



# **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:

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## Table of Contents

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List of Tables.....	iii
List of Figures .....	iii
List of Appendices.....	iii
List of Acronyms & Abbreviations .....	iv
1.0 Introduction .....	1
2.0 Facility Overview .....	2
3.0 Summary of the Ash Release.....	3
4.0 Immediate Response Actions.....	4
4.1 Notification of Release.....	4
4.2 CCR Removal.....	4
4.3 Retention of Professional Engineering Services.....	4
5.0 Corrective Measures Program .....	5
5.1 Initial On-Site Inspection of Immediate CCR Removal Activities .....	5
5.2 Environmental Sampling Plan Development.....	5
5.2.1 Soil Sampling .....	6
5.2.1.1 Overview.....	6
5.2.1.2 Number of Samples .....	6
5.2.1.3 Location of Samples .....	6
5.2.1.4 Comparison Methodology.....	7
5.2.1.5 Testing Methods for Soil Samples .....	7
5.2.1.6 Use of Groundwater Protection Standards .....	8
5.2.2 Surface Water (Stream) Sampling.....	8
5.3 Review of Pertinent Disposal Site Design Documents .....	8
5.4 Correctives Measures Assessment .....	9
5.4.1 Time Period for Assessment .....	9
5.4.2 Requirements for Corrective Measures.....	9
5.4.3 Considered Corrective Measures .....	10
5.5 Public Meeting .....	11
6.0 Sampling Results .....	12
7.0 Recommendation for No Further Action.....	13
8.0 Certification .....	14
Tables	
Figures	
Appendices	

## ***List of Tables***

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Table 1	Background Soil Sample Results
Table 2	Confirmation Soil Sample Results
Table 3	Confirmation Leachate Sample Results
Table 4	Surface Water Sample Results

## ***List of Figures***

---

Figure 1	Site Location Map
Figure 2	Overview of Ash Release Area
Figure 3	Soil and Surface Water Sampling Locations (1 of 2)
Figure 4	Soil and Surface Water Sampling Locations (2 of 2)

## ***List of Appendices***

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Appendix A	CCR Release Notification to PADEP
Appendix B	Notice of Time Period Extension for Assessment of Corrective Measures
Appendix C	Newspaper Advertisement of Public Meeting
Appendix D	Supporting Soil and Surficial Materials Report
Appendix E	Analytical Laboratory Reports

## *List of Acronyms & Abbreviations*

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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

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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

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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***

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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***

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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*

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### 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-1 was 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

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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***

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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

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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 SOUTHOORN, PE, PG

Date: JAN 9/2019

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



*[Signature]*  
1/9/2019  
LICENSE EXPIRES  
9/30/2019



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														
UD-1 0-4	11/13/2018	0-4	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-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.

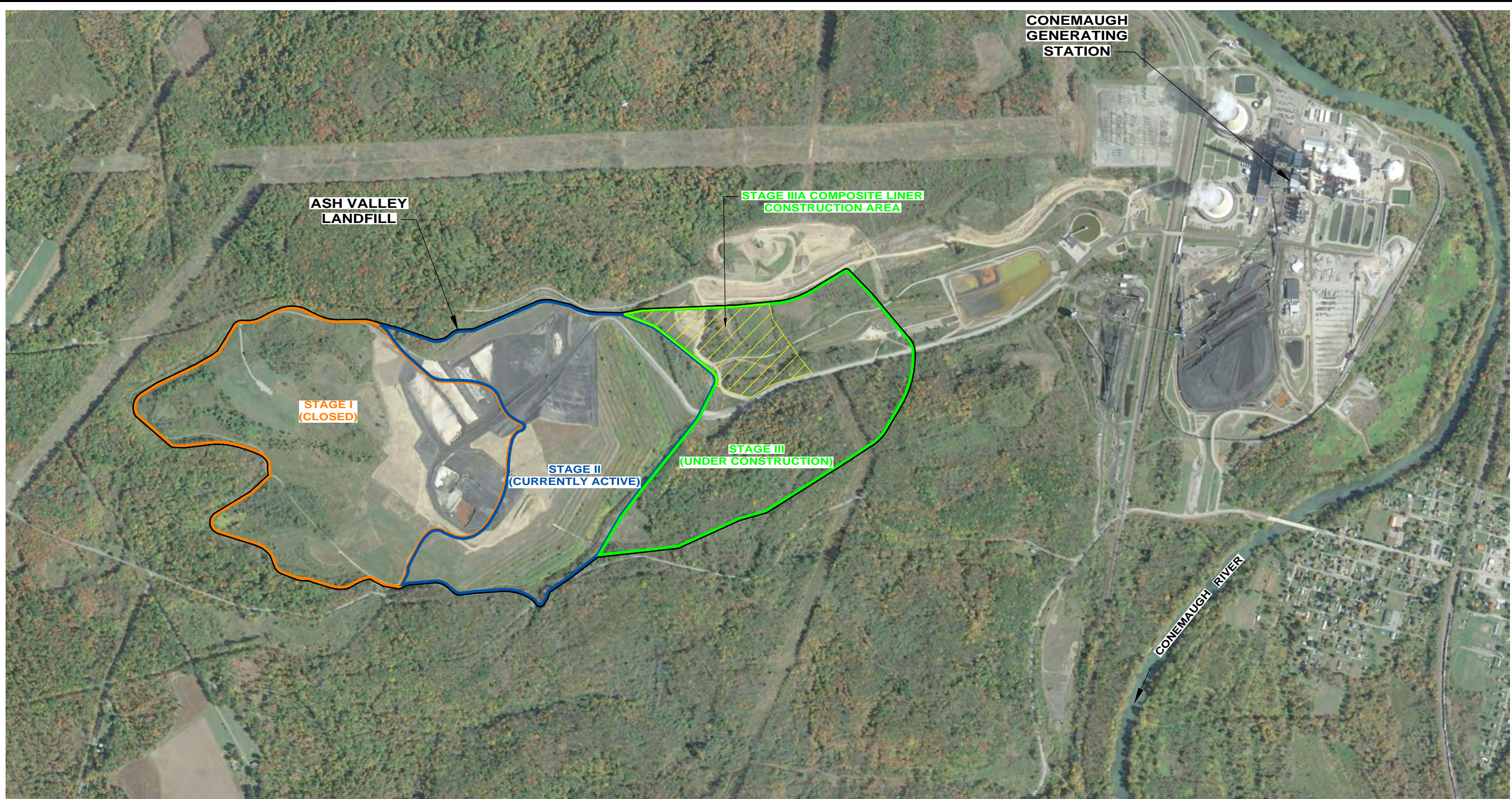
## *Figures*

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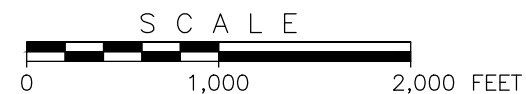
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Plot Date/Time: Jan 07, 2019 -- 4:11pm  
Plotted By: Evan.Schlegel

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	1/7/19	--	E. Schlegel	P. Andriason	R. Southern	003138-B1



REFERENCE:

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



500 Penn Center Boulevard,  
Suite 900  
Pittsburgh, Pennsylvania 15235

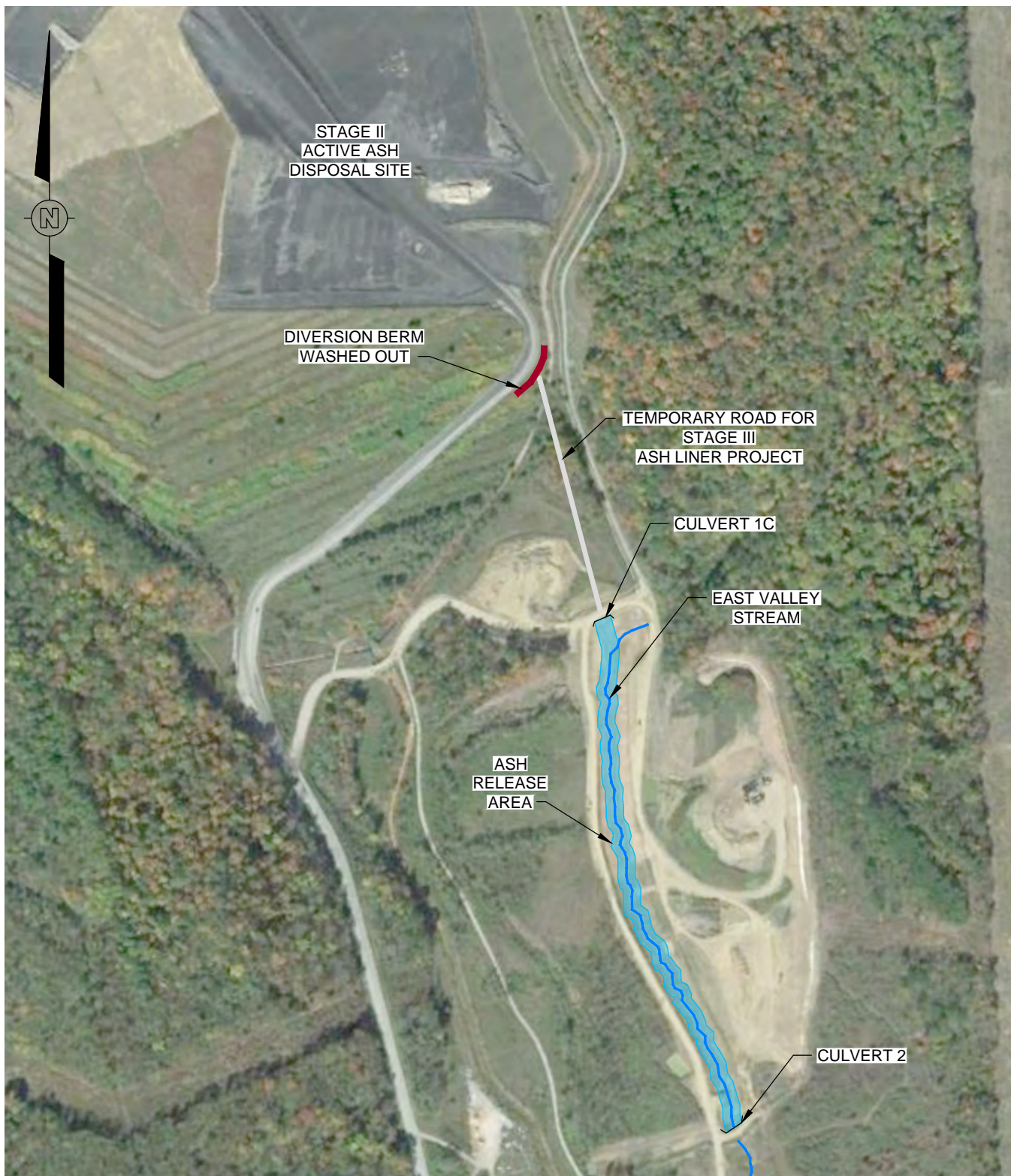


FIGURE 1  
SITE LOCATION MAP  
CONEMAUGH GENERATING STATION  
ASH/REFUSE DISPOSAL SITE  
INDIANA COUNTY, PENNSYLVANIA



File: O:\PROJECT\1009144003\_Conemaugh\003138\003138-A1.dwg  
 Plot Date/Time: Jan 07, 2019 - 4:17pm  
 Plotted By: Evan.Schlegel

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



**REFERENCE:**

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

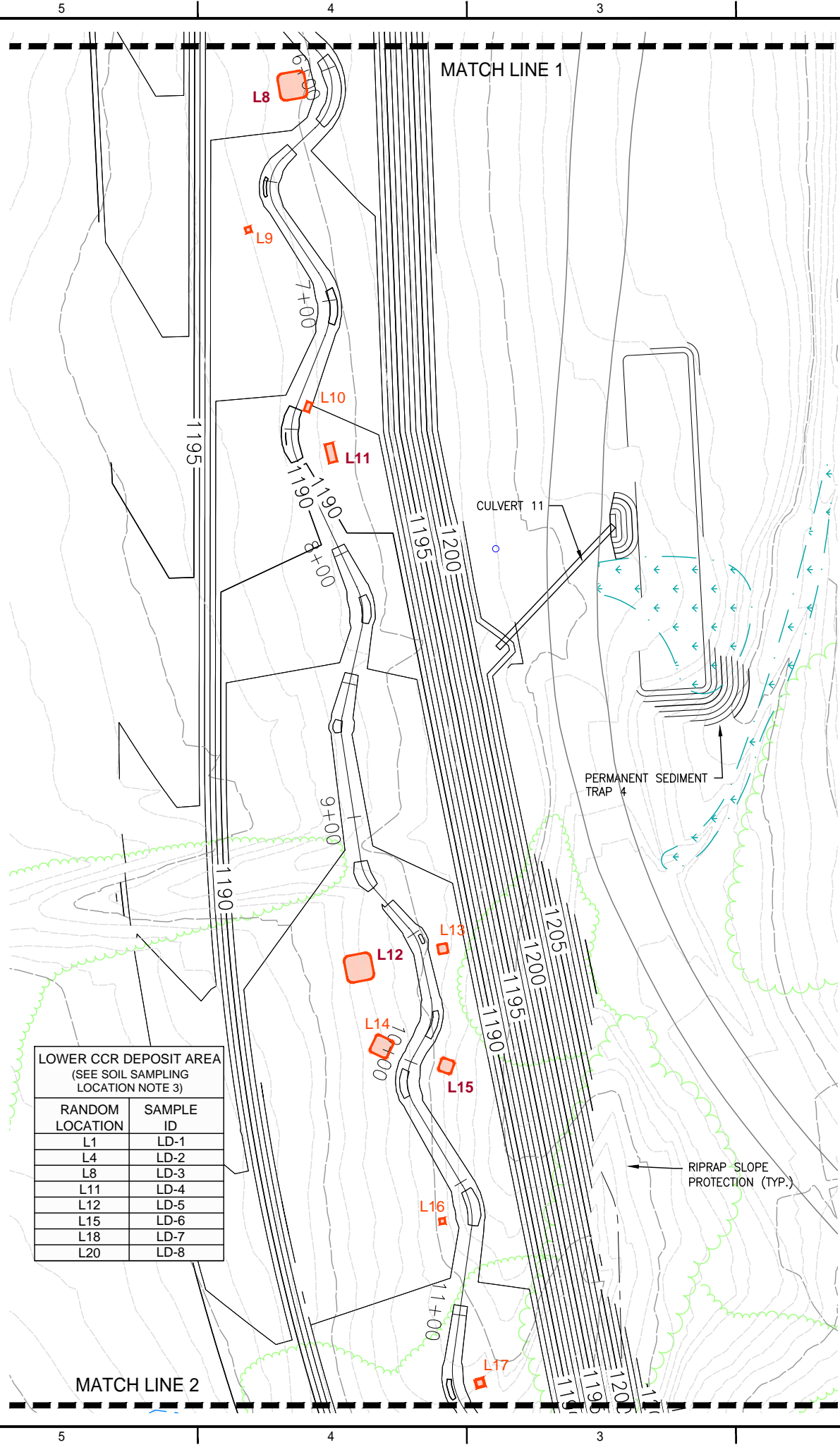
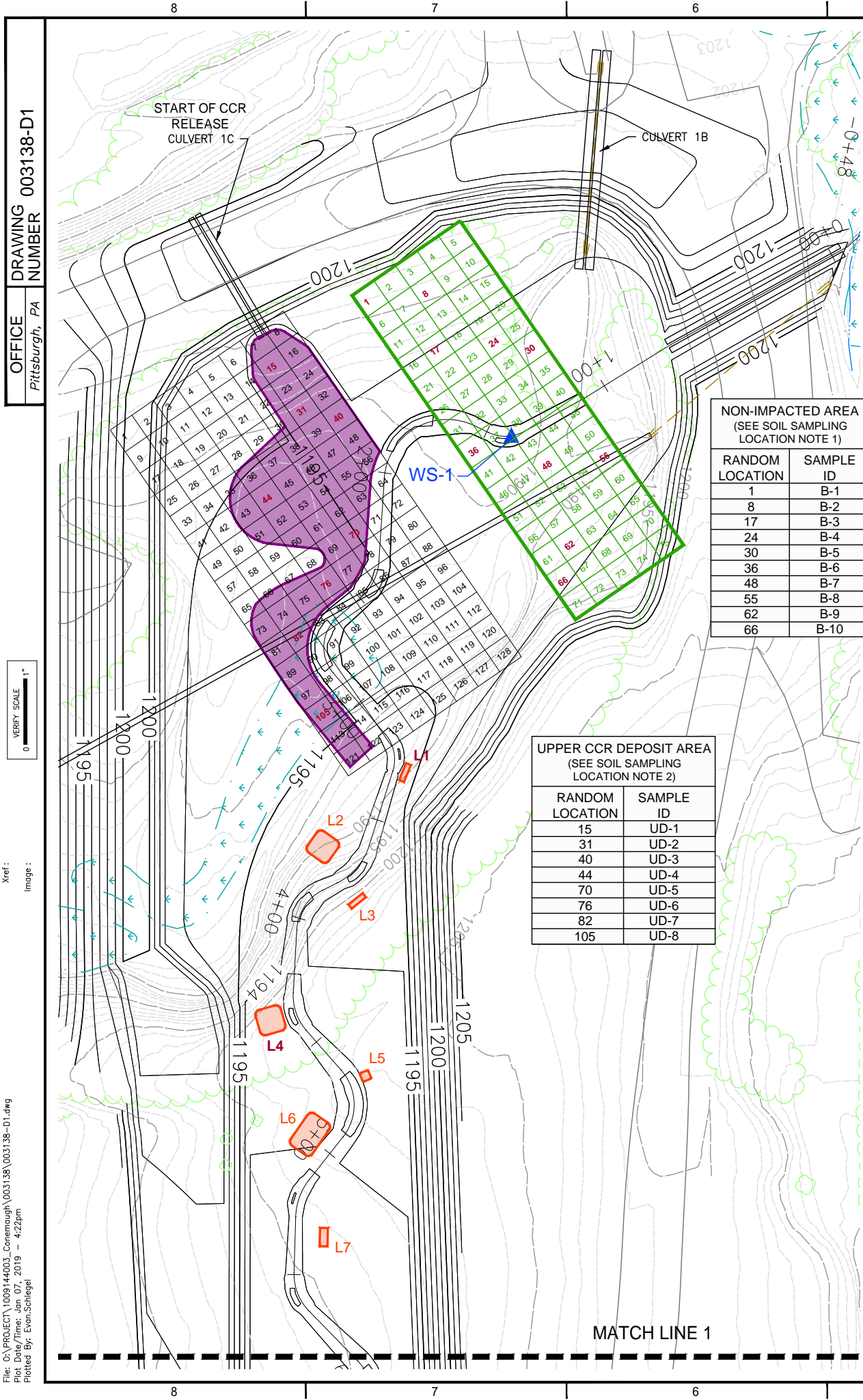


500 Penn Center Boulevard,  
 Suite 900  
 Pittsburgh, Pennsylvania 15235



**FIGURE 2**  
**OVERVIEW OF ASH RELEASE AREA**  
 CONEMAUGH GENERATING STATION  
 ASH/REFUSE DISPOSAL SITE  
 INDIANA COUNTY, PENNSYLVANIA






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




500 Penn Center Boulevard,  
Suite 900  
Pittsburgh, Pennsylvania 15235

DESIGNED BY:  
P. Anderson

DRAWN BY:  
E. Schlegel

CHECKED BY:  
P. Anderson

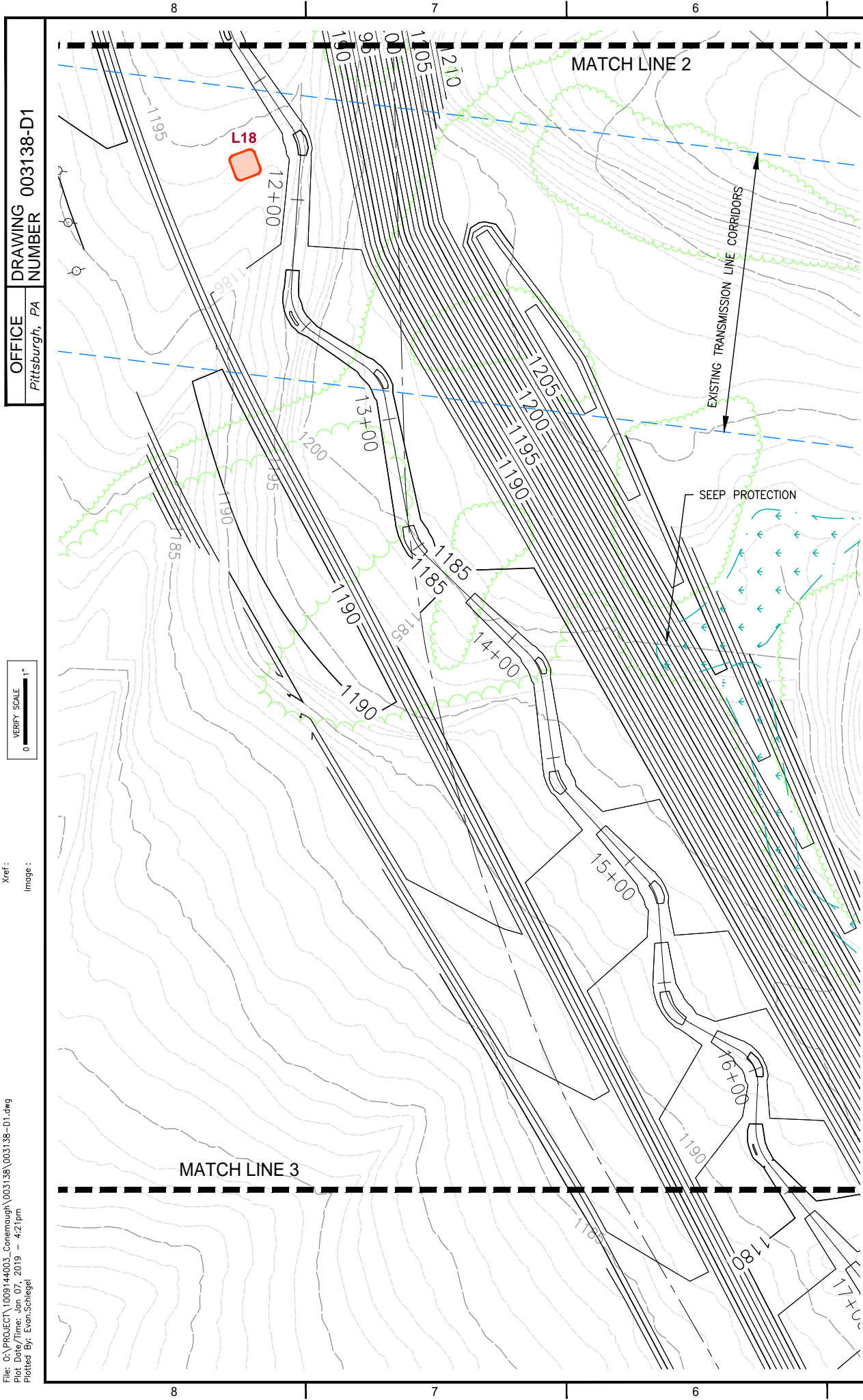
APPROVED BY:  
R. Southorn



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

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

*CCR Release Notification to PADEP*

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August 13, 2018

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

**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 30<sup>th</sup> 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

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\*: 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 30<sup>th</sup> 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 30<sup>th</sup> event was an isolated and rare occurrence.

.....

Please do not hesitate to contact Stephen Frank ([Stephen.frank@genon.com](mailto:Stephen.frank@genon.com)) at 724-249-3610 or John Shimshock ([John.Shimshock@genon.com](mailto: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*

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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](mailto:Richard.Southorn@aptim.com) or directly at 630-762-3327.

Sincerely,

A handwritten signature in blue ink, appearing to read 'RS'.

Richard Southorn, PE, PG

Project Manager

Aptim Environmental & Infrastructure, Inc.



## *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

**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

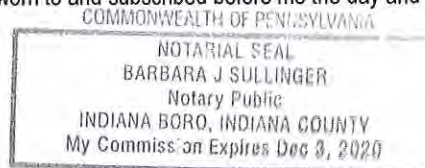
who being duly sworn according to laws, deposes and says, that (s)he is the Solicitor of the Indiana Gazette, that the said Indiana Gazette is a daily newspaper of general circulation, published in the borough of Indiana, in the County of Indiana, State of Pennsylvania, by the Indiana Printing & Publishing 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.



Barbara J. Sullinger  
Signature of notarial officer

	\$179.40
Proof of Publication _____	\$5.00
Proof of Intent _____	
Total _____	<u>\$184.40</u>

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*

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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

This report is preliminary and has not been  
edited or reviewed for conformity with U.S.  
Geological Survey standards or nomenclature.

## Contents

	Page
Introduction.....	1
Sample collection, preparation, and analysis.....	2
Location, description, and concentration of elements for samples of surficial materials.....	3
References cited.....	6

## Table

Page

Table 1. Location, description, and concentration of elements for samples of surficial materials.....	8
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## 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. Griffiths, 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.

<u>State</u>	<u>GPO</u>	<u>Postal Service</u>	<u>State</u>	<u>GPO</u>	<u>Postal Service</u>
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.

<u>Abbreviation</u>	<u>Word or term</u>	<u>Abbreviation</u>	<u>Word or term</u>
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
184450	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 semiquantitative 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	1-5 2.6 MI N JCT I-5 & US 99E; SOIL ON SILT DEPOSIT
GC269550	OR	MARION	44 50	123 5	68 9	1-5 S OF TURNER; B HORIZON SOIL
GC035350	OR	MORROW	45 50	119 36	65 8	1-80-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
GC028950	--	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*

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### *Background Samples (B-1 through B-10)*

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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



## Geochemical Testing

Date: 28-Dec-18

**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



# Laboratory Results

## Geochemical Testing

Date: 28-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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
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# Laboratory Results

## Geochemical Testing

Date: 28-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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
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# Laboratory Results

## Geochemical Testing

Date: 28-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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
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# Laboratory Results

## Geochemical Testing

Date: 28-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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
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# Laboratory Results

## Geochemical Testing

Date: 28-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### GAMMA SPECTROSCOPY

Analyst: **AM**

**EPA 901.1**

Radium-226	0.56+/-0.0319	0.065		pCi/g	1	12/10/18 7:11 PM	12/10/18 7:11 PM
Radium-228	0.74+/-0.0614	0.071		pCi/g	1	12/10/18 7:11 PM	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	11/20/18 2:36 PM
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# Laboratory Results

## Geochemical Testing

Date: 28-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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	
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# Laboratory Results

## Geochemical Testing

Date: 28-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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
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# Laboratory Results

## Geochemical Testing

Date: 28-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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
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# Laboratory Results

## Geochemical Testing

Date: 28-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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
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# Laboratory Results

## Geochemical Testing

Date: 28-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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
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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@optim.com	Fax: ( )
City: NEW FLORENCE State: PA Zip: 15944	Sampled by: PATTI ANDRISON AND	State Sampled: PA
WO#: 61811861	Project: EVAN SCHLEGER	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
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	GENON	11-14-18	2054

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

Sample Matrix: <u>GW</u> Ground Water	SW Surface Water	PW Potable Water	WW Wastewater	SO Soil	SL Sludge	nHZ Not Hazardous / HZ Hazardous	PCBs
Sample Type: <u>G</u> 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
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	<del>007</del> 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)
<u>APTm Patti Anderson</u>	<u>11/13/18</u>	<u>1615</u>	<u>[Signature]</u>	<u>11-13-18</u>	<u>0054</u>

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ☒ Yes or ☐ NoCooler Temp (°C) on receipt: 5Sample Receiving (1st Review): [Signature]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: <u>GENON</u>	Contact (Company): <u>APTM</u>	Phone: <u>(412) 380-4272</u>
Address: <u>CONEMAUGH</u>	e-mail:	Fax: ( )
City: <u>NEW FLORENCE</u> State: <u>PA</u> Zip: <u>15944</u>	Sampled by: <u>Pat Anderson and</u>	State Sampled: <u>PA</u>
WO#: <u>61811861</u>	Project: <u>Evan Schlegel</u>	PO/Quote#:

Sample Matrix: <u>GW</u> Ground Water	SW Surface Water	PW Potable Water	WW Wastewater	SO Soil	SL Sludge	nHZ Not Hazardous / HZ Hazardous	PCBs
Sample Type: <u>G</u> 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
B-9 0-4	Q09	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	Q10	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)
<u>APTM Patricia Anderson</u>	<u>11/13/18</u>	<u>1615</u>	<u>Sam Wan</u>	<u>11-14-18</u>	<u>2054</u>

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ☒ Yes or ☐ No  
Cooler Temp (°C) on receipt: 5  
Sample Receiving (1st Review): JD  
Client Support (2nd Review):

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

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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



## Geochemical Testing

Date: 21-Dec-18

**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



# Laboratory Results

## Geochemical Testing

Date: 21-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### TOTAL METALS

Analyst: **RLL**

**EPA 7473**

Mercury	0.20	0.010	mg/Kg-dry	1		11/20/18 2:36 PM
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### 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
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### 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
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### 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



# Laboratory Results

## Geochemical Testing

Date: 21-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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
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### 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
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### SPLP FLUID #1

Analyst: ALD

EPA 1312

Final pH Metals	6.56	S.U.	1	11/15/18 8:00 PM
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### 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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# Laboratory Results

## Geochemical Testing

Date: 21-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
				Analyst: <b>RLL</b>		<b>EPA 7473</b>	
Mercury	0.072	0.010		mg/Kg-dry	1	11/20/18 2:36 PM	
<b>SPLP INORGANICS</b>							
				Analyst: <b>MBG</b>		<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.20	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 1:03 PM
<b>TOTAL METALS</b>							
				Analyst: <b>MXS</b>		<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>GXI</b>		<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 9:20 AM	11/19/18 1:51 PM
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>MXS</b>		<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
				Analyst: <b>AM</b>		<b>EPA 901.1</b>	
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	

## Laboratory Results

### Geochemical Testing

Date: 21-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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#### 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
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#### 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
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#### SPLP FLUID #1

Analyst: **ALD**

**EPA 1312**

Final pH Metals	4.87	S.U.	1	11/15/18 8:00 PM
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#### 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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# Laboratory Results

## Geochemical Testing

Date: 21-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
				Analyst: <b>RLL</b>		<b>EPA 7473</b>	
Mercury	0.037	0.010		mg/Kg-dry	1	11/20/18 2:36 PM	
<b>SPLP INORGANICS</b>							
				Analyst: <b>MBG</b>		<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.26	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 1:21 PM
<b>TOTAL METALS</b>							
				Analyst: <b>MXS</b>		<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>GXI</b>		<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 9:55 AM
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>MXS</b>		<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
				Analyst: <b>AM</b>		<b>EPA 901.1</b>	
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	



# Laboratory Results

## Geochemical Testing

Date: 21-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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
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### 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
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### SPLP FLUID #1

Analyst: ALD

EPA 1312

Final pH Metals	7.66	S.U.	1	11/15/18 8:00 PM
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### 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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# Laboratory Results

## Geochemical Testing

Date: 21-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
				Analyst: <b>RLL</b>		<b>EPA 7473</b>	
Mercury	0.099	0.010		mg/Kg-dry	1	11/20/18 2:36 PM	
<b>SPLP INORGANICS</b>							
				Analyst: <b>MBG</b>		<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.16	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 1:39 PM
<b>TOTAL METALS</b>							
				Analyst: <b>MXS</b>		<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>GXI</b>		<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 10:01 AM
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>MXS</b>		<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
				Analyst: <b>AM</b>		<b>EPA 901.1</b>	
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	

## Laboratory Results

### Geochemical Testing

Date: 21-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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#### 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
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#### 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
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#### SPLP FLUID #1

Analyst: **ALD**

**EPA 1312**

Final pH Metals	3.97	S.U.	1	11/15/18 8:00 PM
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#### 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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# Laboratory Results

## Geochemical Testing

Date: 21-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
				Analyst: <b>RLL</b>		<b>EPA 7473</b>	
Mercury	0.045	0.010		mg/Kg-dry	1	11/20/18 2:36 PM	
<b>SPLP INORGANICS</b>							
				Analyst: <b>MBG</b>		<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.44	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 1:57 PM
<b>TOTAL METALS</b>							
				Analyst: <b>MXS</b>		<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>GXI</b>		<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 10:02 AM
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>MXS</b>		<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
				Analyst: <b>AM</b>		<b>EPA 901.1</b>	
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	

# Laboratory Results

## Geochemical Testing

Date: 21-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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
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### 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
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### SPLP FLUID #1

Analyst: **ALD**

**EPA 1312**

Final pH Metals	6.13	S.U.	1	11/15/18 8:00 PM
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### 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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# Laboratory Results

## Geochemical Testing

Date: 21-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
		Analyst: <b>RLL</b>					<b>EPA 7473</b>
Mercury	0.054	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
<b>SPLP INORGANICS</b>							
		Analyst: <b>MBG</b>				<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.18	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 2:15 PM
<b>TOTAL METALS</b>							
		Analyst: <b>MXS</b>				<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
		Analyst: <b>GXI</b>				<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 10:04 AM
<b>SPLP METALS FLUID #1</b>							
		Analyst: <b>MXS</b>				<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
		Analyst: <b>AM</b>					<b>EPA 901.1</b>
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



## Laboratory Results

### Geochemical Testing

Date: 21-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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#### 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
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#### 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
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#### SPLP FLUID #1

Analyst: **ALD**

**EPA 1312**

Final pH Metals	4.11	S.U.	1	11/15/18 8:00 PM
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#### 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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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

## Geochemical Testing

Date: 12-Dec-18

**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



# Laboratory Results

## Geochemical Testing

Date: 12-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
				Analyst: <b>RLL</b>		<b>EPA 7473</b>	
Mercury	0.26	0.010		mg/Kg-dry	1	11/20/18 2:36 PM	
<b>SPLP INORGANICS</b>							
				Analyst: <b>MBG</b>		<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.51	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 2:33 PM
<b>TOTAL METALS</b>							
				Analyst: <b>MXS</b>		<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>GXI</b>		<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 10:06 AM
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>MXS</b>		<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
				Analyst: <b>AM</b>		<b>EPA 901.1</b>	
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	

## Laboratory Results

### Geochemical Testing

Date: 12-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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#### 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
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#### 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
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#### SPLP FLUID #1

Analyst: ALD

EPA 1312

Final pH Metals	4.68	S.U.	1	11/15/18 8:00 PM
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#### 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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# Laboratory Results

## Geochemical Testing

Date: 12-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
		Analyst: <b>RLL</b>			<b>EPA 7473</b>		
Mercury	0.040	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
<b>SPLP INORGANICS</b>							
		Analyst: <b>MBG</b>			<b>EPA 300.0</b>		
Fluoride	0.18	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 2:51 PM
<b>TOTAL METALS</b>							
		Analyst: <b>MXS</b>			<b>EPA 3050</b>		
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
<b>SPLP METALS FLUID #1</b>							
		Analyst: <b>GXI</b>			<b>SM 3112 B</b>		
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 10:26 AM
<b>SPLP METALS FLUID #1</b>							
		Analyst: <b>MXS</b>			<b>EPA 200.2</b>		
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
<b>GAMMA SPECTROSCOPY</b>							
		Analyst: <b>AM</b>			<b>EPA 901.1</b>		
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



## Laboratory Results

### Geochemical Testing

Date: 12-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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#### 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
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#### 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
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#### SPLP FLUID #1

Analyst: ALD

EPA 1312

Final pH Metals	6.05	S.U.	1	11/15/18 8:00 PM
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#### 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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# Laboratory Results

## Geochemical Testing

Date: 12-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
				Analyst: <b>RLL</b>		<b>EPA 7473</b>	
Mercury	0.042	0.010		mg/Kg-dry	1	11/20/18 2:36 PM	
<b>SPLP INORGANICS</b>							
				Analyst: <b>MBG</b>		<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.08	0.05	J	mg/L	1	11/16/18 11:45 AM	11/16/18 3:08 PM
<b>TOTAL METALS</b>							
				Analyst: <b>MXS</b>		<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>GXI</b>		<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 10:49 AM
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>MXS</b>		<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
				Analyst: <b>AM</b>		<b>EPA 901.1</b>	
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	

## Laboratory Results

### Geochemical Testing

Date: 12-Dec-18

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

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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#### 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
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#### 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
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#### SPLP FLUID #1

Analyst: ALD

EPA 1312

Final pH Metals	4.54	S.U.	1	11/17/18 1:00 PM
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#### 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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# Laboratory Results

## Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b> LD-2 0-4
<b>Lab Order:</b>	G1811867	
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Sampled By:</b> APTIM
<b>Lab ID:</b>	G1811867-007	<b>Collection Date:</b> 11/14/2018 10:55:00 A
<b>Matrix:</b>	SOLID	<b>Received Date:</b> 11/15/2018 6:32:36 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
				Analyst: <b>RLL</b>		<b>EPA 7473</b>	
Mercury	0.032	0.010		mg/Kg-dry	1	11/20/18 2:36 PM	
<b>SPLP INORGANICS</b>							
				Analyst: <b>MBG</b>		<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.39	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 3:26 PM
<b>TOTAL METALS</b>							
				Analyst: <b>MXS</b>		<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>GXI</b>		<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:17 AM
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>MXS</b>		<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
				Analyst: <b>AM</b>		<b>EPA 901.1</b>	
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	

## Laboratory Results

### Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-2 0-4
<b>Lab Order:</b>	G1811867		
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Sampled By:</b>	APTIM
<b>Lab ID:</b>	G1811867-007	<b>Collection Date:</b>	11/14/2018 10:55:00 A
<b>Matrix:</b>	SOLID	<b>Received Date:</b>	11/15/2018 6:32:36 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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#### 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
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#### 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
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#### SPLP FLUID #1

Analyst: **ALD**

**EPA 1312**

Final pH Metals	3.67		S.U.	1	11/18/18 11:00 AM
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#### 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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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

## Geochemical Testing

Date: 12-Dec-18

**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





# Laboratory Results

## Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-3 0-4
<b>Lab Order:</b>	G1811869	<b>Sampled By:</b>	APTIM
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Collection Date:</b>	11/14/2018 11:15:00 A
<b>Lab ID:</b>	G1811869-001	<b>Received Date:</b>	11/15/2018 6:58:38 AM
<b>Matrix:</b>	SOLID		

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
		Analyst: <b>RLL</b>					<b>EPA 7473</b>
Mercury	0.040	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
<b>SPLP INORGANICS</b>							
		Analyst: <b>MBG</b>				<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.09	0.05	J	mg/L	1	11/16/18 11:45 AM	11/16/18 4:20 PM
<b>TOTAL METALS</b>							
		Analyst: <b>MXS</b>				<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
		Analyst: <b>GXI</b>				<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:16 AM
<b>SPLP METALS FLUID #1</b>							
		Analyst: <b>MXS</b>				<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
		Analyst: <b>AM</b>					<b>EPA 901.1</b>
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

## Laboratory Results

### Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-3 0-4
<b>Lab Order:</b>	G1811869		
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Sampled By:</b>	APTIM
<b>Lab ID:</b>	G1811869-001	<b>Collection Date:</b>	11/14/2018 11:15:00 A
<b>Matrix:</b>	SOLID	<b>Received Date:</b>	11/15/2018 6:58:38 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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#### 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
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#### 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
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#### SPLP FLUID #1

Analyst: **ALD**

**EPA 1312**

Final pH Metals	3.71	S.U.	1	11/17/18 1:00 PM
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#### SPLP FLUID #3

Analyst: **MAG**

**EPA 1312**

Final pH Non Metals	6.46	S.U.	1	11/15/18 9:16 AM
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# Laboratory Results

## Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-4 0-4
<b>Lab Order:</b>	G1811869	<b>Sampled By:</b>	APTIM
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Collection Date:</b>	11/14/2018 11:40:00 A
<b>Lab ID:</b>	G1811869-003	<b>Received Date:</b>	11/15/2018 6:58:38 AM
<b>Matrix:</b>	SOLID		

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
				Analyst: <b>RLL</b>		<b>EPA 7473</b>	
Mercury	0.038	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
<b>SPLP INORGANICS</b>							
				Analyst: <b>MBG</b>		<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.14	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 5:14 PM
<b>TOTAL METALS</b>							
				Analyst: <b>MXS</b>		<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>GXI</b>		<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:25 AM
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>MXS</b>		<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
				Analyst: <b>AM</b>		<b>EPA 901.1</b>	
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

## Laboratory Results

### Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-4 0-4
<b>Lab Order:</b>	G1811869		
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Sampled By:</b>	APTIM
<b>Lab ID:</b>	G1811869-003	<b>Collection Date:</b>	11/14/2018 11:40:00 A
<b>Matrix:</b>	SOLID	<b>Received Date:</b>	11/15/2018 6:58:38 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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#### 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
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#### 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
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#### SPLP FLUID #1

Analyst: **ALD**

**EPA 1312**

Final pH Metals	3.81		S.U.	1	11/17/18 1:00 PM
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#### SPLP FLUID #3

Analyst: **MAG**

**EPA 1312**

Final pH Non Metals	6.61		S.U.	1	11/15/18 9:16 AM
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# Laboratory Results

## Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-5 0-4
<b>Lab Order:</b>	G1811869	<b>Sampled By:</b>	APTIM
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Collection Date:</b>	11/14/2018 11:55:00 A
<b>Lab ID:</b>	G1811869-005	<b>Received Date:</b>	11/15/2018 6:58:38 AM
<b>Matrix:</b>	SOLID		

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
		Analyst: <b>RLL</b>					<b>EPA 7473</b>
Mercury	0.057	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
<b>SPLP INORGANICS</b>							
		Analyst: <b>MBG</b>				<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.05	0.05	U	mg/L	1	11/16/18 11:45 AM	11/16/18 5:32 PM
<b>TOTAL METALS</b>							
		Analyst: <b>MXS</b>				<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
		Analyst: <b>GXI</b>				<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:26 AM
<b>SPLP METALS FLUID #1</b>							
		Analyst: <b>MXS</b>				<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
		Analyst: <b>AM</b>					<b>EPA 901.1</b>
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

## Laboratory Results

### Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-5 0-4
<b>Lab Order:</b>	G1811869		
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Sampled By:</b>	APTIM
<b>Lab ID:</b>	G1811869-005	<b>Collection Date:</b>	11/14/2018 11:55:00 A
<b>Matrix:</b>	SOLID	<b>Received Date:</b>	11/15/2018 6:58:38 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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#### 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
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#### 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
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#### SPLP FLUID #1

Analyst: **ALD**

**EPA 1312**

Final pH Metals	3.83	S.U.	1	11/17/18 1:00 PM
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#### SPLP FLUID #3

Analyst: **MAG**

**EPA 1312**

Final pH Non Metals	6.33	S.U.	1	11/15/18 9:16 AM
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# Laboratory Results

## Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-6 0-4
<b>Lab Order:</b>	G1811869	<b>Sampled By:</b>	APTIM
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Collection Date:</b>	11/14/2018 12:10:00 P
<b>Lab ID:</b>	G1811869-007	<b>Received Date:</b>	11/15/2018 6:58:38 AM
<b>Matrix:</b>	SOLID		

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
		Analyst: <b>RLL</b>					<b>EPA 7473</b>
Mercury	0.052	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
<b>SPLP INORGANICS</b>							
		Analyst: <b>MBG</b>				<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.09	0.05	J	mg/L	1	11/16/18 11:45 AM	11/16/18 5:50 PM
<b>TOTAL METALS</b>							
		Analyst: <b>MXS</b>				<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
		Analyst: <b>GXI</b>				<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:28 AM
<b>SPLP METALS FLUID #1</b>							
		Analyst: <b>MXS</b>				<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
		Analyst: <b>AM</b>					<b>EPA 901.1</b>
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



## Laboratory Results

### Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-6 0-4
<b>Lab Order:</b>	G1811869		
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Sampled By:</b>	APTIM
<b>Lab ID:</b>	G1811869-007	<b>Collection Date:</b>	11/14/2018 12:10:00 P
<b>Matrix:</b>	SOLID	<b>Received Date:</b>	11/15/2018 6:58:38 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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#### 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
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#### 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
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#### SPLP FLUID #1

Analyst: **ALD**

**EPA 1312**

Final pH Metals	3.50	S.U.	1	11/18/18 11:00 AM
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#### 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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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

## 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



# Laboratory Results

## Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-7 0-4
<b>Lab Order:</b>	G1811870	<b>Sampled By:</b>	APTIM
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Collection Date:</b>	11/14/2018 12:30:00 P
<b>Lab ID:</b>	G1811870-001	<b>Received Date:</b>	11/15/2018 7:21:44 AM
<b>Matrix:</b>	SOLID		

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
				Analyst: <b>RLL</b>		<b>EPA 7473</b>	
Mercury	0.046	0.010		mg/Kg-dry	1		11/20/18 2:36 PM
<b>SPLP INORGANICS</b>							
				Analyst: <b>MBG</b>		<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.0917	0.0500	J	mg/L	1	11/16/18 11:45 AM	11/16/18 6:28 PM
<b>TOTAL METALS</b>							
				Analyst: <b>MXS</b>		<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>GXI</b>		<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:30 AM
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>MXS</b>		<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
				Analyst: <b>AM</b>		<b>EPA 901.1</b>	
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

## Laboratory Results

### Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-7 0-4
<b>Lab Order:</b>	G1811870		
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Sampled By:</b>	APTIM
<b>Lab ID:</b>	G1811870-001	<b>Collection Date:</b>	11/14/2018 12:30:00 P
<b>Matrix:</b>	SOLID	<b>Received Date:</b>	11/15/2018 7:21:44 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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#### 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
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#### 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
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#### SPLP FLUID #1

Analyst: **ALD**

**EPA 1312**

Final pH Metals	3.60	S.U.	1	11/17/18 1:00 PM
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#### SPLP FLUID #3

Analyst: **MAG**

**EPA 1312**

Final pH Non Metals	8.63	S.U.	1	11/15/18 9:16 AM
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# Laboratory Results

## Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-8 0-4
<b>Lab Order:</b>	G1811870	<b>Sampled By:</b>	APTIM
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Collection Date:</b>	11/14/2018 12:55:00 P
<b>Lab ID:</b>	G1811870-003	<b>Received Date:</b>	11/15/2018 7:21:44 AM
<b>Matrix:</b>	SOLID		

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>TOTAL METALS</b>							
				Analyst: <b>RLL</b>		<b>EPA 7473</b>	
Mercury	0.095	0.010		mg/Kg-dry	1	11/20/18 2:36 PM	
<b>SPLP INORGANICS</b>							
				Analyst: <b>MBG</b>		<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	0.27	0.05		mg/L	1	11/16/18 11:45 AM	11/16/18 6:45 PM
<b>TOTAL METALS</b>							
				Analyst: <b>MXS</b>		<b>EPA 3050</b>	<b>EPA 6010</b>
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
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>GXI</b>		<b>SM 3112 B</b>	<b>EPA 7470</b>
Mercury	< 0.0001	0.0001	J	mg/L	1	11/19/18 11:32 AM	11/20/18 11:32 AM
<b>SPLP METALS FLUID #1</b>							
				Analyst: <b>JEK</b>		<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>GAMMA SPECTROSCOPY</b>							
				Analyst: <b>AM</b>		<b>EPA 901.1</b>	
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	

# Laboratory Results

## Geochemical Testing

Date: 12-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	LD-8 0-4
<b>Lab Order:</b>	G1811870		
<b>Project:</b>	Conemaugh CCR IV SPLP	<b>Sampled By:</b>	APTIM
<b>Lab ID:</b>	G1811870-003	<b>Collection Date:</b>	11/14/2018 12:55:00 P
<b>Matrix:</b>	SOLID	<b>Received Date:</b>	11/15/2018 7:21:44 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
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### 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
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### 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
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### SPLP FLUID #1

Analyst: **ALD**

**EPA 1312**

Final pH Metals	5.14	S.U.	1	11/18/18 11:00 AM
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### SPLP FLUID #3

Analyst: **MAG**

**EPA 1312**

Final pH Non Metals	9.56	S.U.	1	11/15/18 9:16 AM
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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: <u>GENON</u>		Contact (Company): <u>APM</u>	Phone: <u>(412) 380-6277</u>
Address: <u>CONEMAUGH</u>		e-mail:	Fax: ( )
City: <u>NEW FIDENCE</u>	State: <u>PA</u>	Zip: <u>15944</u>	Sampled by: <u>Pat Anderson and</u>
WO#: <u>6181/860</u>		Project: <u>Evan Schlegel</u>	State Sampled: <u>PA</u>
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)
<u>APM Pat Anderson</u>	<u>11/13/18</u>	<u>1615</u>	<u>APM</u>	<u>11-14-18</u>	<u>1939</u>

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: Yes or NoSample Receiving (1st Review): JSCooler Temp (°C) on receipt: 4

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: <u>GENON</u>	Contact (Company): <u>APTIm</u>	Phone: <u>(412) 380-4272</u>
Address: <u>CONEMAUGH</u>	e-mail: <u>patricia.andrison@aptim.com</u>	Fax: ( )
City: <u>NEW FLORENCE</u> State: <u>PA</u> Zip: <u>15944</u>	Sampled by: <u>Patricia Andrison</u>	State Sampled: <u>PA</u>
WO#: <u>61811860</u>	Project: <u>Evan Schlegel</u>	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 4-8	—	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	<i>[Signature]</i>	11-14-18	1939

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ☒ Yes or ☐ NoCooler Temp (°C) on receipt: 4Sample 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

<b>Billing Client:</b> GENON	<b>Contact (Company):</b> ARTIM	<b>Phone:</b> (412) 380-4272
<b>Address:</b> CONEMAUGH	<b>e-mail:</b>	<b>Fax:</b> ( )
<b>City:</b> NEW FLORENCE <b>State:</b> PA <b>Zip:</b>	<b>Sampled by:</b> PATTI ANDRISON AND	<b>State Sampled:</b> PA
<b>WO#:</b> 61811867	<b>Project:</b> EVAN SCHLEGEL	<b>PO/Quote#:</b>

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

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
<b>**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>								
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)
Patti Anderson ARTIM	11/14/18	1400	Don Paul	11-15-18	6.32

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ☒ Yes or ☐ No

Cooler Temp (°C) on receipt: 4

Sample Receiving (1st Review):

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

<b>Billing Client:</b> GENON	<b>Contact (Company):</b> APTIM	<b>Phone:</b> (412) 380-4272
<b>Address:</b> CONEMAUGH	<b>e-mail:</b>	<b>Fax:</b> ( )
<b>City:</b> NEW FLORENCE <b>State:</b> PA <b>Zip:</b>	<b>Sampled by:</b> PATTI ANDRISON AND	<b>State Sampled:</b> PA
<b>WO#:</b> 61811869	<b>Project:</b> EVAN SCHLEGEL	<b>PO/Quote#:</b>

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

<b>Relinquished by (Company &amp; Signature)</b>	<b>Date</b>	<b>Time (Military)</b>	<b>Received by (Company &amp; Signature):</b>	<b>Date</b>	<b>Time (Military)</b>
Patricia M Gmala APTIM	11/14/18	1400	Don Paul	11-15-18	6:58

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ☒ Yes or ☐ NoSample Receiving (1st Review): ☒ MF

Cooler Temp (°C) on receipt: 5

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: <u>GENON</u>			Contact (Company): <u>APTIM</u>			Phone: <u>(412) 380-4272</u>		
Address: <u>CONEMAUGH</u>			e-mail:			Fax: ( )		
City: <u>NEW FLORENCE</u> State: <u>PA</u> Zip: <u>15050</u>			Sampled by: <u>PATTI ANDERSON AND</u>			State Sampled:		
WO#: <u>61811870</u>			Project: <u>EVAN SCHLEGEL</u>			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	1	1240	1	HOLD	Field Filtered: Y / N	3
LD-8 0-4	003	SO	1	1255	1	SEE BOTTLES	Field Filtered: Y / N	3
LD-8 4-8	-	SO	1	-	1	PMR HOLD NOSAMPLES 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)
<u>Pattina M Gable APTIM</u>	<u>11/14/18</u>	<u>1400</u>	<u>Don R...</u>	<u>11-14-18</u>	<u>7:21</u>

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: 1 Yes or NoSample Receiving (1st Review): MFCooler Temp (°C) on receipt: 17Client Support (2nd Review):

December 06, 2018

Ms. Leslie Nemeth  
Geochemical Testing  
2005 N. Center Avenue  
Somerset, PA 15501

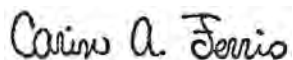
RE: Project: G1811860  
Pace Project No.: 30272445

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 Ferris  
carin.ferris@pacelabs.com  
724-850-5615  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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:**

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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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	<b>0.366 ± 0.382 (0.539)</b> <b>C:NA T:91%</b>	pCi/L	12/06/18 10:42	13982-63-3	
Radium-228	EPA 904.0	<b>-0.149 ± 0.331 (0.802)</b> <b>C:74% T:90%</b>	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	<b>0.394 ± 0.410 (0.611)</b> <b>C:NA T:95%</b>	pCi/L	12/06/18 10:42	13982-63-3	
Radium-228	EPA 904.0	<b>0.280 ± 0.460 (0.999)</b> <b>C:78% T:82%</b>	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	<b>0.564 ± 0.527 (0.748)</b> <b>C:NA T:86%</b>	pCi/L	12/06/18 10:42	13982-63-3	
Radium-228	EPA 904.0	<b>0.502 ± 0.418 (0.836)</b> <b>C:74% T:85%</b>	pCi/L	12/05/18 12:09	15262-20-1	

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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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.

## REPORT OF LABORATORY ANALYSIS

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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.

## REPORT OF LABORATORY ANALYSIS

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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

<b>Billing Client:</b> Geochemical Testing	<b>Contact (Company):</b> Leslie Nemeth	<b>Phone:</b> (814) 443-1671
<b>Address:</b> 2005 North Center Avenue	<b>e-mail:</b> lnemeth@geo-cas.com	<b>Fax:</b> (814) 445-6729
<b>City:</b> Somerset	<b>State:</b> PA <b>Zip:</b> 15501	<b>Preservatives by:</b> <b>Sampler:</b> GT
<b>WO#:</b>	<b>Project:</b>	<b>PO/Quote#:</b> 2008-8996

<b>Sample Matrix:</b> GW Ground Water	<b>SW Surface Water</b>	<b>PW Potable Water</b>	<b>WW Wastewater</b>	<b>SO Soil</b>	<b>SL Sludge</b>	<b>nHZ Not Hazardous / HZ Hazardous</b>	<b>PCBs</b>
<b>Sample Type:</b> G Grab	<b>C Composite</b>	<b>D Distribution/DW</b>	<b>R Raw/DW</b>	<b>S Special/DW</b>	<b>O Other</b>	<b>Containers Supplied by:</b> <input type="checkbox"/> Client <input type="checkbox"/> GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	SPLP 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
		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
		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
		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	<i>John P. PATE</i>	11/21/18	0930

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

Face Analytical

Client Name:

Geo Chem

Project#

30272445

Courier: ☐ Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Tracking #: 1Z5440670347369547

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

## Comments:

Yes No N/A

pH paper Lot#

1002981

Date and Initials of person examining

contents: 11/25/18 JVB

Chain of Custody Present:

Chain of Custody Filled Out:

Chain of Custody Relinquished:

Sampler Name &amp; Signature on COC:

Sample Labels match COC:

-Includes date/time/ID

Matrix:

WT

Samples Arrived within Hold Time:

Short Hold Time Analysis (&lt;72hr remaining):

Rush Turn Around Time Requested:

Sufficient Volume:

Correct Containers Used:

-Pace Containers Used:

Containers Intact:

Orthophosphate field filtered

Hex Cr Aqueous Compliance/NPDES sample field filtered

Organic Samples checked for dechlorination:

Filtered volume received for Dissolved tests

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&amp;G, Phenolics

Initial when completed

JVB

Date/time of preservation

Lot # of added preservative

Headspace in VOA Vials (&gt;6mm):

Trip Blank Present:

Trip Blank Custody Seals Present

Rad Aqueous Samples Screened &gt; 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.

December 17, 2018

Ms. Leslie Nemeth  
Geochemical Testing  
2005 N. Center Avenue  
Somerset, PA 15501

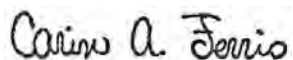
RE: Project: G1811860  
Pace Project No.: 30272707

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 Ferris  
carin.ferris@pacelabs.com  
724-850-5615  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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:**

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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	<b>0.503 ± 0.523 (0.778)</b> <b>C:NA T:84%</b>	pCi/L	12/14/18 22:03	13982-63-3	
Radium-228	EPA 904.0	<b>0.244 ± 0.301 (0.636)</b> <b>C:77% T:84%</b>	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	<b>0.148 ± 0.409 (0.794)</b> <b>C:NA T:90%</b>	pCi/L	12/14/18 22:03	13982-63-3	
Radium-228	EPA 904.0	<b>-0.0576 ± 0.299 (0.705)</b> <b>C:83% T:86%</b>	pCi/L	12/14/18 14:12	15262-20-1	

## REPORT OF LABORATORY ANALYSIS

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## 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

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## 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

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## 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.

## REPORT OF LABORATORY ANALYSIS

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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
WO#:		Sampled by:	Client	Preservatives by:	Sampler_GT
		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 <input type="checkbox"/> GT Lab <input type="checkbox"/>

Sample Location/Description	Lab Number	Sample Matrix	Extraction Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/Preservatives, etc	Number of Containers
<b>**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>								

G1811860-002		nHZ / HZ WW	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2001
		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	2002
		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 Nemeth	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: 14.7  
Sample Receiving (1st Review): Client Support (2nd Review):



# Pittsburgh Lab Sample Condition Upon Receipt

Face Analytical

Client Name:

Geochem

Project # 30272707

Courier: ☐ Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Tracking #: 1Z5440070347480425

Label	BLM
LIMS Login	BLM

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#	Date and Initials of person examining contents:
Chain of Custody Present:	/			10D2981	BLM 11-27-18
Chain of Custody Filled Out:	/				
Chain of Custody Relinquished:	/				
Sampler Name & Signature on COC:		/			
Sample Labels match COC:		/			
-Includes date/time/ID Matrix: WT					
Samples Arrived within Hold Time:	/				
Short Hold Time Analysis (<72hr remaining):		/			
Rush Turn Around Time Requested:		/			
Sufficient Volume:	/				
Correct Containers Used:	/				
-Pace Containers Used:		/			
Containers Intact:	/				
Orthophosphate field filtered			/		
Hex Cr Aqueous Compliance/NPDES sample field filtered			/		
Organic Samples checked for dechlorination:			/		
Filtered volume received for Dissolved tests	/				
All containers have been checked for preservation.	/				
All containers needing preservation are found to be in compliance with EPA recommendation.	/			Phla	
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed BLM	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):			/		
Trip Blank Present:			/		
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.

December 11, 2018

Ms. Leslie Nemeth  
Geochemical Testing  
2005 N. Center Avenue  
Somerset, PA 15501

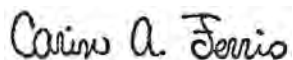
RE: Project: G1811860  
Pace Project No.: 30272858

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 Ferris  
carin.ferris@pacelabs.com  
724-850-5615  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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:**

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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	

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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](mailto: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#: P2015-9054

	GW Ground Water	SW Surface Water	PW Potable Water	WW Wastewater	SO Soil	SL Sludge	nHZ Not Hazardous / HZ Hazardous	PCBs
<b>Sample Matrix:</b>								
<b>Sample Type:</b>	G Grab	C Composite	D Distribution/DW	R Raw/DW	S Special/DW	Q Other	Containers Supplied by <input type="checkbox"/> Client	<input type="checkbox"/> GT Lab

Sample Location/ Description	Lab Number	Sample Matrix	SPLP Ext Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
G1811860-006	nHZ / HZ	WW	11/15/2018		G	SPLP Radium 226, 228	HNO3	2
	nHZ / HZ						Field Filtered: Y / N	
	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:** 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

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 Pace	11-29-18	1015

**SAMPLES MUST BE PRESERVED ON ICE.**

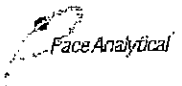
	Yes or	No
Receipt present on receipt:		

Cooler Temp (°C) on receipt:

**Sample Receiving (1st Review):**

Client Support (2nd Review): \_\_\_\_\_

# Pittsburgh Lab Sample Condition Upon Receipt



Client Name: GeoChem

Project # # 30272858

Courier: ☐ Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Tracking #: 12 544 607 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#	Date and Initials of person examining contents:
Chain of Custody Present:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>10D2981</u>	<u>ET 11-29-18</u>
Chain of Custody Filled Out:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Chain of Custody Relinquished:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Sample Labels match COC:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
-Includes date/time/ID Matrix: <u>WT</u>					
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Short Hold Time Analysis (<72hr remaining):	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Rush Turn Around Time Requested:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Sufficient Volume:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Correct Containers Used:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
-Pace Containers Used:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Containers Intact:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Orthophosphate field filtered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Hex Cr Aqueous Compliance/NPDES sample field filtered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Organic Samples checked for dechlorination:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Filtered volume received for Dissolved tests	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
All containers have been checked for preservation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
All containers needing preservation are found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed <u>ET</u>	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Trip Blank Present:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Trip Blank Custody Seals Present	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Rad Aqueous Samples Screened > 0.5 mrem/hr	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Initial when completed <u>ET</u>	Date: <u>11-29-18</u>

## 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.

December 07, 2018

Ms. Leslie Nemeth  
Geochemical Testing  
2005 N. Center Avenue  
Somerset, PA 15501

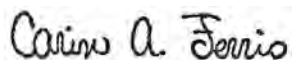
RE: Project: G1811867  
Pace Project No.: 30272447

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 Ferris  
carin.ferris@pacelabs.com  
724-850-5615  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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:**

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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	<b>0.132 ± 0.301 (0.179)</b> <b>C:NA T:90%</b>	pCi/L	12/06/18 21:43	13982-63-3	
Radium-228	EPA 904.0	<b>0.844 ± 0.439 (0.782)</b> <b>C:73% T:91%</b>	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	<b>0.349 ± 0.364 (0.513)</b> <b>C:NA T:90%</b>	pCi/L	12/06/18 22:00	13982-63-3	
Radium-228	EPA 904.0	<b>0.487 ± 0.402 (0.803)</b> <b>C:73% T:82%</b>	pCi/L	12/05/18 12:09	15262-20-1	

## REPORT OF LABORATORY ANALYSIS

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## 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

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## 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

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## 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.

## REPORT OF LABORATORY ANALYSIS

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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

<b>Billing Client:</b> Geochemical Testing	<b>Contact (Company):</b> Leslie Nemeth	<b>Phone:</b> (814) 443-1671
<b>Address:</b> 2005 North Center Avenue	<b>e-mail:</b> lnemeth@geo-ces.com	<b>Fax:</b> (814) 445-6729
<b>City:</b> Somerset	<b>State:</b> PA <b>Zip:</b> 15501	<b>Preservatives by:</b> <u>Sampler</u> <b>GT</b>
<b>WO#:</b>	<b>Project:</b>	<b>PO/Quote#:</b> <u>P2018-4896</u>

<b>Sample Matrix:</b> <input type="checkbox"/> GW Ground Water	<b>SW</b> Surface Water	<b>PW</b> Potable Water	<b>WW</b> Wastewater	<b>SO</b> Soil	<b>SL</b> Sludge	<b>nHZ</b> Not Hazardous / <b>HZ</b> Hazardous	<b>PCBs</b>
<b>Sample Type:</b> <input type="checkbox"/> G Grab	<b>C</b> Composite	<b>D</b> Distribution/DW	<b>R</b> Raw/DW	<b>S</b> Special/DW	<b>O</b> Other	Containers Supplied by: <input type="checkbox"/> Client <input type="checkbox"/> GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	SPLP 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	HNO3 Field Filtered: Y / N	2
		nHZ / HZ					Field Filtered: Y / N	
G1811867-005		nHZ / HZ	11/15/2018	9:16	G	SPLP Radium 226, 228	HNO3 Field Filtered: Y / N	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	

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	<i>Janet PAVE</i>	11/21/18	0930

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

Face Analytical

Client Name: Geo Chem

Project # 30272447

Courier: ☐ Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Tracking #: 1Z 544 067 03472 9547

Label	<u>JVB</u>
LIMS Login	<u>JVB</u>

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

Comments:	Yes	No	N/A	pH paper Lot#	Date and Initials of person examining contents:
Chain of Custody Present:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>1002981</u>	<u>11/25/18 JVB</u>
Chain of Custody Filled Out:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Chain of Custody Relinquished:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Sampler Name & Signature on COC:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Sample Labels match COC:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
-Includes date/time/ID Matrix: <u>WT</u>					
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Short Hold Time Analysis (<72hr remaining):	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Rush Turn Around Time Requested:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Sufficient Volume:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Correct Containers Used:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
-Pace Containers Used:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Containers Intact:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Orthophosphate field filtered	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Hex Cr Aqueous Compliance/NPDES sample field filtered	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Organic Samples checked for dechlorination:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Filtered volume received for Dissolved tests	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
All containers have been checked for preservation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
All containers needing preservation are found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
exceptions: VOA, coliform, TOC, O&G, Phenolics					
				Initial when completed <u>JVB</u>	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Trip Blank Present:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Trip Blank Custody Seals Present	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Rad Aqueous Samples Screened > 0.5 mrem/hr	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Initial when completed: <u>JVB</u>	Date: <u>11/25/18</u>

## 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.

December 10, 2018

Ms. Leslie Nemeth  
Geochemical Testing  
2005 N. Center Avenue  
Somerset, PA 15501

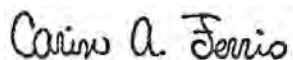
RE: Project: G1811867  
Pace Project No.: 30272705

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 Ferris  
carin.ferris@pacelabs.com  
724-850-5615  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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:**

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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	<b>0.0821 ± 0.581 (1.16)</b> <b>C:NA T:84%</b>	pCi/L	12/07/18 12:08	13982-63-3	
Radium-228	EPA 904.0	<b>-0.217 ± 0.347 (0.854)</b> <b>C:73% T:79%</b>	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	<b>0.477 ± 0.498 (0.702)</b> <b>C:NA T:68%</b>	pCi/L	12/07/18 12:08	13982-63-3	
Radium-228	EPA 904.0	<b>0.301 ± 0.570 (1.25)</b> <b>C:70% T:57%</b>	pCi/L	12/05/18 15:36	15262-20-1	

## REPORT OF LABORATORY ANALYSIS

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## 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

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## 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.

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## 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.

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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#: 2018-8998

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: <input type="checkbox"/> Client <input type="checkbox"/> 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	2001
		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	2002
		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	

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 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

Face Analytical

Client Name:

Geochem

Project # 30272705

Courier: ☐ Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Tracking #: 1Z5440070347480425

Label

BLM

LIMS Login

BLM

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#	Date and Initials of person examining contents:
						10D2981	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:				/		5.	No date or time on samples
-Includes date/time/ID Matrix: WT							
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.			/				PhL2
exceptions: VOA, coliform, TOC, O&G, Phenolics						Initial when completed	Date/time of preservation
						BLM	
						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	Date: 11-28-18
						BLM	

## 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.

December 07, 2018

Ms. Leslie Nemeth  
Geochemical Testing  
2005 N. Center Avenue  
Somerset, PA 15501

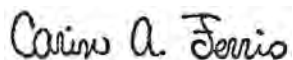
RE: Project: G1811869  
Pace Project No.: 30272448

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 Ferris  
carin.ferris@pacelabs.com  
724-850-5615  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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:**

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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	<b>0.155 ± 0.353 (0.209)</b> <b>C:NA T:84%</b>	pCi/L	12/06/18 22:00	13982-63-3	
Radium-228	EPA 904.0	<b>0.360 ± 0.353 (0.721)</b> <b>C:74% T:84%</b>	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	<b>0.379 ± 0.577 (0.993)</b> <b>C:NA T:91%</b>	pCi/L	12/06/18 22:00	13982-63-3	
Radium-228	EPA 904.0	<b>0.528 ± 0.438 (0.883)</b> <b>C:77% T:82%</b>	pCi/L	12/05/18 12:10	15262-20-1	

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## 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

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## 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

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## 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.

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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

<b>Billing Client:</b> Geochemical Testing	<b>Contact (Company):</b> Leslie Nemeth	<b>Phone:</b> (814) 443-1671
<b>Address:</b> 2005 North Center Avenue	<b>e-mail:</b> lnemeth@geo-ces.com	<b>Fax:</b> (814) 445-6729
<b>City:</b> Somerset	<b>State:</b> PA	<b>Zip:</b> 15501
<b>WO#:</b>	<b>Sampled by:</b> Client	<b>Preservatives by:</b> Sampler GT
	<b>Project:</b>	<b>PO/Quote#:</b> 2005-8996

<b>Sample Matrix:</b> GW Ground Water	<b>SW</b> Surface Water	<b>PW</b> Potable Water	<b>WW</b> Wastewater	<b>SO</b> Soil	<b>SL</b> Sludge	<b>nHZ</b> Not Hazardous / <b>HZ</b> Hazardous	<b>PCBs</b>
<b>Sample Type:</b> G Grab	<b>C</b> Composite	<b>D</b> Distribution/DW	<b>R</b> Raw/DW	<b>S</b> Special/DW	<b>O</b> Other	<b>Containers Supplied by:</b> <input type="checkbox"/> Client <input type="checkbox"/> GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	SPLP 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 Filled: Y / N HNO3	2
		nHZ / HZ					Field Filled: Y / N	
G1811869-005		nHZ / HZ	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filled: Y / N HNO3	2
		nHZ / HZ					Field Filled: Y / N	
		nHZ / HZ					Field Filled: Y / N	
		nHZ / HZ					Field Filled: Y / N	
		nHZ / HZ					Field Filled: Y / N	
		nHZ / HZ					Field Filled: Y / N	
		nHZ / HZ					Field Filled: 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	Jim Bar 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



Client Name: GeoChem

Project # 30272448

Courier: ☐ Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Tracking #: 1Z5440670347269547

Label	<u>DB</u>
LIMS Login	<u>DB</u>

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

Comments:	Yes	No	N/A	pH paper Lot#	Date and Initials of person examining contents:
Chain of Custody Present:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>1002981</u>	<u>11/25/18 DB</u>
Chain of Custody Filled Out:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Chain of Custody Relinquished:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Sampler Name & Signature on COC:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Sample Labels match COC:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
-Includes date/time/ID Matrix: <u>WT</u>					
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Short Hold Time Analysis (<72hr remaining):	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Rush Turn Around Time Requested:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Sufficient Volume:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Correct Containers Used:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
-Pace Containers Used:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Containers Intact:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Orthophosphate field filtered	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Hex Cr Aqueous Compliance/NPDES sample field filtered	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Organic Samples checked for dechlorination:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Filtered volume received for Dissolved tests	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
All containers have been checked for preservation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
All containers needing preservation are found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed <u>DB</u>	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Trip Blank Present:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Trip Blank Custody Seals Present	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Rad Aqueous Samples Screened > 0.5 mrem/hr	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Initial when completed: <u>DB</u>	Date: <u>11/25/18</u>

## 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.

December 06, 2018

Ms. Leslie Nemeth  
Geochemical Testing  
2005 N. Center Avenue  
Somerset, PA 15501

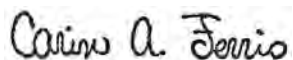
RE: Project: G1811870  
Pace Project No.: 30272446

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 Ferris  
carin.ferris@pacelabs.com  
724-850-5615  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, LLC.



## 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

## REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, LLC.

## 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:**

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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	<b>0.205 ± 0.355 (0.634)</b> <b>C:NA T:92%</b>	pCi/L	12/06/18 10:42	13982-63-3	
Radium-228	EPA 904.0	<b>-0.237 ± 0.379 (0.933)</b> <b>C:68% T:83%</b>	pCi/L	12/05/18 12:09	15262-20-1	

## REPORT OF LABORATORY ANALYSIS

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## 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

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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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#: 20018-29916

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: <input type="checkbox"/> Client <input type="checkbox"/> GT Lab	

Sample Location/ Description	Lab Number	Sample Matrix	SPLP 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	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	
		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#: 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	<i>Janet B. Bue</i>	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



Client Name: GeoChem

Project # 30272446

Courier: ☐ Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Tracking #: 1Z544 067 034726 9547

Label	<u>QVB</u>
LIMS Login	<u>QVB</u>

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

Comments:	pH paper Lot#			Date and Initials of person examining contents: <u>11/25/18 QVB</u>
	Yes	No	N/A	
Chain of Custody Present:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.
Sampler Name & Signature on COC:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.
Sample Labels match COC:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. <u>date on samples is 11.16.18 / no time on samples</u>
-Includes date/time/ID      Matrix: <u>WT</u>				
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6.
Short Hold Time Analysis (<72hr remaining):	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7.
Rush Turn Around Time Requested:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8.
Sufficient Volume:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9.
Correct Containers Used:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10.
-Pace Containers Used:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Containers Intact:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11.
Orthophosphate field filtered	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12.
Hex Cr Aqueous Compliance/NPDES sample field filtered	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	13.
Organic Samples checked for dechlorination:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	14.
Filtered volume received for Dissolved tests	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	15.
All containers have been checked for preservation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16.
All containers needing preservation are found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>PHL2</u>
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed <u>QVB</u> Date/time of preservation
				Lot # of added preservative
Headspace in VOA Vials (>6mm):	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	17.
Trip Blank Present:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	18.
Trip Blank Custody Seals Present	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Rad Aqueous Samples Screened > 0.5 mrem/hr	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Initial when completed <u>QVB</u> Date: <u>11/25/18</u>

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.

December 10, 2018

Ms. Leslie Nemeth  
Geochemical Testing  
2005 N. Center Avenue  
Somerset, PA 15501

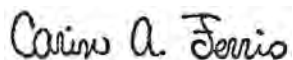
RE: Project: G1811870  
Pace Project No.: 30272661

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 Ferris  
carin.ferris@pacelabs.com  
724-850-5615  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
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## 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

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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:**

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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	<b>0.792 ± 0.627 (0.852)</b> <b>C:NA T:85%</b>	pCi/L	12/07/18 12:08	13982-63-3	
Radium-228	EPA 904.0	<b>0.427 ± 0.397 (0.808)</b> <b>C:75% T:82%</b>	pCi/L	12/05/18 15:36	15262-20-1	

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

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## 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.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

Shuttle/Cooler ID#:

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

Address: 2005 North Center Avenue

City: Somerset

State: PA

Zip: 15501

WO#:

Contact (Company): Leslie Nemeth

e-mail: lnemeth@geo-ces.com

Phone: (814) 443-1671

Fax: (814) 445-6729

Preservatives by: Sampler\_GT

PO/Quote#: P2019-0909

Sample Matrix:	GW Ground Water	SW Surface Water	PW Potable Water	WW Wastewater	SO Soil	nH2 Not Hazardous / HZ Hazardous	PCBs
Sample Type:	G Grab	C Composite	D Distribution/DW	R Raw/DW	S Special/DW	O Other	Client <input type="checkbox"/> GT Lab <input type="checkbox"/>

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		nH2 / HZ WW	11/15/2018	9:16	G	SPLP Radium 226, 228	Field Filtered: Y / N HNO3	2
		nH2 / HZ					Field Filtered: Y / N	
		nH2 / HZ					Field Filtered: Y / N	
		nH2 / HZ					Field Filtered: Y / N	
		nH2 / HZ					Field Filtered: Y / N	
		nH2 / HZ					Field Filtered: Y / N	
		nH2 / HZ					Field Filtered: Y / N	
		nH2 / HZ					Field Filtered: Y / N	
		nH2 / HZ					Field Filtered: Y / N	
		nH2 / HZ					Field Filtered: Y / N	

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	<u>Ben M...</u>	11-27-18	1340

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: ☐ Yes or ☒ No

Cooler Temp (°C) on receipt: 11.1

Sample Receiving (1st Review): \_\_\_\_\_

Client Support (2nd Review): \_\_\_\_\_

# Pittsburgh Lab Sample Condition Upon Receipt



Client Name: Geochem

Project # **# 30272661**

Courier: ☐ Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other \_\_\_\_\_

Tracking #: 1Z 544 007 03 4748 0425

Label	<u>ET</u>
LIMS Login	<u>ET</u>

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# <u>10D2981</u>	Date and Initials of person examining contents: <u>BLM 11-27-18</u>
Chain of Custody Present:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.	
Chain of Custody Filled Out:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2.	
Chain of Custody Relinquished:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.	
Sampler Name & Signature on COC:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.	
Sample Labels match COC:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.	<u>No date or time on sample</u>
-Includes date/time/ID Matrix: <u>WT</u>					
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6.	
Short Hold Time Analysis (<72hr remaining):	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7.	
Rush Turn Around Time Requested:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8.	
Sufficient Volume:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9.	
Correct Containers Used:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10.	
-Pace Containers Used:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Containers Intact:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11.	
Orthophosphate field filtered	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12.	
Hex Cr Aqueous Compliance/NPDES sample field filtered	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	13.	
Organic Samples checked for dechlorination:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	14.	
Filtered volume received for Dissolved tests	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	15.	
All containers have been checked for preservation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16.	
All containers needing preservation are found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<u>Ph 12</u>
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed <u>BLM</u>	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.	
Trip Blank Present:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	18.	
Trip Blank Custody Seals Present	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Rad Aqueous Samples Screened > 0.5 mrem/hr	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Initial when completed <u>BLM</u>	Date: <u>11-27-18</u>

## 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.

### *Surface Water Samples (WS-1 and WS-2)*

---

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

## Geochemical Testing

Date: 21-Dec-18

**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





# Laboratory Results

## Geochemical Testing

Date: 21-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	WS-1	
<b>Lab Order:</b>	G1811841			Ash Disposal Site
<b>Project:</b>	Conemaugh CCR App IV	<b>Sampled By:</b>	Aptim	
<b>Lab ID:</b>	G1811841-001	<b>Collection Date:</b>	11/14/2018 10:45:00 A	
<b>Matrix:</b>	AQUEOUS	<b>Received Date:</b>	11/14/2018 5:15:27 PM	

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>INORGANIC NON-METALS</b>		Analyst: <b>MBG</b>				<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	< 0.1	0.1		mg/L	1	11/15/18 10:15 AM	11/15/18 8:43 PM
<b>INORGANIC METALS</b>		Analyst: <b>LXM</b>				<b>EPA 200.2</b>	<b>EPA 200.8</b>
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
<b>INORGANIC METALS</b>		Analyst: <b>GXI</b>				<b>SM 3112 B</b>	<b>SM 3112 B</b>
Mercury	< 0.0002	0.0002		mg/L	1	11/16/18 9:20 AM	11/16/18 1:48 PM
<b>INORGANIC METALS</b>		Analyst: <b>JEK</b>				<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>RADIOLOGICAL PARAMETERS</b>		Analyst: <b>SUB</b>					<b>EPA 903.1</b>
Radium 226	0.336+-0.350	0.494		pCi/L	1		12/11/18 8:59 PM
<b>RADIOLOGICAL PARAMETERS</b>		Analyst: <b>SUB</b>					<b>EPA 904.0</b>
Radium 228	0.0474+-0.371	0.853		pCi/L	1		12/10/18 11:41 AM

# Laboratory Results

## Geochemical Testing

Date: 21-Dec-18

<b>CLIENT:</b>	GENON - CONEMAUGH STATION CCR	<b>Client Sample ID:</b>	WS-2	
<b>Lab Order:</b>	G1811841			Ash Disposal Site
<b>Project:</b>	Conemaugh CCR App IV	<b>Sampled By:</b>	Aptim	
<b>Lab ID:</b>	G1811841-002	<b>Collection Date:</b>	11/14/2018 1:10:00 PM	
<b>Matrix:</b>	AQUEOUS	<b>Received Date:</b>	11/14/2018 5:15:27 PM	

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
<b>INORGANIC NON-METALS</b>		Analyst: <b>MBG</b>				<b>EPA 300.0</b>	<b>EPA 300.0</b>
Fluoride	< 0.1	0.1		mg/L	1	11/15/18 10:15 AM	11/15/18 9:01 PM
<b>INORGANIC METALS</b>		Analyst: <b>LXM</b>				<b>EPA 200.2</b>	<b>EPA 200.8</b>
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
<b>INORGANIC METALS</b>		Analyst: <b>GXI</b>				<b>SM 3112 B</b>	<b>SM 3112 B</b>
Mercury	< 0.0002	0.0002		mg/L	1	11/16/18 9:20 AM	11/16/18 1:50 PM
<b>INORGANIC METALS</b>		Analyst: <b>JEK</b>				<b>EPA 200.2</b>	<b>EPA 200.7</b>
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
<b>RADIOLOGICAL PARAMETERS</b>		Analyst: <b>SUB</b>					<b>EPA 903.1</b>
Radium 226	0.134+-0.306	0.493		pCi/L	1		12/11/18 8:59 PM
<b>RADIOLOGICAL PARAMETERS</b>		Analyst: <b>SUB</b>					<b>EPA 904.0</b>
Radium 228	0.662+-0.431	0.816		pCi/L	1		12/10/18 11:41 AM

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:	GEON	Contact (Company):	APTM	Phone:	(412) 380-4272
Address:	CONEMANUEH	e-mail:		Fax:	( )
City:	NEW FLORENCE	State:	PA	Sampled by:	PATTI ANDERSON AND
WO#:	G1811841	Zip:		Project:	EVAN SCHLEGER
				State Sampled:	PA
				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
WS-1	001	SW	11/14/18	1045	G	SEE BOTTLES	Field Filtered: Y / N	4
WS-2	002	SW	11/14/18	1310	G	SEE BOTTLES	Field Filtered: Y / N	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	
							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)
fatima M Gable APTM	11/14/18	1400	Jess Gable	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): JM Client Support (2nd Review):

December 12, 2018

Ms. Leslie Nemeth  
Geochemical Testing  
2005 N. Center Avenue  
Somerset, PA 15501

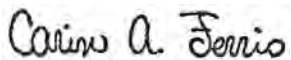
RE: Project: G1811841  
Pace Project No.: 30272256

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 Ferris  
carin.ferris@pacelabs.com  
724-850-5615  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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

## REPORT OF LABORATORY ANALYSIS

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## 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:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: G1811841

Pace Project No.: 30272256

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**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.

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: G1811841

Pace Project No.: 30272256

<b>Sample: G1811841-001</b>		<b>Lab ID: 30272256001</b>	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	<b>0.336 ± 0.350 (0.494)</b> <b>C:NA T:91%</b>	pCi/L	12/11/18 20:59	13982-63-3	
Radium-228	EPA 904.0	<b>0.0474 ± 0.371 (0.853)</b> <b>C:81% T:75%</b>	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	

## REPORT OF LABORATORY ANALYSIS

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## 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

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## 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

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## 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.

## REPORT OF LABORATORY ANALYSIS

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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

Address: 2005 North Center Avenue

City: Somerset State: PA Zip: 15501

WO#:

Contact (Company): Leslie Nemeth

e-mail: lnemeth@geo-ces.com

Sampled by: Client

Project:

Phone: (814) 443-1671

Fax: (814) 445-6729

Preservatives by: Sampler\_GT

PO/Quote#: 2018-8990

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 <input type="checkbox"/> GT Lab <input type="checkbox"/>

Sample Location/Description	Lab Number	Sample Matrix	Date	Time (Military)	**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	11/14/2018	10:45	Radium 226, 228	Field Filtered: Y / N HNO3	2
		nHZ / HZ				Field Filtered: Y / N	
G1811841-002		nHZ / HZ	11/14/2018	1:10	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	
		nHZ / HZ				Field Filtered: Y / N	



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 Nemeth	11-20-18	1100

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: Yes or No ☒ No ☐

Cooler Temp (°C) on receipt: N/A

Sample Receiving (1st Review):

Client Support (2nd Review):

# Pittsburgh Lab Sample Condition Upon Receipt

Face Analytical

Client Name:

Geochem

Project #, 30272256

Courier: ☐ Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Tracking #: 12 544 007 03 4854 4524

Label	ET
LIMS Login	ET

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#	Date and Initials of person examining contents:
Chain of Custody Present:	/			1002981	BLM 11-20-18
Chain of Custody Filled Out:	/				
Chain of Custody Relinquished:	/	/			
Sampler Name & Signature on COC:	/				
Sample Labels match COC:	/				
-Includes date/time/ID Matrix: WT					
Samples Arrived within Hold Time:	/				
Short Hold Time Analysis (<72hr remaining):		/			
Rush Turn Around Time Requested:		/			
Sufficient Volume:	/				
Correct Containers Used:	/				
-Pace Containers Used:		/			
Containers Intact:	/				
Orthophosphate field filtered			/		
Hex Cr Aqueous Compliance/NPDES sample field filtered			/		
Organic Samples checked for dechlorination:			/		
Filtered volume received for Dissolved tests			/		
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				Initial when completed BLM	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):			/		
Trip Blank Present:			/		
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.