:	**17**	**23**	**35**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	135	1276	
Wt. of Tare & Wet Sample (g):	25.52	20.11	
Wt. of Tare & Dry Sample (g):	24.68	19.26	
Weight of Tare (g):	19.41	13.85	
Weight of Water (g):	0.8	0.8	
Weight of Dry Sample (g):	5.3	5.4	
Moisture Content (%):	**15.9**	**15.7**	**0.2**

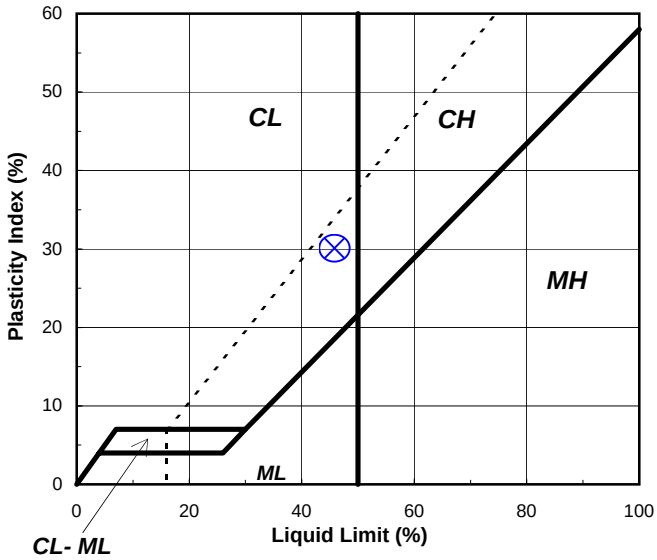
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**46**
Plastic Limit (%):	**16**
Plasticity Index (%):	**30**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By *RAL* *Date* *9/8/15* *Checked By* *KC* *Date* 9/9/15

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PERMEABILITY TEST

ASTM D 5084-10

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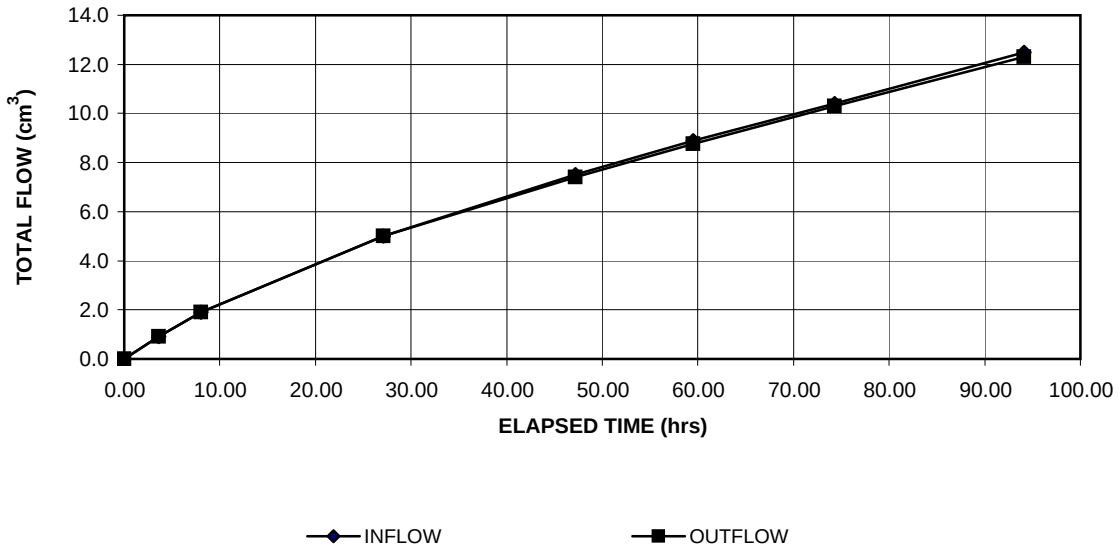
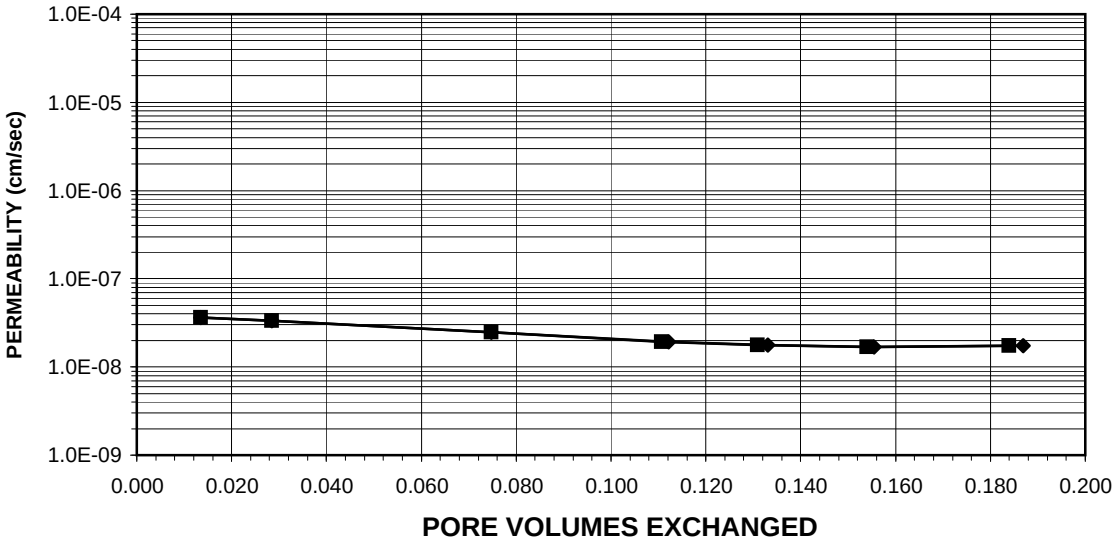
Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Botom 8" of tube
Project No.:	2015-471-001	Sample No.:	GT-2
Lab ID No.:	2015-471-001-003		

AVERAGE PERMEABILITY = 1.8E-08 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.8E-10 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10

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PERMEABILITY TEST

ASTM D 5084-10

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Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Botom 8" of tube
Project No.:	2015-471-001	Sample No.:	GT-2
Lab ID No.:	2015-471-001-003		

Specific Gravity:	2.70	Assumed
Sample Condition:		Undisturbed

Visual Description: Brown Sandy Clay

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	905	1692
Weight of Tare & Wet Sample (g)	388.44	481.74
Weight of Tare & Dry Sample (g)	350.59	426.90
Weight of Tare (g)	110.00	82.48
Weight of Water (g)	37.85	54.84
Weight of Dry Sample (g)	240.59	344.42
Moisture Content (%)	**15.7**	**15.9**

SPECIMEN:	BEFORE TEST	AFTER TEST
Weight of Tube & Wet Sample (g)	392.20	NA
Weight of Tube (g)	0.00	NA
Weight of Wet Sample (g)	392.20	392.84
Length 1 (in)	1.723	1.817
Length 2 (in)	1.755	1.834
Length 3 (in)	1.711	1.802
Top Diameter (in)	2.848	2.863
Middle Diameter (in)	2.845	2.876
Bottom Diameter (in)	2.851	2.864
Average Length (in)	1.73	1.82
Average Area (in^2)	6.37	6.46
Sample Volume (cm^3)	180.56	192.38
Unit Wet Weight (g/cm^3)	2.17	2.04
Unit Wet Weight (pcf)	135.6	127.5
Unit Dry Weight (pcf)	117.2	110.0
Unit Dry Weight (g/cm^3)	1.88	1.76
Void Ratio, e	0.44	0.53
Porosity, n	0.30	0.35
Pore Volume (cm^3)	55.1	66.9
Total Weight of Sample After Test (g)		399.4

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

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PERMEABILITY TEST

ASTM D 5084-10

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Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Botom 8" of tube
Project No.:	2015-471-001	Sample No.:	GT-2
Lab ID No.:	2015-471-001-003		

Pressure Heads (Constant)		**Final Sample Dimensions**	
Top Cap (psi)	67.5	Sample Length (cm), L	4.62
Bottom Cap (psi)	70.0	Sample Diameter (cm)	7.28
Cell (psi)	75.0	Sample Area (cm^2), A	41.67
Total Pressure Head (cm)	175.8	Inflow Burette Area (cm^2), a-in	0.860
Hydraulic Gradient	38.07	Outflow Burette Area (cm^2), a-out	0.857
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.8E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 1.8E-10 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/4/15	9	22	0.000	0.0	0.0	201.4	0	22.1	NA
9/4/15	12	59	3.617	0.9	0.9	199.4	0	22.0	3.6E-08
9/4/15	17	25	8.050	1.9	1.9	197.0	0	22.0	3.3E-08
9/5/15	12	30	27.133	5.0	5.0	189.8	0	22.0	2.5E-08
9/6/15	8	35	47.217	7.5	7.4	184.1	0	22.0	1.9E-08
9/6/15	20	54	59.533	8.9	8.8	180.9	0	22.8	1.8E-08
9/7/15	11	40	74.300	10.4	10.3	177.4	0	22.0	1.7E-08
9/8/15	7	30	94.133	12.5	12.3	172.6	1	22.0	1.7E-08

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10

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SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

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Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Middle 16" of Tube
Project No.:	2015-471-001	Sample No.:	GT-3
Lab ID:	2015-471-001-004	Soil Color:	Brown

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	6.80
#4 To #200	*Sand*	25.73
Finer Than #200	*Silt & Clay*	67.47

USCS Symbol:

CL, TESTED

USCS Classification:

SANDY LEAN CLAY

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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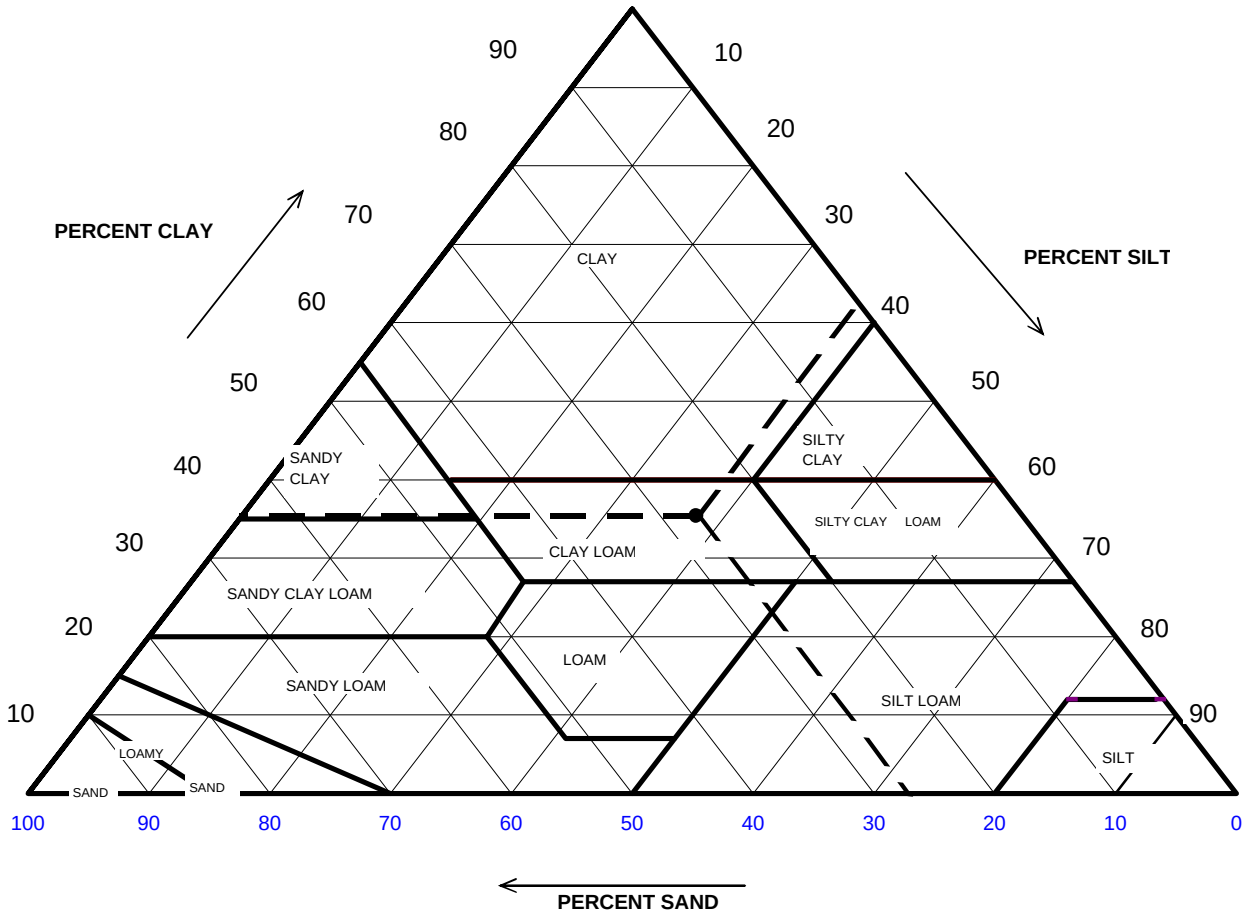
USDA CLASSIFICATION CHART

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Middle 16" of Tube
Project No.:	2015-471-001	Sample No.:	GT-3
Lab ID:	2015-471-001-004	Soil Color:	Brown



Particle Size (mm)	Percent Finer (%)	USDA SUMMARY	Actual Percentage (%)	Corrected % of Minus 2.0 mm material for USDA Classificat. (%)
		Gravel	11.52	**0.00**
2	88.48	*Sand*	23.89	**27.00**
0.05	64.59	*Silt*	33.26	**37.59**
0.002	31.33	*Clay*	31.33	**35.40**

USDA Classification: ***CLAY LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Middle 16" of Tube
Project No.:	2015-471-001	Sample No.:	GT-3
Lab ID:	2015-471-001-004	Soil Color:	Brown

Moisture Content of Passing 3/4" Materia		Water Content of Retained 3/4" Material	
Tare No.	672	Tare No.	NA
Weight of Tare & Wet Sample (g)	483.71	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	433.00	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	96.31	Weight of Tare (g)	NA
Weight of Water (g)	50.71	Weight of Water (g)	NA
Weight of Dry Sample (g)	336.69	Weight of Dry Sample (g)	NA
Moisture Content (%)	**15.1**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	336.69
Dry Weight of -3/4" Sample (g)	109.51	Weight of - #200 Material (g)	227.18
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	109.51
Dry Weight of +3/4" Sample (g)	0.00		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	0.00	0.00	0.00		100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00		100.00	**100.00**
1/2"	12.5	10.47	3.11	3.11		96.89	**96.89**
3/8"	9.50	3.20	0.95	4.06		95.94	**95.94**
#4	4.75	9.21	2.74	6.80		93.20	**93.20**
#10	2.00	15.89	4.72	11.52		88.48	**88.48**
#20	0.85	14.68	4.36	15.88		84.12	**84.12**
#40	0.425	11.03	3.28	19.15		80.85	**80.85**
#60	0.250	10.68	3.17	22.32		77.68	**77.68**
#140	0.106	21.76	6.46	28.79		71.21	**71.21**
#200	0.075	12.59	3.74	32.53		67.47	**67.47**
Pan	-	227.18	67.47	100.00		-	**-**

Tested By	RAL	Date	9/8/15	Checked By	KC	Date	9/11/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Middle 16" of Tube
Project No.:	2015-471-001	Sample No.:	GT-3
Lab ID:	2015-471-001-004	Soil Color:	Brown

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		46.0	23.7	5.75	40.2	89.2	0.01287	0.0269	**60.2**
5		44.0	23.7	5.75	38.2	84.8	0.01287	0.0173	**57.2**
15		40.0	23.7	5.75	34.2	75.9	0.01287	0.0104	**51.2**
30		38.0	23.7	5.75	32.2	71.5	0.01287	0.0075	**48.2**
64		34.5	24	5.64	28.9	64.0	0.01282	0.0052	**43.2**
250		28.5	24	5.64	22.9	50.7	0.01282	0.0028	**34.2**
1440		23.5	24.1	5.61	17.9	39.7	0.01281	0.0012	**26.8**

Soil Specimen Data		**Other Corrections**		
Tare No.	1681			
Weight of Tare & Dry Material (g)	147.78	a - Factor	0.99	
Weight of Tare (g)	98.11			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	67.47	
Weight of Dry Material (g)	44.7			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 9/9/15 Checked By KC Date 9/11/15

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ATTERBERG LIMITS

ASTM D 4318-10

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Middle 16" of tube
Project No.:	2015-471-001	Sample No.:	GT-3
Lab ID:	2015-471-001-004	Soil Description:	BROWN LEAN CLAY

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

(Minus No. 40 sieve material, Airdried)

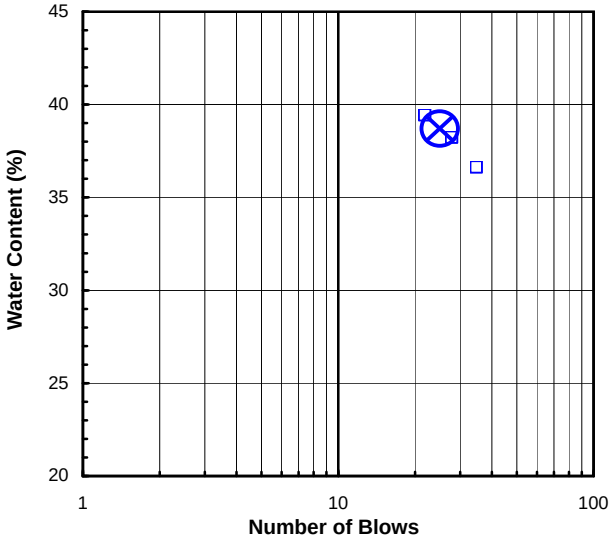
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	2	183	221	**U**
Wt. of Tare & Wet Sample (g):	40.99	40.64	40.30	**L**
Wt. of Tare & Dry Sample (g):	35.22	34.74	34.34	**T**
Weight of Tare (g):	19.45	19.29	19.21	**I**
Weight of Water (g):	5.8	5.9	6.0	**P**
Weight of Dry Sample (g):	15.8	15.5	15.1	**O**
				I
Moisture Content (%):	**36.6**	**38.2**	**39.4**	**N**
Number of Blows:	**35**	**28**	**22**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	228	230	
Wt. of Tare & Wet Sample (g):	24.90	24.14	
Wt. of Tare & Dry Sample (g):	23.94	23.18	
Weight of Tare (g):	18.70	18.08	
Weight of Water (g):	1.0	1.0	
Weight of Dry Sample (g):	5.2	5.1	
Moisture Content (%):	**18.3**	**18.8**	**-0.5**

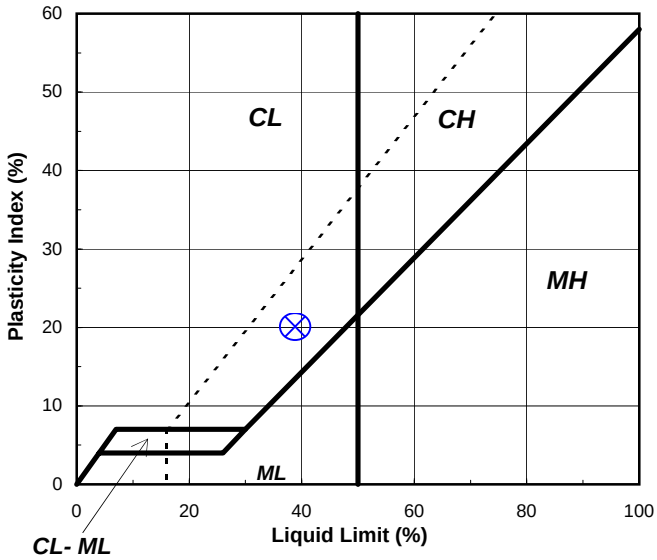
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**39**
Plastic Limit (%):	**19**
Plasticity Index (%):	**20**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By	*JP*	*Date*	*9/9/15*	*Checked By*	*KC*	*Date*	9/10/15

 DCN: CTS4B, REV. 4, 3/18/13

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PERMEABILITY TEST

ASTM D 5084-10

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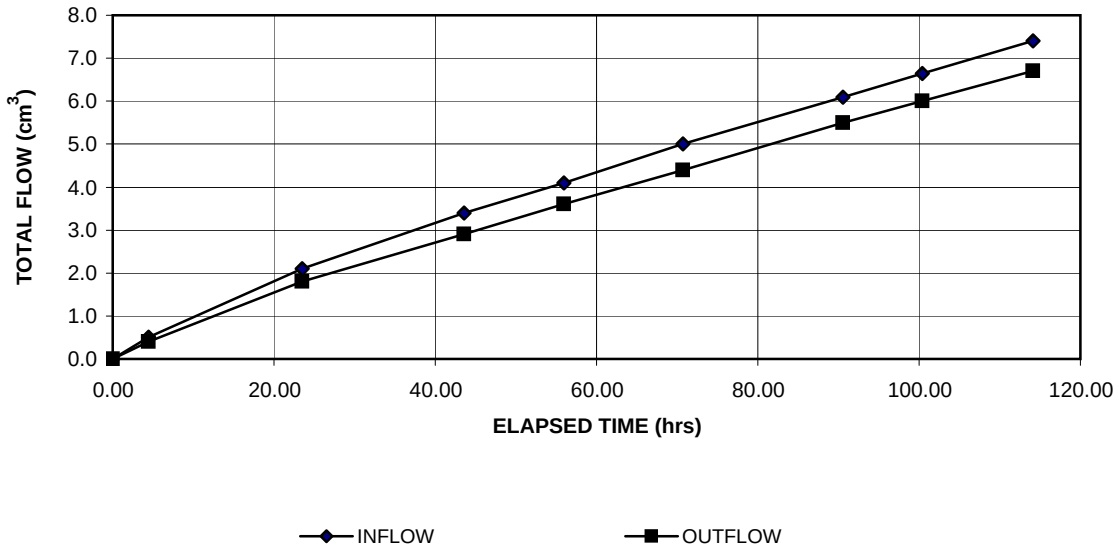
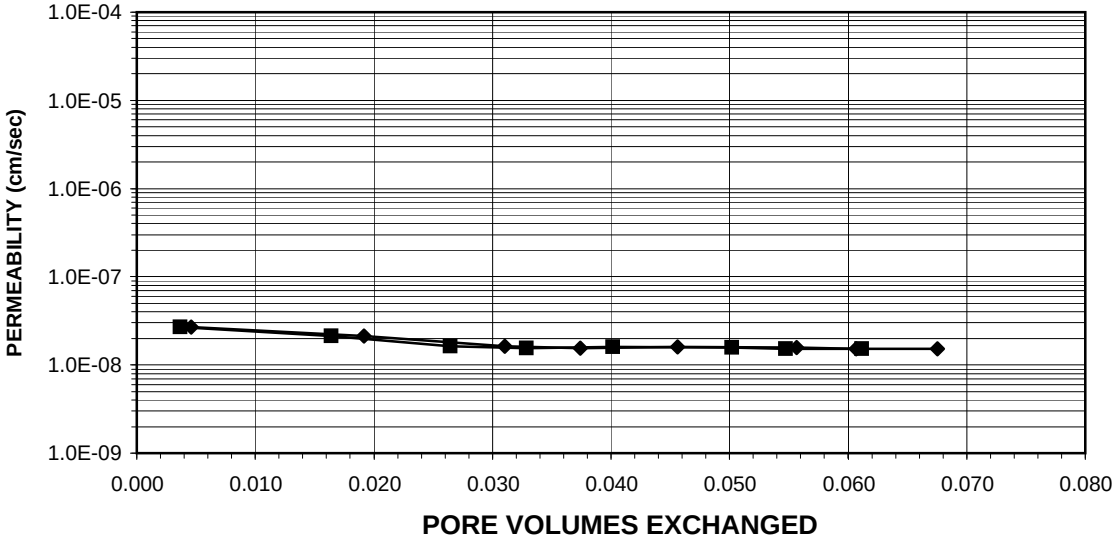
Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Middle 16" of tube
Project No.:	2015-471-001	Sample No.:	GT-3
Lab ID No.:	2015-471-001-004		

AVERAGE PERMEABILITY = 1.6E-08 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.6E-10 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/10/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10

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PERMEABILITY TEST

ASTM D 5084-10

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Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Middle 16" of tube
Project No.:	2015-471-001	Sample No.:	GT-3
Lab ID No.:	2015-471-001-004		

Specific Gravity:	2.70	Assumed
Sample Condition:		Undisturbed

Visual Description: Brown Sandy Clay with Rock Fragments

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	1706	1743
Weight of Tare & Wet Sample (g)	194.21	852.25
Weight of Tare & Dry Sample (g)	180.40	741.10
Weight of Tare (g)	82.78	83.54
Weight of Water (g)	13.81	111.15
Weight of Dry Sample (g)	97.62	657.56
Moisture Content (%)	**14.1**	**16.9**

SPECIMEN:	BEFORE TEST	AFTER TEST
Weight of Tube & Wet Sample (g)	762.31	NA
Weight of Tube (g)	0.00	NA
Weight of Wet Sample (g)	762.31	780.72
Length 1 (in)	3.352	3.318
Length 2 (in)	3.366	3.361
Length 3 (in)	3.353	3.342
Top Diameter (in)	2.872	2.876
Middle Diameter (in)	2.876	2.883
Bottom Diameter (in)	2.883	2.885
Average Length (in)	3.36	3.34
Average Area (in^2)	6.50	6.52
Sample Volume (cm^3)	357.62	356.92
Unit Wet Weight (g/cm^3)	2.13	2.19
Unit Wet Weight (pcf)	133.1	136.5
Unit Dry Weight (pcf)	116.6	116.8
Unit Dry Weight (g/cm^3)	1.87	1.87
Void Ratio, e	0.45	0.44
Porosity, n	0.31	0.31
Pore Volume (cm^3)	110.3	109.6
Total Weight of Sample After Test (g)		769.1

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/10/15

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PERMEABILITY TEST

ASTM D 5084-10

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Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Middle 16" of tube
Project No.:	2015-471-001	Sample No.:	GT-3
Lab ID No.:	2015-471-001-004		

Pressure Heads (Constant)		**Final Sample Dimensions**	
Top Cap (psi)	67.5	Sample Length (cm), L	8.48
Bottom Cap (psi)	70.0	Sample Diameter (cm)	7.32
Cell (psi)	75.0	Sample Area (cm^2), A	42.07
Total Pressure Head (cm)	175.8	Inflow Burette Area (cm^2), a-in	0.861
Hydraulic Gradient	20.72	Outflow Burette Area (cm^2), a-out	0.859
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.6E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 1.6E-10 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/4/15	12	59	0.000	0.0	0.0	201.0	0	22.0	NA
9/4/15	17	25	4.433	0.5	0.4	199.9	0	22.0	2.7E-08
9/5/15	12	30	23.517	2.1	1.8	196.4	0	22.0	2.1E-08
9/6/15	8	35	43.600	3.4	2.9	193.7	0	22.0	1.6E-08
9/6/15	20	54	55.917	4.1	3.6	192.0	0	22.8	1.5E-08
9/7/15	11	40	70.683	5.0	4.4	190.1	0	22.0	1.6E-08
9/8/15	7	30	90.517	6.1	5.5	187.5	0	22.0	1.6E-08
9/8/15	17	25	100.433	6.7	6.0	186.3	0	22.0	1.5E-08
9/9/15	7	5	114.100	7.4	6.7	184.6	1	22.0	1.5E-08

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/10/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10

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SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

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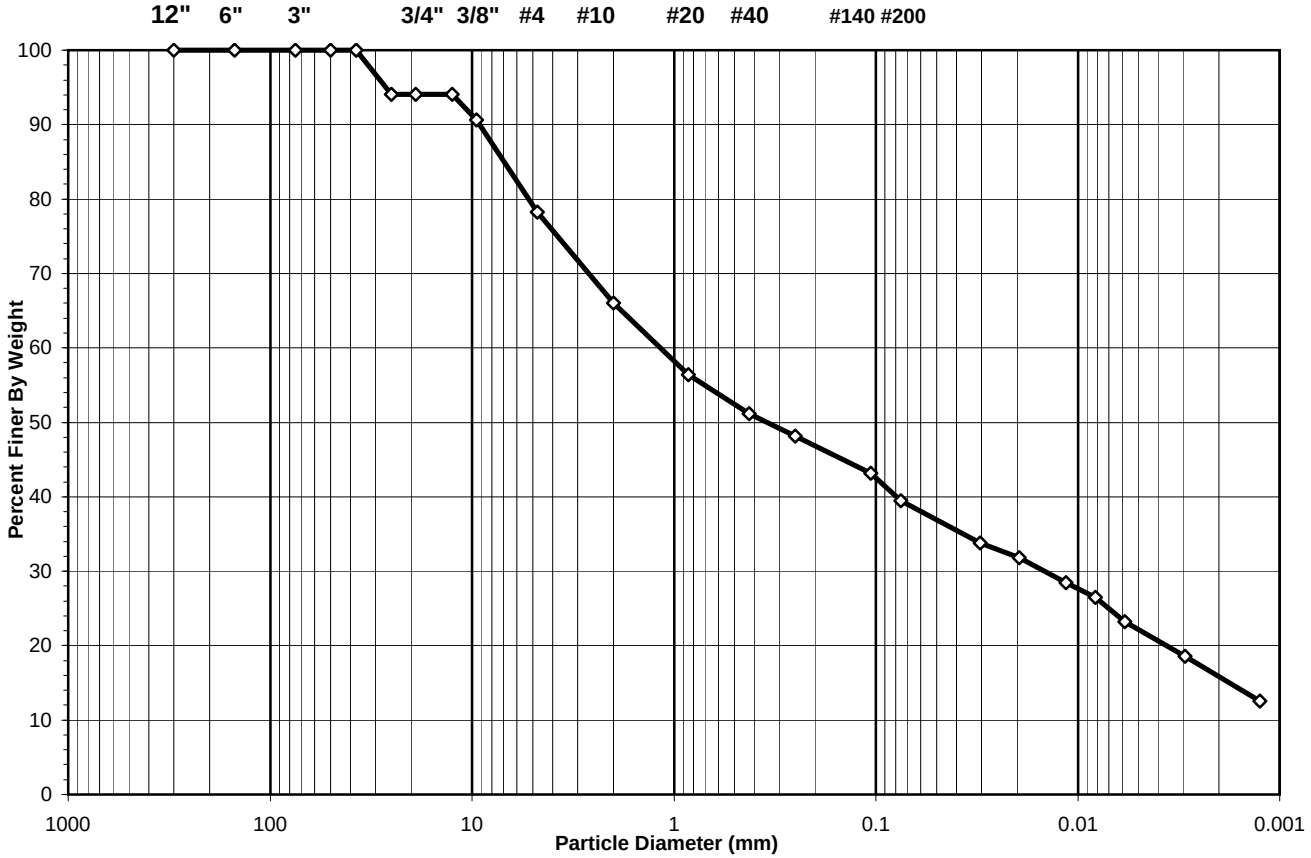
Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-4
Lab ID:	2015-471-001-005	Soil Color:	Brown

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	21.72
#4 To #200	*Sand*	38.85
Finer Than #200	*Silt & Clay*	39.43

USCS Symbol:

SC, TESTED

USCS Classification:

CLAYEY SAND WITH GRAVEL

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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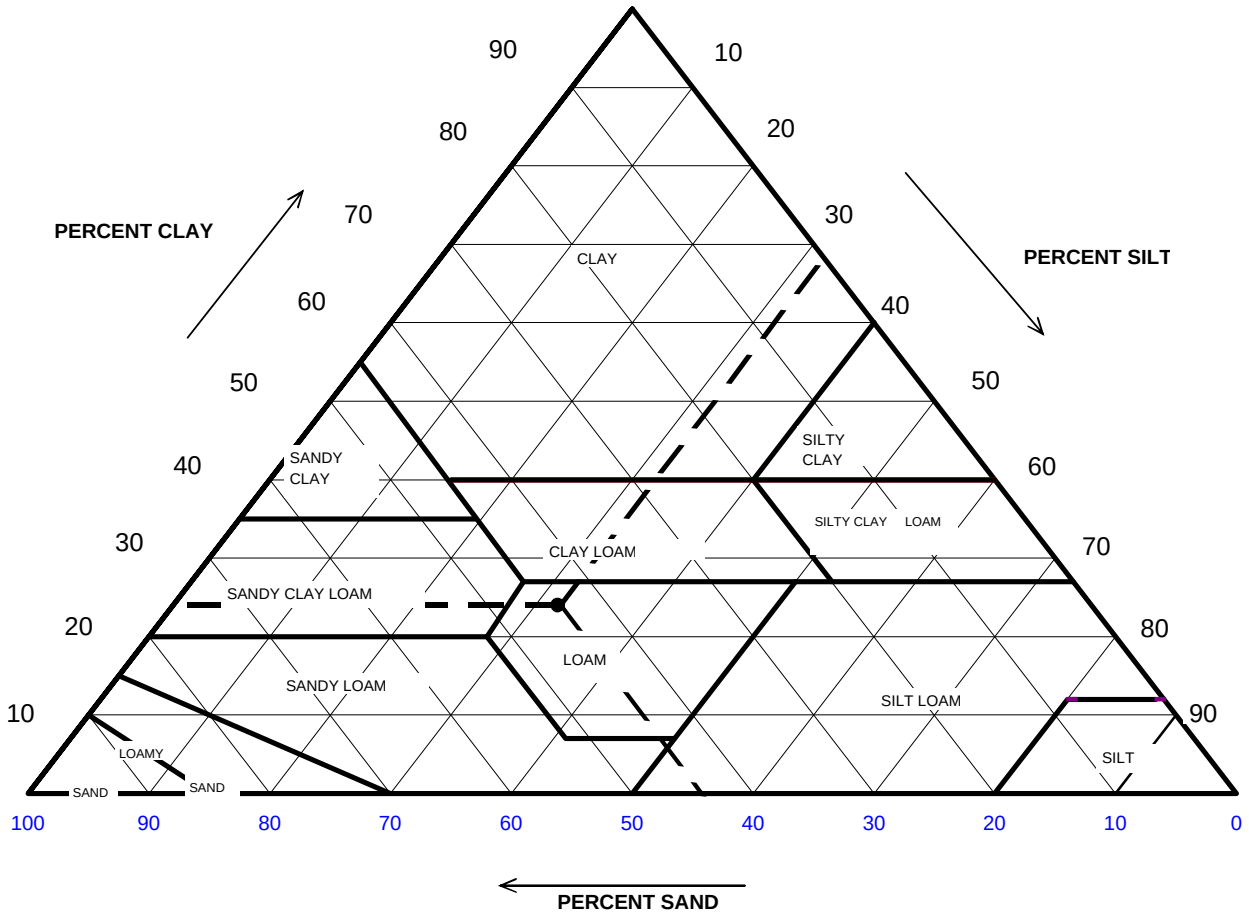
USDA CLASSIFICATION CHART

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-4
Lab ID:	2015-471-001-005	Soil Color:	Brown



Particle Size (mm)	Percent Finer (%)	USDA SUMMARY	Actual Percentage (%)	Corrected % of Minus 2.0 mm material for USDA Classificat. (%)
		Gravel	33.95	**0.00**
2	66.05	*Sand*	29.15	**44.13**
0.05	36.90	*Silt*	21.04	**31.86**
0.002	15.86	*Clay*	15.86	**24.01**

USDA Classification: ***LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-4
Lab ID:	2015-471-001-005	Soil Color:	Brown

Moisture Content of Passing 3/4" Materia		Water Content of Retained 3/4" Material	
Tare No.	967	Tare No.	NA
Weight of Tare & Wet Sample (g)	441.20	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	400.80	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	100.44	Weight of Tare (g)	NA
Weight of Water (g)	40.40	Weight of Water (g)	NA
Weight of Dry Sample (g)	300.36	Weight of Dry Sample (g)	NA
Moisture Content (%)	**13.5**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	300.36
Dry Weight of -3/4" Sample (g)	164.04	Weight of - #200 Material (g)	118.43
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	181.93
Dry Weight of +3/4" Sample (g)	17.89		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	17.89	5.96	5.96		94.04	**94.04**
3/4"	19.0	0.00	0.00	5.96		94.04	**94.04**
1/2"	12.5	0.00	0.00	5.96		94.04	**94.04**
3/8"	9.50	10.23	3.41	9.36		90.64	**90.64**
#4	4.75	37.11	12.36	21.72		78.28	**78.28**
#10	2.00	36.74	12.23	33.95		66.05	**66.05**
#20	0.85	29.02	9.66	43.61		56.39	**56.39**
#40	0.425	15.69	5.22	48.83		51.17	**51.17**
#60	0.250	9.10	3.03	51.86		48.14	**48.14**
#140	0.106	14.91	4.96	56.83		43.17	**43.17**
#200	0.075	11.24	3.74	60.57		39.43	**39.43**
Pan	-	118.43	39.43	100.00		-	**-**

Tested By	RAL	Date	9/8/15	Checked By	KC	Date	9/14/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-4
Lab ID:	2015-471-001-005	Soil Color:	Brown

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		31.0	23.7	5.75	25.2	85.8	0.01287	0.0305	**33.8**
5		29.5	23.7	5.75	23.7	80.7	0.01287	0.0195	**31.8**
15		27.0	23.7	5.75	21.2	72.2	0.01287	0.0114	**28.5**
30		25.5	23.7	5.75	19.7	67.1	0.01287	0.0082	**26.4**
60		23.0	24	5.64	17.4	58.9	0.01282	0.0059	**23.2**
250		19.5	24	5.64	13.9	47.1	0.01282	0.0029	**18.6**
1440		15.0	24.1	5.61	9.4	31.9	0.01281	0.0013	**12.6**

Soil Specimen Data		**Other Corrections**		
Tare No.	2337			
Weight of Tare & Dry Material (g)	129.72	a - Factor	0.99	
Weight of Tare (g)	95.57			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	39.43	
Weight of Dry Material (g)	29.2			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 9/9/15 Checked By KC Date 9/14/15

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ATTERBERG LIMITS

ASTM D 4318-10

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Upper 8" of tube
Project No.:	2015-471-001	Sample No.:	GT-4
Lab ID:	2015-471-001-005	Soil Description:	BROWN LEAN CLAY

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

(Minus No. 40 sieve material, Airdried)

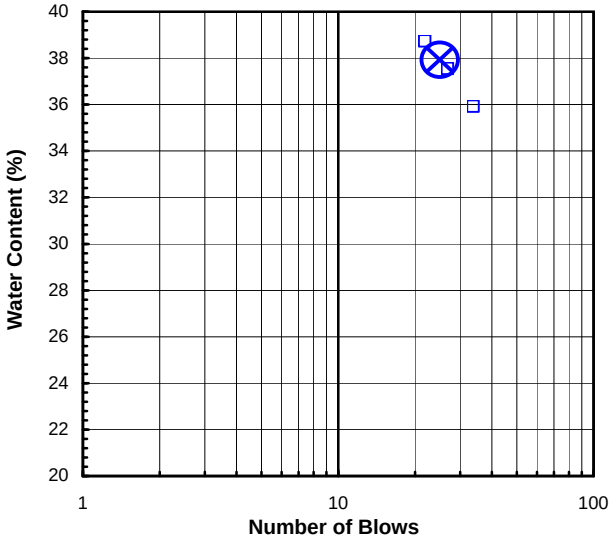
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	157	163	244	**U**
Wt. of Tare & Wet Sample (g):	38.20	38.57	39.29	**L**
Wt. of Tare & Dry Sample (g):	32.73	32.98	33.57	**T**
Weight of Tare (g):	17.49	18.08	18.79	**I**
Weight of Water (g):	5.5	5.6	5.7	**P**
Weight of Dry Sample (g):	15.2	14.9	14.8	**O**
				I
Moisture Content (%):	**35.9**	**37.5**	**38.7**	**N**
Number of Blows:	**34**	**27**	**22**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	180	184	
Wt. of Tare & Wet Sample (g):	25.76	25.91	
Wt. of Tare & Dry Sample (g):	24.76	24.84	
Weight of Tare (g):	19.64	19.64	
Weight of Water (g):	1.0	1.1	
Weight of Dry Sample (g):	5.1	5.2	
Moisture Content (%):	**19.5**	**20.6**	**-1.0**

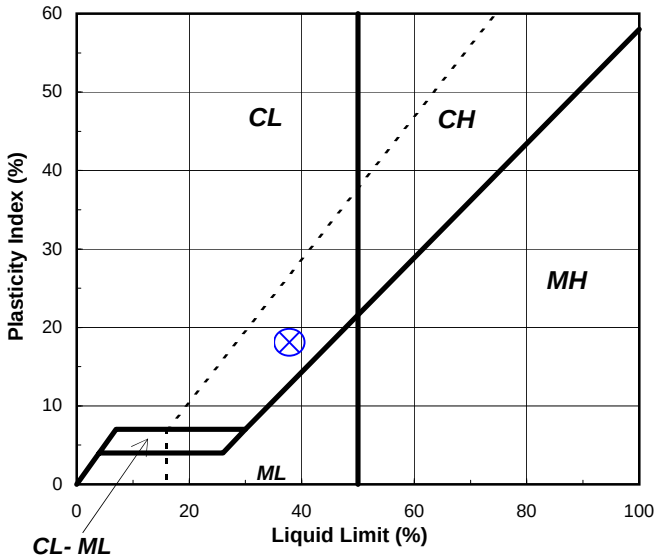
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**38**
Plastic Limit (%):	**20**
Plasticity Index (%):	**18**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By *JP* *Date* *9/11/15* *Checked By* *KC* *Date* 9/14/15

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PERMEABILITY TEST

ASTM D 5084-10

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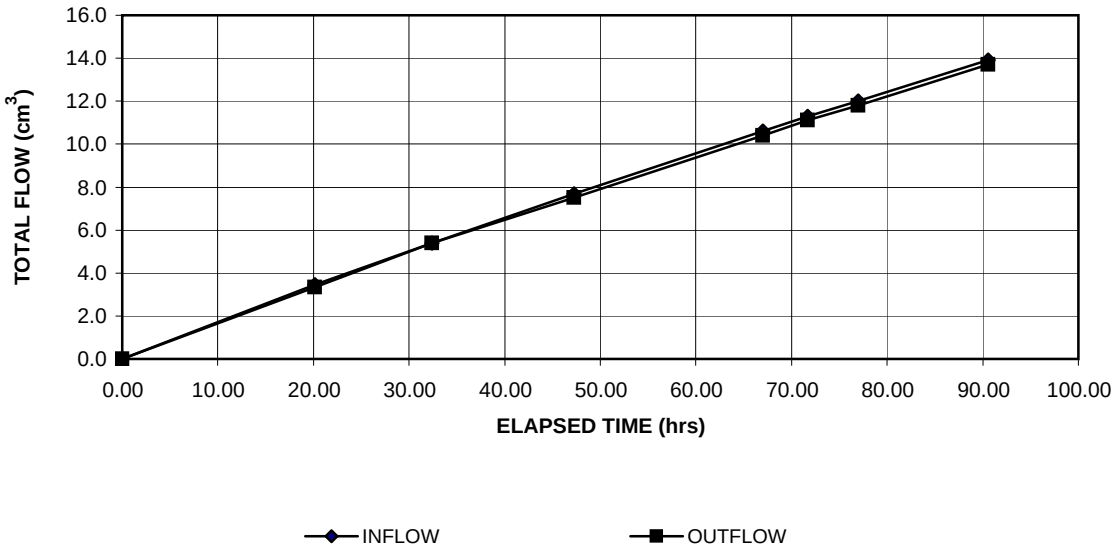
Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-4
Lab ID No.:	2015-471-001-005		

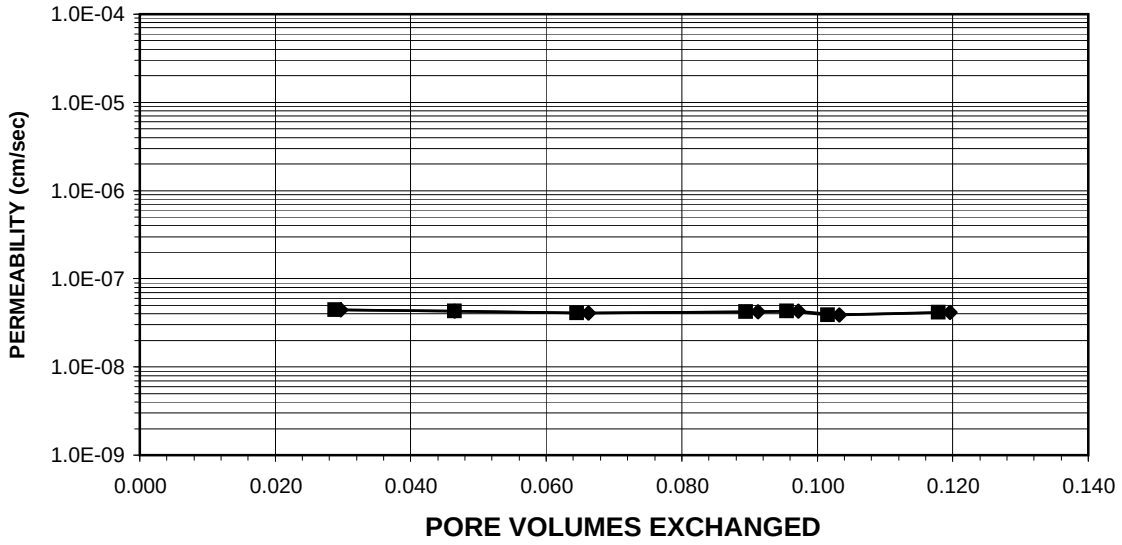
AVERAGE PERMEABILITY = 4.1E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 4.1E-10 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/10/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10

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PERMEABILITY TEST

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Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-4
Lab ID No.:	2015-471-001-005		

Specific Gravity:	2.70	Assumed
Sample Condition:		Undisturbed

Visual Description: Brown Sandy Clay with Rock Fragments

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	785	605
Weight of Tare & Wet Sample (g)	202.10	459.52
Weight of Tare & Dry Sample (g)	183.22	405.60
Weight of Tare (g)	85.29	86.44
Weight of Water (g)	18.88	53.92
Weight of Dry Sample (g)	97.93	319.16
Moisture Content (%)	**19.3**	**16.9**

SPECIMEN:	BEFORE TEST	AFTER TEST
Weight of Tube & Wet Sample (g)	720.55	NA
Weight of Tube (g)	0.00	NA
Weight of Wet Sample (g)	720.55	706.14
Length 1 (in)	3.184	3.232
Length 2 (in)	3.193	3.190
Length 3 (in)	3.201	3.211
Top Diameter (in)	2.883	2.874
Middle Diameter (in)	2.877	2.857
Bottom Diameter (in)	2.872	2.873
Average Length (in)	3.19	3.21
Average Area (in^2)	6.50	6.46
Sample Volume (cm^3)	340.19	339.93
Unit Wet Weight (g/cm^3)	2.12	2.08
Unit Wet Weight (pcf)	132.2	129.7
Unit Dry Weight (pcf)	110.8	110.9
Unit Dry Weight (g/cm^3)	1.78	1.78
Void Ratio, e	0.52	0.52
Porosity, n	0.34	0.34
Pore Volume (cm^3)	116.5	116.2
Total Weight of Sample After Test (g)		725.8

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/10/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10 *permflow.xls*

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PERMEABILITY TEST

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Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Upper 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-4
Lab ID No.:	2015-471-001-005		

Pressure Heads (Constant)		**Final Sample Dimensions**	
Top Cap (psi)	67.5	Sample Length (cm), L	8.16
Bottom Cap (psi)	70.0	Sample Diameter (cm)	7.28
Cell (psi)	75.0	Sample Area (cm^2), A	41.68
Total Pressure Head (cm)	175.8	Inflow Burette Area (cm^2), a-in	0.875
Hydraulic Gradient	21.55	Outflow Burette Area (cm^2), a-out	0.961
		B Parameter (%)	96

AVERAGE PERMEABILITY = 4.1E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 4.1E-10 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/5/15	12	30	0.000	0.0	0.0	201.0	0	22.0	NA
9/6/15	8	38	20.133	3.5	3.4	193.6	0	22.0	4.4E-08
9/6/15	20	54	32.400	5.4	5.4	189.2	0	22.8	4.3E-08
9/7/15	11	45	47.250	7.7	7.5	184.4	0	22.0	4.1E-08
9/8/15	7	30	67.000	10.6	10.4	178.1	0	22.0	4.2E-08
9/8/15	12	13	71.717	11.3	11.1	176.6	0	22.0	4.3E-08
9/8/15	17	30	77.000	12.0	11.8	175.1	0	22.0	3.9E-08
9/9/15	7	5	90.583	13.9	13.7	170.9	1	22.0	4.2E-08

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/10/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10

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SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

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Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-5
Lab ID:	2015-471-001-006	Soil Color:	Brown

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	19.48
#4 To #200	*Sand*	24.62
Finer Than #200	*Silt & Clay*	55.90

USCS Symbol:

CL, TESTED

USCS Classification:

SANDY LEAN CLAY WITH GRAVEL

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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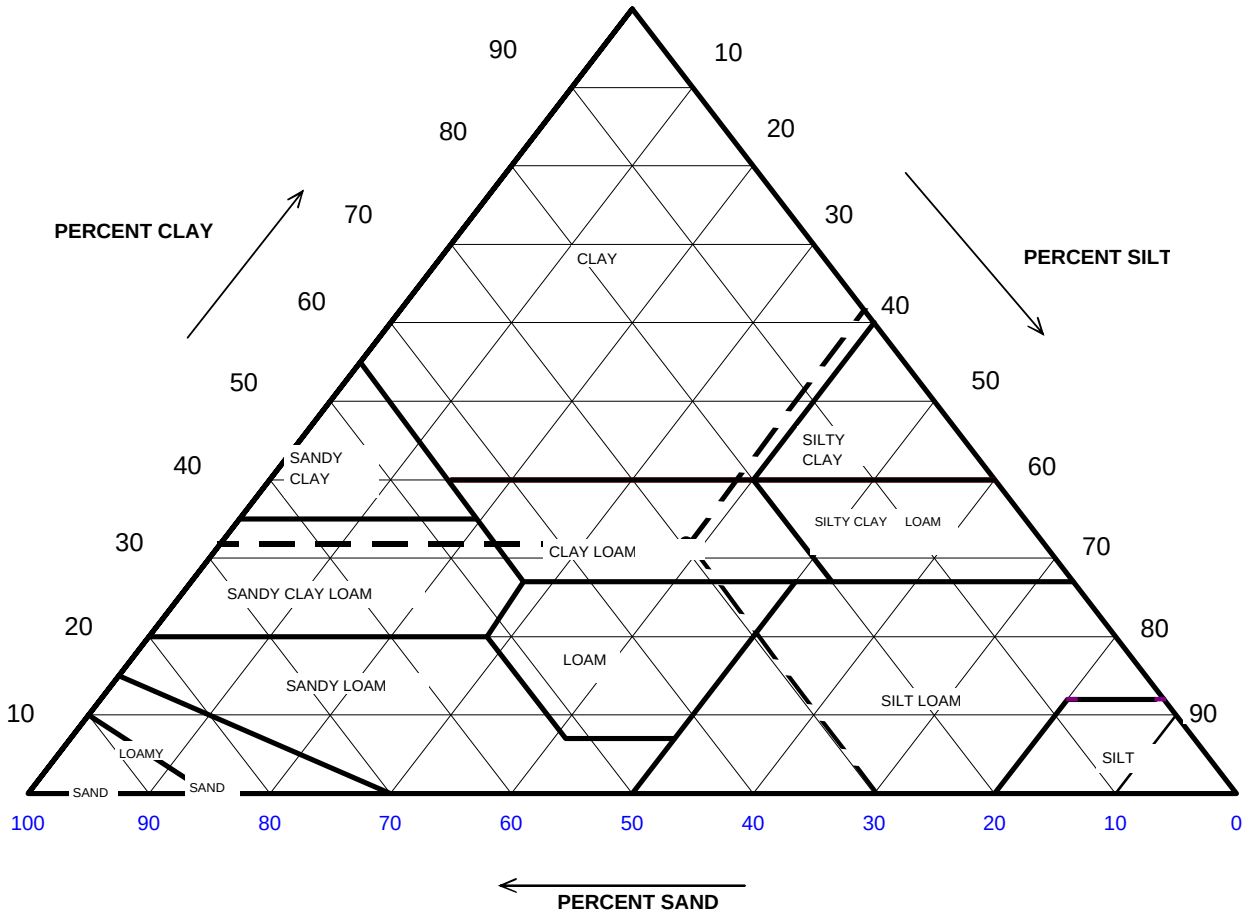
USDA CLASSIFICATION CHART

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-5
Lab ID:	2015-471-001-006	Soil Color:	Brown



Particle Size (mm)	Percent Finer (%)	USDA SUMMARY	Actual Percentage (%)	Corrected % of Minus 2.0 mm material for USDA Classificat. (%)
		Gravel	24.91	**0.00**
2	75.09	*Sand*	22.23	**29.60**
0.05	52.86	*Silt*	28.99	**38.60**
0.002	23.88	*Clay*	23.88	**31.80**

USDA Classification: ***CLAY LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-5
Lab ID:	2015-471-001-006	Soil Color:	Brown

Moisture Content of Passing 3/4" Materia		Water Content of Retained 3/4" Material	
Tare No.	31	Tare No.	NA
Weight of Tare & Wet Sample (g)	608.58	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	547.20	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	203.32	Weight of Tare (g)	NA
Weight of Water (g)	61.38	Weight of Water (g)	NA
Weight of Dry Sample (g)	343.88	Weight of Dry Sample (g)	NA
Moisture Content (%)	**17.8**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	343.88
Dry Weight of -3/4" Sample (g)	131.79	Weight of - #200 Material (g)	192.24
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	151.64
Dry Weight of +3/4" Sample (g)	19.85		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	0.00	0.00	0.00		100.00	**100.00**
3/4"	19.0	19.85	5.77	5.77		94.23	**94.23**
1/2"	12.5	17.14	4.98	10.76		89.24	**89.24**
3/8"	9.50	17.19	5.00	15.76		84.24	**84.24**
#4	4.75	12.81	3.73	19.48		80.52	**80.52**
#10	2.00	18.67	5.43	24.91		75.09	**75.09**
#20	0.85	14.22	4.14	29.05		70.95	**70.95**
#40	0.425	9.12	2.65	31.70		68.30	**68.30**
#60	0.250	9.29	2.70	34.40		65.60	**65.60**
#140	0.106	20.37	5.92	40.32		59.68	**59.68**
#200	0.075	12.98	3.77	44.10		55.90	**55.90**
Pan	-	192.24	55.90	100.00		-	**-**

Tested By	RAL	Date	9/11/15	Checked By	KC	Date	9/14/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-5
Lab ID:	2015-471-001-006	Soil Color:	Brown

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		51.0	24.1	5.61	45.4	85.5	0.01281	0.0255	**47.8**
5		47.5	24.1	5.61	41.9	78.9	0.01281	0.0167	**44.1**
15		43.5	24.1	5.61	37.9	71.4	0.01281	0.0100	**39.9**
30		39.5	24.1	5.61	33.9	63.9	0.01281	0.0073	**35.7**
60		37.0	23.9	5.68	31.3	59.0	0.01284	0.0053	**33.0**
250		30.5	23.6	5.79	24.7	46.6	0.01288	0.0027	**26.0**
1440		25.0	23.7	5.75	19.2	36.3	0.01287	0.0012	**20.3**

Soil Specimen Data		**Other Corrections**		
Tare No.	704			
Weight of Tare & Dry Material (g)	150.38	a - Factor	0.99	
Weight of Tare (g)	92.84			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	55.90	
Weight of Dry Material (g)	52.5			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 9/10/15 Checked By KC Date 9/14/15

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ATTERBERG LIMITS

ASTM D 4318-10

Client:	CB&I	Boring No.:	Pond B
Client Reference:	NRG Conemaugh	Depth (ft):	Lower 8" of tube
Project No.:	2015-471-001	Sample No.:	GT-5
Lab ID:	2015-471-001-006	Soil Description:	BROWN LEAN CLAY

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

(Minus No. 40 sieve material, Airdried)

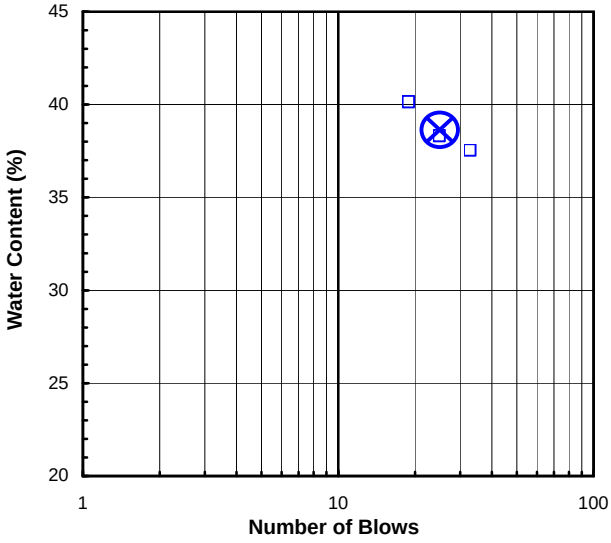
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	150	202	209	**U**
Wt. of Tare & Wet Sample (g):	39.90	37.32	40.75	**L**
Wt. of Tare & Dry Sample (g):	34.41	31.77	34.61	**T**
Weight of Tare (g):	19.77	17.27	19.30	**I**
Weight of Water (g):	5.5	5.6	6.1	**P**
Weight of Dry Sample (g):	14.6	14.5	15.3	**O**
				I
Moisture Content (%):	**37.5**	**38.3**	**40.1**	**N**
Number of Blows:	**33**	**25**	**19**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	215	216	
Wt. of Tare & Wet Sample (g):	24.66	25.28	
Wt. of Tare & Dry Sample (g):	23.62	24.24	
Weight of Tare (g):	18.36	19.21	
Weight of Water (g):	1.0	1.0	
Weight of Dry Sample (g):	5.3	5.0	
Moisture Content (%):	**19.8**	**20.7**	**-0.9**

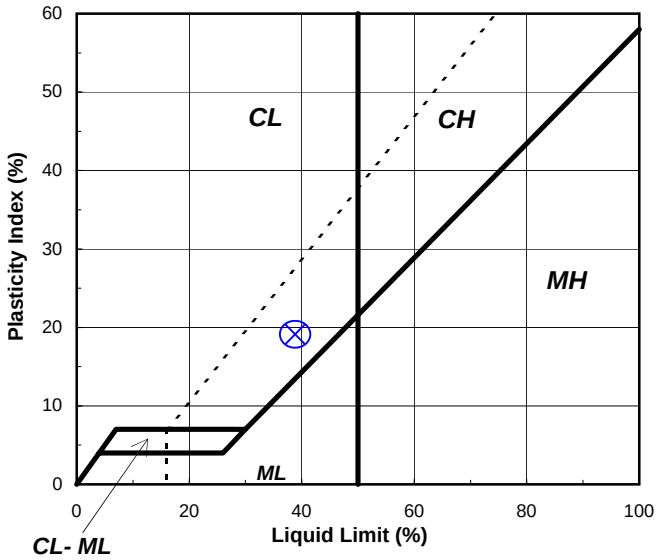
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**39**
Plastic Limit (%):	**20**
Plasticity Index (%):	**19**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By *JP* *Date* *9/11/15* *Checked By* *KC* *Date* 9/14/15

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PERMEABILITY TEST

ASTM D 5084-10

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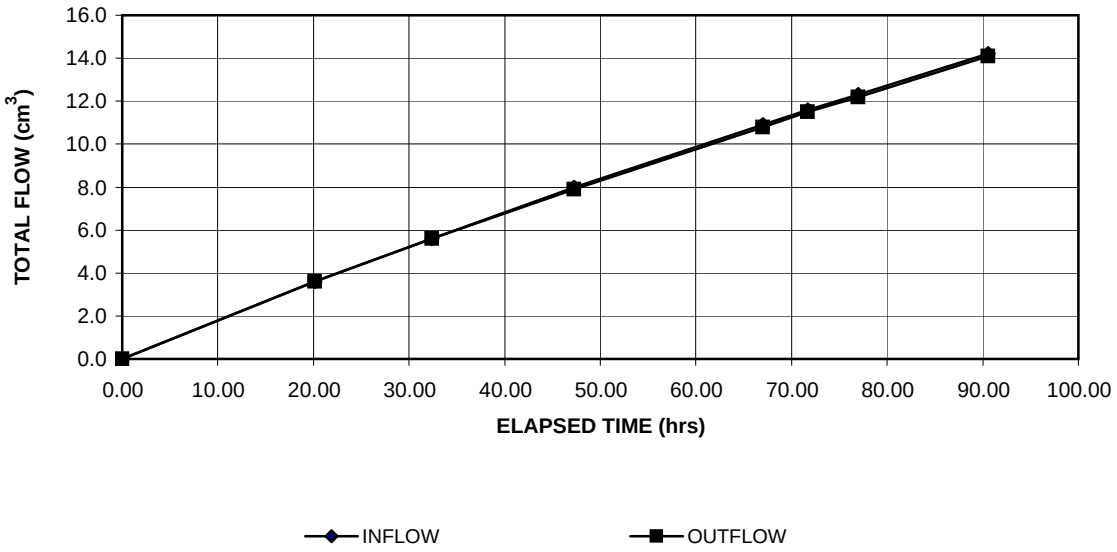
Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-5
Lab ID No.:	2015-471-001-006		

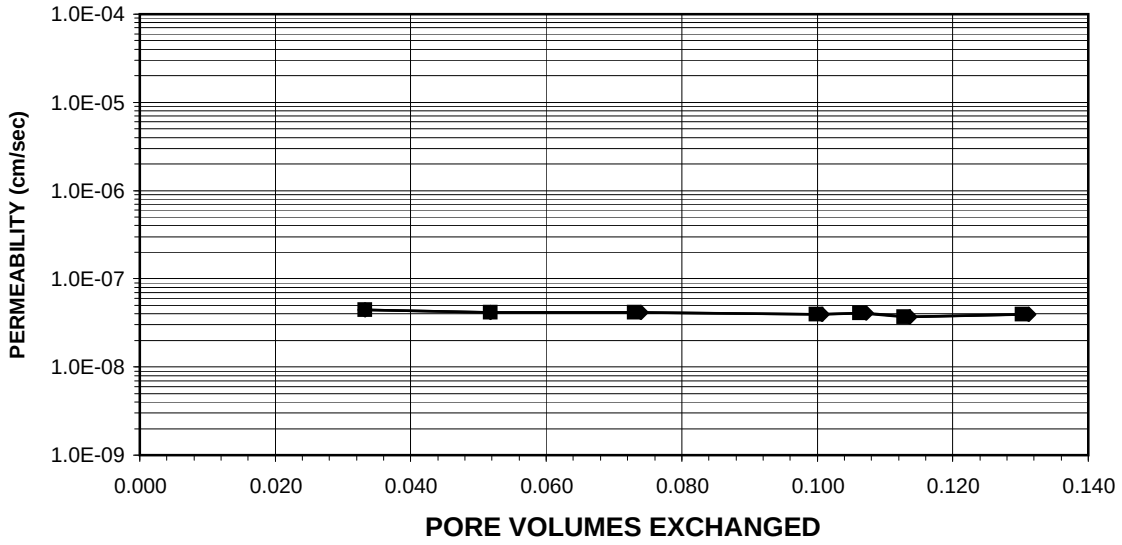
AVERAGE PERMEABILITY = 3.9E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 3.9E-10 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: JAB Date: 9/4/15 Checked By: KC Date: 9/10/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10

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PERMEABILITY TEST

ASTM D 5084-10

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Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-5
Lab ID No.:	2015-471-001-006		

Specific Gravity:	2.70	Assumed
Sample Condition:		Undisturbed

Visual Description: Brown Clay

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	555	599
Weight of Tare & Wet Sample (g)	340.94	125.88
Weight of Tare & Dry Sample (g)	301.10	118.92
Weight of Tare (g)	81.75	83.94
Weight of Water (g)	39.84	6.96
Weight of Dry Sample (g)	219.35	34.98
Moisture Content (%)	**18.2**	**19.9**

SPECIMEN:	BEFORE TEST	AFTER TEST
Weight of Tube & Wet Sample (g)	925.54	NA
Weight of Tube (g)	226.05	NA
Weight of Wet Sample (g)	699.49	709.76
Length 1 (in)	3.059	3.077
Length 2 (in)	3.047	3.082
Length 3 (in)	3.083	3.086
Top Diameter (in)	2.896	2.870
Middle Diameter (in)	2.857	2.873
Bottom Diameter (in)	2.886	2.877
Average Length (in)	3.06	3.08
Average Area (in^2)	6.51	6.48
Sample Volume (cm^3)	326.91	327.45
Unit Wet Weight (g/cm^3)	2.14	2.17
Unit Wet Weight (pcf)	133.6	135.3
Unit Dry Weight (pcf)	113.0	112.8
Unit Dry Weight (g/cm^3)	1.81	1.81
Void Ratio, e	0.49	0.49
Porosity, n	0.33	0.33
Pore Volume (cm^3)	107.7	108.2
Total Weight of Sample After Test (g)		701.0

Tested By: JAB Date: 9/4/15 Checked By: KC Date: 9/10/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10 *permflow.xls*

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PERMEABILITY TEST

ASTM D 5084-10

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Client:	CB&I	Boring No.:	Pond B
Client Project:	NRG Conemaugh	Depth (ft):	Lower 8" of Tube
Project No.:	2015-471-001	Sample No.:	GT-5
Lab ID No.:	2015-471-001-006		

Pressure Heads (Constant)		**Final Sample Dimensions**	
Top Cap (psi)	67.5	Sample Length (cm), L	7.83
Bottom Cap (psi)	70.0	Sample Diameter (cm)	7.30
Cell (psi)	75.0	Sample Area (cm^2), A	41.83
Total Pressure Head (cm)	175.8	Inflow Burette Area (cm^2), a-in	0.899
Hydraulic Gradient	22.45	Outflow Burette Area (cm^2), a-out	0.876
		B Parameter (%)	97

AVERAGE PERMEABILITY = 3.9E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 3.9E-10 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/5/15	12	30	0.000	0.0	0.0	206.0	0	22.0	NA
9/6/15	8	38	20.133	3.6	3.6	197.8	0	22.0	4.4E-08
9/6/15	20	54	32.400	5.6	5.6	193.3	0	22.0	4.2E-08
9/7/15	11	45	47.250	8.0	7.9	188.0	0	22.0	4.1E-08
9/8/15	7	30	67.000	10.9	10.8	181.4	0	22.0	4.0E-08
9/8/15	12	13	71.717	11.6	11.5	179.8	0	22.0	4.1E-08
9/8/15	17	30	77.000	12.3	12.2	178.2	0	22.0	3.7E-08
9/9/15	7	5	90.583	14.2	14.1	173.9	1	22.0	4.0E-08

Tested By: JAB Date: 9/4/15 Checked By: KC Date: 9/10/15

DCN: CT-22 DATE: 4/10/13 REVISION: 10

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ATTACHMENT 7

Demonstration of No Reasonable Probability of Complete and Direct Transport Pathway per §257.71(d)(1)(i)(D)

The Conemaugh Generating Station property is located adjacent to the Conemaugh River. The Ash Filter Ponds (AFPs) are set back from the river by approximately 0.2 – 0.3 miles. Based on the design and location of the AFPs, there is no reasonable probability that a complete and direct transport pathway (i.e., not mediated by groundwater) could exist between the AFPs and the nearby Conemaugh River. The following list of items provides evidence for this statement, in accordance with § 257.71(d)(1)(i)(4).

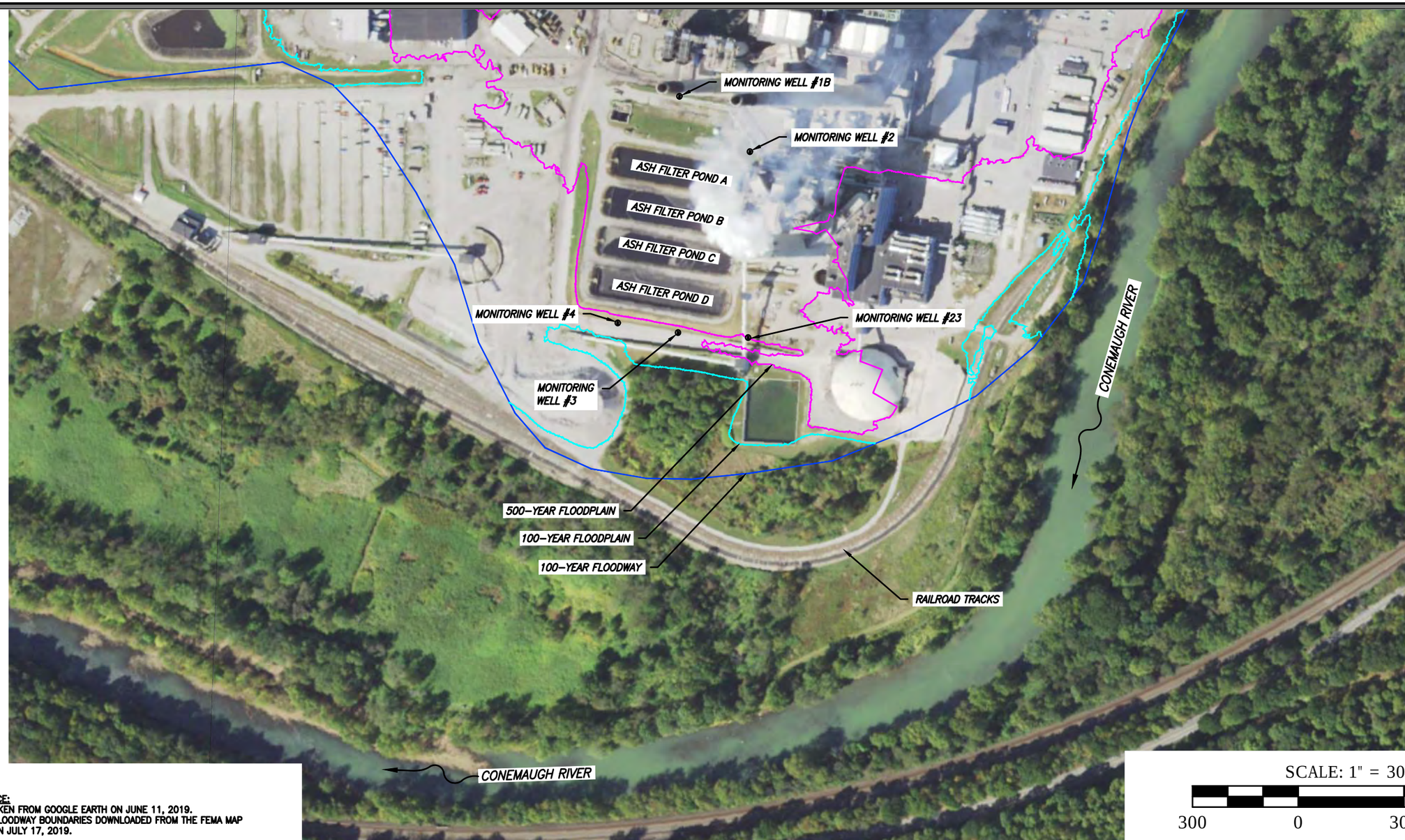
- The AFPs are located approximately 0.2 – 0.3 miles from the Conemaugh River.

- The AFPs are located outside of the 100-year and 500-year floodplain boundaries, as established by the Federal Emergency Management Agency (FEMA), as shown in Figure A7-1.

- Surface drainage downstream of the AFP embankments is topographically separated from the river by a railroad embankment, and the area between the AFPs and the river is well vegetated (Figure A-1). Additionally, the drainage features downgradient of the AFPs do not discharge to the river. As such, potential discharge to surface water would be impeded by site topography and existing drainage features and be required to re-enter the groundwater prior to discharge to the Conemaugh River.

- No seeps have been observed emanating from the embankments of the AFPs.

- Low conductivity soil is not present between the AFP liners and the uppermost aquifer (refer to boring logs included in Attachment 3B). As such, the soil conditions beneath the pond liners are not anticipated prevent AFP water from entering the monitored aquifer or direct AFP water laterally towards the Conemaugh River in a pathway not mediated by groundwater.



NORTH

SCALE: 1" = 300'

300 0 300 600

MAPPING REFERENCE:
AERIAL IMAGERY TAKEN FROM GOOGLE EARTH ON JUNE 11, 2019.
FLOODPLAIN AND FLOODWAY BOUNDARIES DOWNLOADED FROM THE FEMA MAP SERVICE CENTER ON JULY 17, 2019.

NO.:	DATE:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DESCRIPTION:

REVISION RECORD

DRAWING TITLE: FIGURE A7-1 - GENERAL LOCATION MAP

PROJECT: ASH FILTER PONDS
CONEMAUGH GENERATING STATION
INDIANA COUNTY, PENNSYLVANIA

gai consultants

CLIENT: KEYSTONE-CONEMAUGH PROJECTS, LLC
BLAIRSVILLE, PA

ISSUE DATE: 11/20/2020	DRAWN BY: M.DOYLE
SCALE: AS SHOWN	CHECKED BY: L. ROUNCE
REVISION	APPROVED BY: A.SCHELLER
	SHEET NO.: 1 OF 1

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GAI FILE NUMBER: C190459-01-003-C-B2-A71

GAI DRAWING NUMBER: FIGURE A7-1

GAI CAD FILE PATH: \\gaiconsultants.local\BUProj\Energy\2019\C190459.01 – KeyCon CON AshFilterPonds\CAD\Production DWGs\PERMIT – EPA CCR\C190459-01-003-C-B2-A71.dwg

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