2021 ANNUAL CCR RULE GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

McELROY'S RUN COAL COMBUSTION BYPRODUCT DISPOSAL FACILITY

Pleasants Power Station
Pleasants County, West Virginia

Prepared for:

Allegheny Energy Supply Company
A Wholly Owned Subsidiary of FirstEnergy

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Tetra Tech Project No. 212C-SW-00070

January 2022

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1.0 INTRODUCTION

This 2021 Annual Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action Report was prepared by Tetra Tech, Inc. (Tetra Tech) on behalf of Allegheny Energy Supply Company (AESC), for the McElroy's Run Coal Combustion Byproduct Disposal Facility ("CCBDF", "CCR units", or "site") associated with the Pleasants Power Station (hereinafter referred to as the "Station"). The CCR unit and Station are located in Pleasants County, West Virginia. This report was developed to comply with the requirements of § 257.90(e) of the federal CCR Rule (40 CFR, Part 257, Subpart D). In accordance with § 257.90(e)(6), an overview of the current status of the CCR groundwater program at the site is provided in the table below, and discussed in Sections 2.0 through 5.0 of this report:

Status Summary for Reporting Period (January 1 to December 31, 2021)	
Groundwater Monitoring Program in Effect as of January 1, 2021 - 257.90(e)(6)(i)	Assessment Monitoring (Sampling Event AM-6)
Groundwater Monitoring Program in Effect as of December 31, 2021 - 257.90(e)(6)(ii)	Assessment Monitoring (Sampling Event AM-8)
Appendix III SSI's during Reporting Period - 257.90(e)(6)(iii)	n/a – Site in Assessment Monitoring
Appendix IV SSL's during Reporting Period - 257.90(e)(6)(iv)	Arsenic in GW-19, -23, -24, -25, -26, and -29 (Same parameter and same wells as Sampling Events AM-1 through AM-6) Molybdenum in GW-20 (New parameter limited to single well)
Assessment of Corrective Measures - 257.90(e)(6)(iv)	Initiated April 2019 Completed October 2019
Assessment of Corrective Measures Public Meeting - 257.90(e)(6)(iv)	n/a – Selection of Remedy Ongoing
Selection of Remedy - 257.90(e)(6)(v)	On-going, with Semi-Annual Progress Reports prepared for 2021
Corrective Action - 257.90(e)(6)(vi)	n/a - Selection of Remedy Ongoing

1.1 BACKGROUND AND SITE CHARACTERISTICS

CCRs produced at the Station are placed in the CCBDF, which is located approximately one mile east-southeast of the Station. The facility consists of both a wet disposal area (impoundment) and dry disposal area (landfill) developed in the McElroy's Run watershed. Taken together, the landfill and impoundment are regulated under West Virginia Department of Environmental Protection (WVDEP) Solid Waste/National Pollutant Discharge Elimination System (NPDES) Water Pollution Control Permit No. WV0079171 and under the CCR Rule. A WVDEP groundwater monitoring program for the facility has been in effect since 1994 and a separate CCR Rule groundwater monitoring program has been in effect since 2017. As per the CCR Rule, the landfill and impoundment are considered two separate, existing CCR units that share a common boundary (the impoundment dam). As provided by the CCR Rule, a multi-unit groundwater monitoring system has been established for the CCBDF.

The impoundment is situated in the upper portion of the watershed, is unlined, and has been in continuous use since the late 1970s. The landfill is situated in the lower portion of the watershed (adjacent to and overlying the impoundment dam), is lined, and has been in continuous use since the early 1990s. At the current water level, the surface impoundment area is approximately 250 acres. The impoundment dam was constructed with a clay-filled cutoff trench at the upstream toe and with a clay blanket on the upstream face for a low permeability seepage barrier. The downstream portion of the dam was constructed using compacted fly ash and intermittent layers of bottom ash for blanket drains connected to sloping chimney drains that collect and convey seepage to discharge pipes for monitoring. The downstream face of the dam is covered by the landfill facility which WVDEP considers to be a buttress for the dam.

The landfill consists of three primary development stages (I, II, and III in the original WVDEP permit drawings and now referred to as 1, 2, and 3) which are further subdivided into construction subareas (e.g., Stage 1G, 2A, etc.). At this time, development and disposal operations have only been performed in the Stage 1 and 2 areas while the Stage 3 area remains undeveloped. Up until 2009, all the landfill subareas were constructed with a compacted clay liner system that included an underlying combined groundwater underdrain/leak detection system and overlying leachate collection system. However, since 2009 (in subareas 1G and 2B), a composite geosynthetic liner system (geosynthetic clay liner and geomembrane) has been utilized that also includes an underlying combined groundwater underdrain/leak detection system and overlying leachate collection system. For all portions of the landfill that overlie the downstream face of the impoundment dam, a bottom ash blanket drain layer has also been installed beneath the liner

system. Leachate and contact stormwater runoff from the Stage 1 and 2 disposal areas are managed in Sedimentation Pond Nos. 1 and 2, which are geosynthetic-lined impoundments located immediately down-valley of the future Stage 3 landfill development area.

Groundwater in the CCBDF area occurs primarily within fractured bedrock, principally in the following sandstone units (listed in descending order): the Morgantown sandstone, Grafton sandstone, Jane Lew sandstone, and the Saltsburg sandstone. Groundwater has also been identified in the Ames limestone and Harlem Coal (in association with the Jane Lew sandstone), and, to a lesser extent, the redbed units at the site. Generally, the fine-grained rock units (e.g., redbeds) typically serve as aquitards to limit vertical groundwater migration, while the coarser grained rock units (e.g., sandstones) typically have more well-developed and open fracture systems and are the primary conduits for groundwater migration. The fractured bedrock of multiple sandstone units, including the Morgantown sandstone, Grafton sandstone, Jane Lew sandstone, and Saltsburg sandstone, has been collectively identified as the uppermost aquifer for CCR Rule groundwater monitoring for the combined landfill and impoundment CCR units.

Historic and recent groundwater level data indicate groundwater flow at the CCBDF as being primarily controlled by topography (more important for vertical migration across groundwater flow units along the valley margins near where the units outcrop) with limited, secondary control by orientation (strike and dip) of the rock units (i.e., migration down-dip within a groundwater flow unit). Groundwater is interpreted to generally flow north from the topographically higher areas located to the south of the impoundment, with some flow divergence towards the northwest and to the northeast near the northern boundary of the site. West and northwest of the impoundment dam, topography may be the dominant influence on groundwater flow, as the multiple sandstone units underlying the site are eroded and discontinuous across the valley. Groundwater flow northwest of the dam and under the landfill is in the downstream direction of McElroy's Run toward the west. Flow in all of the rock units exhibit very little seasonal and temporal fluctuations. Water level data from the current reporting period (2021) were used for contouring groundwater flow patterns at the site. A more detailed discussion of the site's geologic and hydrogeologic characteristics is provided in Section 2.0 of this report.

1.2 REGULATORY BASIS

As required by § 257.90(e) of the CCR Rule, Owners or Operators of existing CCR landfills and surface impoundments were to prepare an initial Annual Groundwater Monitoring and Corrective Action Report ("AGMCA Report") no later than January 31, 2018, and annually thereafter.

According to the subject section, "For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year."

This report has been developed to meet the general requirements above and the specific requirements of § 257.90(e)(1) through (6), which include:

(1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit (see Figures 2-1 and 2-2);

(2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken (see Section 2.1.1);

(3) In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs (see Sections 3.0 and 4.0 and Table 3-1);

(4) A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels; see Section 2.3);

(5) Other information required to be included in the annual report as specified in §§ 257.90 through 257.98 (see Sections 4.1 and 5.0 and Tables 4-1 and 4-2); and

(6) A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit." (See Section 1.0).

In addition, the Owner or Operator must place the report in the facility's operating record as required by § 257.105(h)(1), provide notification of the report's availability to the appropriate State Director within 30 days of placement in the operating record as required by § 257.106(h)(1), and place the report on the facility's publicly accessible website, also within 30 days of placing the report in the operating record, as required by § 257.107(h)(1).

1.3 OVERVIEW OF REPORT CONTENTS

Section 1.0 of this report provided an overview of the CCR groundwater program status, CCR unit characteristics, regulatory basis, and a summary of the requirements for CCR Annual Groundwater Monitoring and Corrective Action Reports. Section 2.0 summarizes the status of key actions pertaining to CCR groundwater monitoring and activities completed during 2021 for the CCBDF and plans for the upcoming year. Section 3.0 presents Detection Monitoring (DM) results from groundwater sampling events completed in 2021. Section 4.0 presents Assessment Monitoring (AM) results from groundwater sampling events completed in 2021. Finally, Section 5.0 presents a summary of the Selection of Remedy (SoR) activities that were performed for the CCR units during 2021.

2.0 GENERAL INFORMATION

This section provides an overview of the status of the CCR groundwater monitoring program through 2021 and key activities planned for 2022.

2.1 STATUS OF THE CCR GROUNDWATER MONITORING AND CORRECTIVE ACTION PROGRAM

During calendar year 2021 (January 1st through December 31st), the following key actions were completed with regard to the CCR groundwater monitoring program for the CCBDF.

2.1.1 Groundwater Monitoring Well System

As documented in the facility's previous AGMCA Reports (accessible at http://ccrdocs.firstenergycorp.com/), the certified CCR monitoring well network currently consists of three upgradient (background) wells (GW-7, -21, and -22), seven downgradient wells to monitor the northern side of the combined CCR units (GW-9, -19, -20, -23, -24, -25, and -26), and three downgradient wells to monitor the western side of the combined CCR units (GW-27, -28, and -29), as summarized in attached Table 2-1 and shown on attached Figures 2-1 and 2-2. However, as detailed in the 2020 AGMCA Report, only GW-7 is currently being used for upgradient/background interwell comparisons based on a combination of factors which include: statistical dissimilarity that precludes upgradient well grouping; recurring problems with the availability of sufficient volumes of recoverable water in GW-21; and the slow drop and subsequent stabilization of groundwater levels in some of the CCR network wells installed in 2016 that resulted in a modified interpretation of groundwater flow patterns along the northern boundary of the site.

During the current reporting period, the CCR monitoring well network is in the process of being modified as per one of the key planned activities outlined in the 2020 AGMCA Report. This activity is the installation of six additional monitoring wells positioned downgradient and/or sidegradient of the CCR units. These new well locations were selected to better determine the extent of arsenic concentrations greater than the GWPS in groundwater along the north and northeastern facility boundary, to monitor potential arsenic migration beyond the facility boundary that could affect the downgradient property(ies), and to evaluate potential natural attenuation impacts on arsenic concentrations downgradient of the CCR units. Three of these new monitoring wells were sited on AESC-owned property (designated as GW-32, GW-33A, and GW-33B) and three were sited on adjoining privately-owned property (designated as GW-30, GW-31, and GW-34). However,

due to protracted negotiation of access rights and a lease agreement with the landowner for one of the monitoring well locations (GW-30) and due to borehole collapse issues discussed below for another well location during drilling (GW-33B), this SoR activity was only able to be partially completed during the reporting period. Also, after completing installation of monitoring well GW-31, AESC entered an agreement to acquire most of the adjoining property where GW-31 is located, recategorizing it from an off-site to an on-site well.

Well installation activities that were performed included one new sidegradient (GW-34) and three new downgradient (GW-31, -32, and -33A) monitoring wells. Following their installation, the four new monitoring wells were also developed and left to stabilize hydraulically and geochemically for the remainder of the 2021 calendar year and initial sampling will be attempted during the AM-9 event scheduled for the first quarter of 2022. At that time, the wells will be added to the certified CCR monitoring well network. As shown on Figures 2-1 and 2-2, the four new monitoring wells are located along and beyond the southeastern (GW-34), eastern (GW-33A), and northern (GW-31 and -32) facility boundaries, with GW-34 located on property that is not owned by AESC. Since groundwater flow in the uppermost aquifer at the CCR unit (Grafton Sandstone) is primarily controlled by topography with limited, secondary control by orientation (strike and dip) of the rock units and flows primarily to the north and northeast beneath the impoundment, all four locations are positioned downdip/downgradient of existing upgradient/background monitoring well GW-7.

The new wells were drilled and installed between August 19, 2021, and December 9, 2021, by a West Virginia Department of Environmental Protection (WVDEP) certified well driller in accordance with USEPA and WVDEP requirements for installation of typical groundwater monitoring wells. The boreholes were drilled using hollow-stem auger and air rotary/air hammer drilling techniques. The depth of each borehole was determined in the field by an on-site geologist based on the targeted formation; the Morgantown Sandstone for GW-33A, and the Grafton Sandstone for GW-31, -32, -33B, and -34. A detailed log of each borehole was maintained, documenting the borehole lithology, water-bearing zones, and other pertinent information (see Attachment A).

Due to borehole collapse and the inability to keep the borehole open at depth, GW-33B could not be installed. The borehole was subsequently abandoned on November 19, 2021, in accordance with WVDEP requirements. Also, due to the protracted negotiation of access rights and a lease agreement with the landowner, the remaining well (GW-30) located north of GW-9 and also proposed to be installed as part of the SoR activities, was delayed. Because of these factors, the drilling program was suspended in December 2021 to allow time for completing negotiations to

install GW-30 and for planning and development of alternative drilling methods to prevent borehole collapse and facilitate the successful installation of GW-33B. Both GW-30 and GW-33B will be installed at a later date in 2022.

Upon completing and clearing a borehole by airlifting, monitoring wells were then installed in each borehole. The new monitoring wells were constructed of 4-inch diameter Schedule 80 polyvinyl chloride (PVC) well screens and casing. The larger diameter and thicker casings were utilized in the new wells to improve the availability of sufficient volumes of sampling water and to provide sufficient well casing strength and protection against collapse due to the depth of the wells (ranging from 360 feet to 543.5 feet below ground surface). The monitoring wells were constructed with a 20-foot length of 0.010-inch slotted screen with the exception of GW-33A, which was constructed with a 30-foot length of 0.010-inch slotted screen. The annulus around each well screen was filled with 20-40 silica filter sand up to 5 feet above the top of the screen. A 5-foot-thick bentonite seal was placed above the filter sand and the remaining annulus was filled with cement-bentonite grout to the surface. Each new well was completed at the ground surface with a steel protective casing with an aluminum lockable cap, and a concrete pad was constructed around the protective casing. Well construction information was recorded on monitoring well construction sheets as provided in Attachment A, and preliminary well construction information, pending a survey to be completed in January 2022, is presented in Table 2-1.

The new wells were successfully developed between October 26, 2021, and December 16, 2021, as the well installation activities progressed. Each new well was developed by first purging the standing formation water using a portable submersible pump, allowing the well to partially recover, then surging it with potable water obtained from the Station followed by pumping the well dry again (see Attachment A). Rising and falling head slug tests were performed on newly installed monitoring wells GW-31, -32, and -33A in December 2021 to determine the hydraulic conductivity of the targeted monitoring zone to aid in SoR activities. Specific details and results of the slug testing will be provided and summarized in the final SoR report that will be prepared for the site.

The ground surface, top of PVC well casing, and top of the protective casing at each new monitoring well location are scheduled to be surveyed during the first quarter of 2022 with horizontal and vertical location to be tied into the existing survey network for the site.

2.1.2 Groundwater Monitoring Plan

Consistent with the work performed and summarized in previous AGMCA Reports, the CCR unit's Groundwater Monitoring Plan (GWMP) was followed during all 2021 field sampling and laboratory

analysis activities and for statistically evaluating groundwater monitoring data developed from the CCR sampling and analysis program. No changes to the facility's GWMP occurred during 2021.

2.1.3 Background Groundwater Sampling

As documented in the 2017 and 2018 AGMCA Reports, eight independent rounds of background groundwater samples were collected from each CCR monitoring well and each sample was analyzed for all Appendix III and IV parameters prior to initiating the facility's CCR Detection Monitoring program in October 2017. No modifications to this background dataset occurred during 2021.

2.1.4 Statistical Methods

As documented in the 2017 and 2018 AGMCA Reports, the background dataset discussed in Section 2.1.3 of this Report was used to select the appropriate statistical evaluation methods for each CCR groundwater monitoring parameter to identify any Statistically Significant Increases (SSIs) over background concentrations and to determine whether any concentrations were at Statistically Significant Levels (SSLs) above their respective Groundwater Protection Standards (GWPS) established for the site. These statistical methods are available on the facility's publicly accessible website and no changes were made to them during 2021.

2.2 PROBLEMS ENCOUNTERED/RESOLVED

During the AM-7 event, downgradient well GW-26 was not sampled, nor was the water level measured, because the well location was inaccessible due to extremely poor access road conditions. However, while GW-26 was accessible during the AM-8 event, consistent with some past sampling events, having a sufficient recoverable volume of groundwater to sample in GW-26 also continued to be a problem. During the AM-8 event there was insufficient water volume in GW-26 for the well to be sampled using its dedicated bladder pump, so the bladder pump was removed from the well and GW-26 was instead sampled with a Hydra-Sleeve.

In addition to the problems for GW-26 noted above, an attempt was made to sample upgradient well GW-22 during the AM-7 event, however, the bladder pump was malfunctioning. After attempting to troubleshoot the pump issues to no avail, sample collection was abandoned. During the AM-8 event the bladder pump in GW-22 was pulled from the well, disassembled, and it was noted that the check valve was stuck. The check valve was repaired and the pump was placed back into the well; however, the pump still failed to work and GW-22 was unable to be sampled. The pump is recommended for servicing and maintenance by the vendor from which the pump

was purchased, with this work planned for the first quarter of 2022. As noted in Section 2.1.1 of this report, upgradient well GW-22 is not currently used for interwell comparisons for the CCR units, so the inability to obtain data for it during AM-7 and -8 did not affect the 2021 AM program evaluations for the CCR units.

Finally, while upgradient well GW-21 was unable to be regularly sampled during previous events due to insufficient volumes of recoverable water, it was able to be sampled during AM-7 and AM-8 with Hydra-Sleeves. The data obtained from GW-21 during AM-7 and AM-8 will be compiled with the existing GW-21 dataset and used to determine whether or not it's statistically appropriate to group its results with the dataset for upgradient well GW-22.

Consistent with previous sampling events, GW-23, GW-24, and GW-25 were sampled with Hydra-Sleeves during both the AM-7 and AM-8 events due to insufficient volumes of recoverable water to allow for sampling using the wells' dedicated bladder pumps.

Other than the issues discussed above, there were no other significant problems encountered during 2021 with regard to the CCR groundwater monitoring program.

2.3 TRANSITION BETWEEN MONITORING PROGRAMS

As documented in the 2018 AGMCA Report, the CCR units transitioned from Detection Monitoring to Assessment Monitoring that year. As part of this transition, all required notifications were issued, appropriate GWPS for Appendix IV parameters were established, and the first two AM sampling events (AM-1 and AM-2) were completed that year. Statistical evaluations of the AM-1, -2, and -3 sampling events were performed and documented in the 2019 AGMCA Report and the data indicated there were SSLs in one or more well comparisons. Based on the parameters for which SSLs were identified, an Appendix IV Alternative Source Demonstration (ASD) was then undertaken but not all of the Appendix IV SSLs that were identified could be attributed to alternative sources. As such, Nature and Extent (N&E) of Release Characterization activities and an Assessment of Corrective Measures (ACM) were completed and are documented in the 2019 AGMCA Report. Since that time and throughout 2021, the CCR unit remained in AM with ongoing SoR activities being performed as discussed in Section 5.0 of this report.

2.4 KEY ACTIVITIES PLANNED FOR THE UPCOMING YEAR

The following are the key CCR groundwater compliance activities planned for 2022:

- Continue with Assessment Monitoring by conducting the annual and semi-annual rounds of sampling and analysis for applicable Appendix III and Appendix IV constituents [per 40 CFR § 257.96(b)] and evaluate the need to update the background data sets and associated Upper Prediction Limits (UPLs).
- Service the bladder pump for GW-22 during the first quarter of 2022. If the pump can't be repaired by the vendor and returned to functional status, a new bladder pump will be purchased for installation and use in GW-22.
- If any new SSLs are identified, provide appropriate notification [per § 257.95(g)] then potentially conduct an Appendix IV ASD [per § 257.95(g)(3)(ii)] to determine if a source other than the CCR units may be causing the new SSLs. Concurrent with undertaking an Appendix IV ASD, characterize the Nature and Extent of the new Appendix IV release and provide appropriate notification depending on the findings [per §§ 257.95(g)(1) and (2), respectively].
- If any new SSLs are identified and an ASD is either not undertaken, indicates that an alternative source is not responsible for all the new SSLs identified, or is not completed within 90 days of identifying there are new SSLs, then initiate and perform an Assessment of Corrective Measures for the new SSLs in accordance with § 257.96.
- Conduct SoR activities in compliance with § 257.97(a), which states that as soon as feasible after completion of the ACM, select a remedy that, at a minimum, meets the performance standards listed in § 257.97(b) and the evaluation factors listed in § 257.97(c) These activities are currently in progress and include surveying and sampling newly installed monitoring wells GW-31, -32, -33A, and -34; finalizing a right-of-access and lease agreement for the GW-30 well location; installing, surveying, and sampling the two remaining new monitoring wells (GW-30 and GW-33B); evaluating the historic groundwater monitoring dataset for relationships between key parameters affecting arsenic natural attenuation and arsenic concentrations in groundwater; and completing development of the Arsenic Natural Attenuation Evaluation Work Plan.
- As required by § 257.97(d), specify, as part of the selected remedy, a schedule(s) for implementing and completing remedial activities. The schedule will require the completion of remedial activities within a reasonable period of time taking into consideration the factors set forth in §§ 257.97(d)(1) through (d)(6).
- As required by § 257.97(a), continue preparing semi-annual reports describing the progress in selecting and designing the remedy.

- Should all required SoR activities be completed in 2022, prepare a final report describing the selected remedy. The final report will include a certification from a qualified professional engineer that the remedy selected meets the requirements of the CCR Rule selection criteria and the final report will be placed in the facility's operating record as required by § 257.105(h)(12).
- As required by § 257.96(e), discuss the results of the ACM at least 30 days prior to the final SoR, in a public meeting with interested and affected parties.

3.0 DETECTION MONITORING INFORMATION

3.1 GROUNDWATER ANALYTICAL RESULTS SUMMARY

As noted in Section 2.3, site-wide Assessment Monitoring was performed throughout 2021. As part of the AM program, all DM (Appendix III) parameters were also analyzed during each AM sampling event.

The need to statistically evaluate the 2021 Appendix III data to identify SSIs and determine if AM was necessary was precluded by the CCR units already being in AM during all of 2021, so no statistical analysis of the data was necessary. The 2021 Appendix III data that was collected and validated is presented in Table 3-1 with the intent of using it during the next update of the background dataset and associated UPLs, which will help increase the statistical power of future analyses.

4.0 ASSESSMENT MONITORING INFORMATION

4.1 GROUNDWATER ANALYTICAL RESULTS SUMMARY

In accordance with 40 CFR §§ 257.95(b) and (d)(1), the CCR groundwater sampling and analysis program implemented during 2021 consisted of two AM sampling events (AM-7 and AM-8) performed between February 16 and 23, 2021, and between September 8 and September 15, 2021, respectively. For both AM events, all Appendix III and all Appendix IV constituents were analyzed with the exception of combined radium 226/228 during AM-7, which was inadvertently excluded from the sampling event. However, as documented in the CCR unit's 2019 Appendix IV ASD, multiple lines of evidence (LOE) indicate that elevated concentrations of combined radium 226/228 found in groundwater can be attributed to historical and current oil and gas exploration and production activities that have occurred at the site and, as such, the lack of radium data for AM-7 did not affect the 2021 AM program evaluations for the CCR units. The analyses that were performed exceed the requirements of § 257.95 which only stipulate analyzing for all Appendix IV parameters once per year. Laboratory analysis and validation of the sample data were completed on June 4, 2021, and January 4, 2022, for AM-7 and AM-8, respectively. Table 3-1 presents the validated analytical results for these events.

Statistical evaluations of 2021 AM data included sampling events AM-7 and AM-8, respectively. All statistical evaluation work was performed in accordance with the certified methods included in both the facility's operating record and the publicly accessible website, and the results were used to determine whether there were any detected Appendix IV parameters at SSLs above the CCR unit's established GWPS. As documented in the 2018 AGMCA Report, site-specific Appendix IV GWPS were established for the CCR units using the higher of the federal Maximum Contaminant Level (MCL) or UPL for each parameter or, for those parameters that don't have MCLs, the higher of the EPA Risk Screening Level (RSL) or the UPL. The site-specific GWPS and the results of the statistical evaluations of AM-7 and AM-8 are presented in Tables 4-1 (northern boundary) and 4-2 (western boundary) and discussed below.

For the northern boundary monitoring wells, results from statistical analysis of the AM-7 and AM-8 data were generally consistent with results of the AM-1 to AM-6 data, including recurring SSLs in multiple downgradient wells for arsenic (GW-19, -23, -24, -25, and -26), barium (GW-23, -24, and -25), lithium (GW-23, -24, -25, and -26), and combined radium 226/228 (GW-23, -24, and -25). As documented in the CCR unit's 2019 Appendix IV ASD, multiple LOE indicate that the elevated concentrations of barium and combined radium 226/228 can be attributed to historical

and current oil and gas exploration and production activities that have occurred at the site, and that a high potential exists that the elevated lithium concentrations are also attributable to these oil and gas activities. During AM-7 and AM-8, there was also a recurring SSL for molybdenum in GW-20 (molybdenum was first identified as a potential SSL in GW-20 during AM-3 and AM-4, but the exceedances were attributed to sample turbidity issues, which was later confirmed by results below the associated GWPS during AM-5 and AM-6). However, recurrence of the molybdenum GWPS exceedances during AM-7 and AM-8, during which both samples had low turbidities, indicates that this parameter is an SSL in GW-20. As such, appropriate notification of the SSL, performing an Appendix IV ASD to determine if a source other than the CCR units may be causing the molybdenum SSLs, and characterizing the Nature and Extent of the molybdenum release will be performed in accordance with the associated CCR Rule requirements cited in Section 2.4 of this report.

For the western boundary monitoring wells, results from statistical analysis of the AM-7 and AM-8 data were generally consistent with results of the AM-1 to AM-6 data, with a recurring SSL for arsenic limited to downgradient well GW-29. However, there were also first-time GWPS exceedances identified for lithium in GW-29 during both AM-7 and AM-8, and for combined radium 226/228 in GW-27 during AM-8. However, as documented in the CCR unit's 2019 Appendix IV ASD, multiple LOE indicate that the elevated concentrations of combined radium 226/228 can be attributed to historical and current oil and gas exploration and production activities that have occurred at the site, and that a high potential exists that the elevated lithium concentrations are also attributable to these oil and gas activities.

Taking into account the exclusions for barium, combined radium 226/228, and lithium noted above, and the data presented in Tables 4-1 and 4-2, arsenic and molybdenum were the only Appendix IV constituents detected at SSLs above their respective GWPS under the CCR units' AM program during the reporting period, and arsenic currently remains the only parameter that is the focus of ongoing SoR activities for the CCR units (pending the findings of the forthcoming molybdenum ASD) as discussed in Section 5.0 of this report.

5.0 SELECTION OF REMEDY

As previously noted in Section 2.3 of this report, throughout 2021 the CCR unit remained in AM with ongoing SoR activities being performed. As detailed in the CCR units' 2019 ACM Report, the evaluation of viable remediation technologies for addressing arsenic in groundwater at the site determined that Monitored Natural Attenuation (MNA), combined with source control by the eventual installation of a final cover system on the CCR units, ranked highest among the evaluated options. Therefore, the 2021 SoR activities were focused on developing additional information and data to determine if the preferred remedy identified during the ACM meets the performance standards listed in 40 CFR § 257.97(b), while considering the evaluation factors listed in § 257.97(c).

5.1 CURRENT STATUS OF THE SELECTION OF REMEDY PROGRAM

As outlined in the Semi-Annual SoR Progress reporting included as Attachment B of this report, the following activities were performed during the current reporting period to support final remedy selection at the site:

- In order to better characterize the extent of arsenic in groundwater and to evaluate potential natural attenuation impacts on arsenic concentrations downgradient of the CCR units, four of the six new downgradient monitoring wells, including two off-site locations, were installed and developed as detailed in Section 2.1.1 of this report.
- Negotiations are on-going with the remaining off-site landowner to establish a right-of-access and lease agreement to install and sample GW-30. Upon reaching an agreement, GW-30 will be drilled and installed during the 2022 calendar year.
- The drilling program in 2021 was suspended following borehole collapse at GW-33B due to formation instability. Planning and development of alternative drilling methods to prevent borehole collapse and facilitate the successful installation of GW-33B are in progress with plans to drill and install GW-33B during the 2022 calendar year.
- Continued development of a Natural Attenuation Evaluation Work Plan to include evaluating historic concentrations of parameters which can affect the natural attenuation of arsenic (e.g., iron, pH, ORP, etc.) as well as planning the sampling and analysis program that would be associated with future MNA activities.

- Continued a review of candidate technologies with regard to their potential to meet the performance standards listed in § 257.97(b) and the evaluation factors listed in § 257.97(c).
- Assessed February and September 2021 groundwater flow patterns in the monitoring network areas downgradient of the CCR units and confirmed they were consistent with established flow patterns at the site.
- Completed statistical evaluations of the AM-7 and AM-8 analytical data to determine whether there were any detected Appendix IV parameters at SSLs above the CCR unit's established GWPS other than arsenic and those previously determined by the 2019 Appendix IV ASD to be attributable to other sources, with molybdenum identified as an SSL above its respective GWPS in a single well.

Ongoing and/or new SoR activities that are planned for 2022 have been included in Section 2.4 of this report.

TABLES

TABLE 2-1
CCR RULE GROUNDWATER MONITORING SYSTEM WELL SUMMARY
McELROY's RUN CCB DISPOSAL FACILITY – 2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

Well	Year Installed	Formation Monitored	Ground Surface Elevation (ft MSL)	Total Well Depth (ft bgs)	Monitored Interval (ft bgs)	Monitored Interval (ft MSL)	Casing ID and Material
Upgradient (Background)							
GW-7	1994	Grafton SS, Ames LS	918.40	101.2	75.7 – 100.7	817.70 – 842.70	4" - Sch. 40 PVC
GW-21*	2016	Morgantown SS	1033.01	234.2	214.2 – 234.2	798.77 – 818.77	2" - Sch. 40 PVC
GW-22*	2016	Morgantown SS	1045.18	370.2	350.2 – 370.2	675.02 – 695.02	2.5" - Sch. 80 PVC
Downgradient							
GW-9	1994	Ames LS, Jane Lew SS, Pittsburgh RB	797.42	177.7	137.2 – 177.2	620.22 – 660.22	4" - Sch. 40 PVC
GW-19	1995	Birmingham RB, Grafton SS, Ames LS	920.64	238.9	198.9 – 238.9	681.74 – 721.74	2" - Sch. 40 PVC
GW-20	1995	Lower Clarksburg RB	923.00	150.5	100.5 – 150.5	772.50 – 822.50	2" - Sch. 40 PVC
GW-23	2016	Grafton SS	974.40	392.9	372.9 – 392.9	581.53 – 601.53	2.5" - Sch. 80 PVC
GW-24	2016	Grafton SS	941.55	271.1	251.1 – 271.1	670.50 – 690.50	2" - Sch. 40 PVC
GW-25	2016	Grafton SS	1006.22	303.7	283.7 – 303.7	702.53 – 722.53	2" - Sch. 40 PVC
GW-26	2016	Grafton SS	984.16	288.2	268.2 – 288.2	695.95 – 715.95	2" - Sch. 40 PVC
GW-27	2016	Saltsburg SS	675.30	48.3	38.3 – 48.3	626.96 – 636.96	2" - Sch. 40 PVC
GW-28	2016	Saltsburg SS	801.95	175.6	165.6 – 175.6	626.38 – 636.38	2" - Sch. 40 PVC
GW-29	2016	Grafton SS	928.49	166.0	156.0 – 166.0	762.45 – 772.45	2" - Sch. 40 PVC
GW-31**	2021	Grafton SS	1043***	360.0	340.0 – 360.0	683 – 703***	4" - Sch. 80 PVC
GW-32**	2021	Grafton SS	941***	424.0	404.0 – 424.0	517 – 537***	4" - Sch. 80 PVC
GW-33A**	2021	Morgantown SS	1063***	467.0	437.0 – 467.0	596 – 626***	4" - Sch. 80 PVC
Side-Gradient							
GW-34**	2021	Grafton SS	1043***	543.5	523.5 – 543.5	500 – 520***	4" - Sch. 80 PVC

Notes: SS = sandstone LS = limestone RB = red beds MSL = mean sea level bgs = below ground surface ID = inside diameter PVC = polyvinyl chloride
* = Only for water level measurements
** = New well that will be incorporated into CCR monitoring network in 2022.
*** = Elevations shown are approximate pending completion of field survey.

			APPENDIX III (all Chemical Constituents reported as TOTAL RECOVERABLE)[1]							APPENDIX IV (all Chemical Constituents reported as TOTAL RECOVERABLE)[1]													
SAMPLING EVENT NO.[2]	WELL ID[3]	SAMPLE DATE	BORON METALS MG/L	CALCIUM METALS MG/L	CHLORIDE MISC MG/L	FLUORIDE MISC MG/L	PH MISC S.U.	SULFATE MISC MG/L	TDS MISC MG/L	ANTIMONY METALS MG/L	ARSENIC METALS MG/L	BARIUM METALS MG/L	BERYLLIUM METALS MG/L	CADMIUM METALS MG/L	CHROMIUM METALS MG/L	COBALT METALS MG/L	LEAD METALS MG/L	LITHIUM METALS MG/L	MERCURY METALS MG/L	MOLYBDENUM METALS MG/L	SELENIUM METALS MG/L	THALLIUM METALS MG/L	RADIUM-226 RADIOCHEM PCI/L	RADIUM-228 RADIOCHEM PCI/L
17 (AM-7)	GW-7	2/16/2021	0.2391	2.58	122	8.36	8.32 J	0.101 J	1350	0.001 U	0.00059	0.07638	0.0002 U	0.0006 U	0.00036 J	0.001 U	0.0005 U	0.02755	0.00075 U	0.001 U	0.003 U	0.00018 U	NA	NA
18 (AM-8)	GW-7	9/9/2021	0.278	2.67	121 J-	8.172	8.19 J	0.2 U	1390	0.005 U	0.00046 J	0.08598	0.0004 U	0.0017 U	0.0072 U	0.002 U	0.0018 U	0.02775	0.00075 U	0.005 U	0.0068 U	0.0006 U	-0.0682 U	0.496 U
18 (AM-8)	GW-7 (D)	9/9/2021	0.2784	2.69	120	8.136	8.21 J	0.2 U	1290	0.005 U	0.00057 J	0.0765	0.0004 U	0.0017 U	0.0072 U	0.002 U	0.0018 U	0.02794	0.00075 U	0.005 U	0.0068 U	0.0006 U	0.289 U	0.318 U
17 (AM-7)	GW-9	2/23/2021	0.0685 J	12.916	8.28	0.279	7.64 J	119	788	0.001 U	0.00047	0.06019	0.001 U	0.0006 U	0.0075 U	0.001 U	0.0005 U	0.01664 J-	0.00075 U	0.001 U	0.015 U	0.00018 U	NA	NA
18 (AM-8)	GW-9	9/9/2021	0.0885 J	12.602	7.681	0.291	7.86 J	112	840	0.005 U	0.00067	0.05822	0.0004 U	0.0017 U	0.0072 U	0.002 U	0.0018 U	0.02056	0.00075 U	0.00126 J	0.0068 U	0.0006 U	0.283 U	0.284 U
17 (AM-7)	GW-19	2/23/2021	0.2191	9.63	619	1.9	7.71 J	0.2 U	2510	0.001 U	0.13416	1.2243	0.001 U	0.0006 U	0.0075 U	0.001 U	0.00025 J	0.01749 J-	0.00075 U	0.001 U	0.015 U	0.00018 U	NA	NA
18 (AM-8)	GW-19	9/15/2021	0.2464	10.398	611	1.94	7.68 J	0.2 U	2830	0.005 U	0.11504	1.19747	0.0004 U	0.0017 U	0.0072 U	0.002 U	0.0018 U	0.02071	0.00075 U	0.00132 J	0.0068 U	0.0006 U	1.55	1.57 U
17 (AM-7)	GW-20	2/18/2021	0.1625 J	5.44	545	5.94 J-	8.04 J	27.6	1913.333	0.00023 J	0.00208	0.19309	0.0002 U	0.00017 J	0.00075 J	0.00014 J	0.00029 J	0.01915	0.00075 U	0.10791	0.01644	0.00018 U	NA	NA
18 (AM-8)	GW-20	9/13/2021	0.2168	5.46	522	5.894	8.08 J	28.1	2073.333	0.005 U	0.00187	0.19031	0.0004 U	0.0017 U	0.0072 U	0.002 U	0.0018 U	0.02028	0.00075 U	0.10538	0.01288	0.0006 U	0.212 U	0.276 U
17 (AM-7)	GW-21	2/18/2021	0.0951 J	10.151	857	2.26 J-	8.12 J	189	2720	0.00077 J	0.00901	0.13999	0.0002 U	0.00021 J	0.00137 J	0.00036 J	0.00047 J	0.01649	0.00075 U	0.20112	0.03342	0.00018 U	NA	NA
18 (AM-8)	GW-21	9/13/2021	0.1717 J	10.922	897	2.304	8.06 J	172	3060	0.005 U	0.00839	0.1756	0.0004 U	0.00045 J	0.00612	0.00054 J	0.00084 J	0.02197	0.00075 U	0.20624	0.02812	0.0006 U	0.117 U	0.422 U
17 (AM-7)	GW-22[4]	2/16/2021	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
18 (AM-8)	GW-22[4]	9/13/2021	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
17 (AM-7)	GW-23	2/23/2021	0.7123	709	13400	0.1 U	6.78 J	0.347	92400	0.00112 J	0.03321	16.37124	0.001 U	0.0006 U	0.03 U	0.00053 J	0.0025 U	0.08286 J-	0.00075 U	0.00398	0.015 U	0.0009 U	NA	NA
18 ((AM-8)	GW-23	9/13/2021	0.1506 J	739	13250	0.1 U	6.98 J	0.458	110000	0.005 U	0.0434	14.46866	0.0004 U	0.0017 U	0.09 U	0.00114	0.0225 U	0.08929	0.00075 U	0.00824	0.034 U	0.003 U	31.8 J	75.8 J
17 (AM-7)	GW-24	2/22/2021	0.3191	356	9020	0.1 U	7.08 J	0.2 U	65400	0.00099 J	0.03343	11.2487	0.005 U	0.015 U	0.0375 U	0.00063 J	0.0125 U	0.05197	0.00075 U	0.00357	0.015 U	0.0045 U	NA	NA
18 (AM-8)	GW-24	9/8/2021	0.3093	467	9346	0.1 U	7.06 J	0.2 U	76600	0.005 U	0.02458	13.18969	0.002 U	0.0017 U	0.09 U	0.00126	0.009 U	0.0607	0.00075 U	0.00523	0.034 U	0.0006 U	16.3 J	39.3 J
17 (AM-7)	GW-25	2/22/2021	0.1605 J	319	8500	0.1 U	7.57 J	0.2 U	63000	0.00037 J	0.04573	8.14145	0.005 U	0.015 U	0.0375 U	0.00035 J	0.0125 U	0.04358	0.00075 U	0.00518	0.015 U	0.0045 U	NA	NA
18 (AM-8)	GW-25	9/14/2021	0.2004	344	9384	0.1 U	7.57 J	0.2 U	71000	0.025 U	0.0388	10.39418	0.0004 U	0.0085 U	0.036 U	0.00124	0.009 U	0.05761	0.00075 U	0.01001	0.034 U	0.003 U	16.7	21.7
17 (AM-7)	GW-26[5]	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
18 (AM-8)	GW-26	9/14/2021	0.1604 J	101	815	1.701	8.41 J	0.527	24600	0.005 U	0.0174	1.71966	0.00727	0.0017 U	0.14025	0.0476	0.04438	0.13566	0.00075 U	0.00886	0.085 U	0.00058	0.53	0.233 U
17 (AM-7)	GW-27	2/16/2021	0.033 J	52.772	137	0.322	7.56 J	1.48	624	0.001 U	0.00043	0.99025	0.0002 U	0.0006 U	0.00034 J	0.0001 J	0.0005 U	0.01805	0.00075 U	0.0043	0.003 U	0.00018 U	NA	NA
18 (AM-8)	GW-27	9/14/2021	0.1008 J	55.215	130	0.324	7.53 J	3.179	644	0.005 U	0.0013 U	0.93473	0.0004 U	0.0017 U	0.0072 U	0.002 U	0.0018 U	0.01732	0.00075 U	0.00473	0.0068 U	0.0006 U	6.66	6.54 J
17 (AM-7)	GW-28	2/22/2021	0.1953 J	6.23	693	2.12	7.83 J	0.529	2310	0.001 U	0.00437	0.19867	0.0002 U	0.0006 U	0.0015 U	0.001 U	0.0005 U	0.01989	0.00075 U	0.03067	0.003 U	0.00018 U	NA	NA
18 (AM-8)	GW-28	9/9/2021	0.208	6.14	684	2.007	7.72 J	0.623	2470	0.005 U	0.00485	0.24653	0.0004 U	0.0017 U	0.0072 U	0.002 U	0.0018 U	0.0252	0.00075 U	0.03656	0.0068 U	0.0006 U	0.379 U	0.514 U
17 (AM-7)	GW-29	2/22/2021	0.2994	12.023	1010	1.3	7.79 J	0.487	4166.667 J	0.00024 J	0.0127	1.34389	0.001 U	0.0006 U	0.0075 U	0.00013 J	0.0005 U	0.03767 J-	0.00075 U	0.0041	0.015 U	0.00018 U	NA	NA
17 (AM-7)	GW-29 (D)	2/22/2021	0.3132	12.213	1010	1.3	7.79 J	0.518	2980 J	0.001 U	0.01312	1.3142	0.001 U	0.0006 U	0.0075 U	0.00011 J	0.0005 U	0.04487 J-	0.00075 U	0.00407	0.015 U	0.00018 U	NA	NA
18 (AM-8)	GW-29	9/8/2021	0.3158	12.683	996 J-	1.267	7.8 J	0.273	4633.333	0.005 U	0.01062	1.14405	0.0004 U	0.0017 U	0.036 U	0.002 U	0.0018 U	0.05314	0.00075 U	0.00762	0.0068 U	0.0006 U	0.806 U	0.659 U

NOTES:

[1] Lab analyses were completed by Beta Lab and Eurofins/TestAmerica Laboratories, Inc., both of which are accredited/certified laboratories: Beta Lab NSF/ISR ISO 9001:2015 Cert. No. 83761-IS8 (Exp. 01-16-24) and Eurofins/TestAmerica WVDEP Certificate No. 381, Expiration Date: 10-31-22.

[2] Event Nos. 17 and 18 correspond to Assessment Monitoring (AM) sampling events AM-7 and AM-8, respectively.

[3] Field duplicate samples that were taken for Quality Control purposes are noted with a (D).

[4] NS = Not Sampled. For GW-22 this occurred due bladder pump malfunction.

[5] NS = Not Sampled. For GW-26 this occurred due to extremely poor road condtions making the well inaccessible.

NA = Parameter was not analyzed.

DATA QUALIFER DEFINITIONS:

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted method detection limit for sample and method.
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in sample
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in sample.

Northern Boundary							Event 17 (AM-7) Downgradient Wells								Event 17 (AM-7) Upgradient Well GW-7	
Parameter	Units	Data Distribution for Upgradient Well GW-7	UPL Type	UPL Value[a,b]	Federal MCLs/RSLs	GWPS	GW-9	GW-19	GW-20	GW-23	GW-24	GW-25	GW-26[f]			
Antimony	mg/L	Unknown	Poisson	0.00133	0.006	0.006	<0.001	<0.001	0.00023	0.00112	0.00099	0.00037	NS		<0.001	U
Arsenic	mg/L	Unknown	Poisson	0.00682	0.01	0.01	0.00047	0.13416	0.00208	0.03321	0.03343	0.04573	NS		0.00059	
Barium	mg/L	Log–Normal	Parametric	0.0934	2	2	0.06019	1.2243	0.19309	16.3712	11.2487	8.14145	NS		0.07638	
Beryllium	mg/L	Unknown[c]	DQ[d]	NA	0.004	0.004	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.005	NS		<0.0002	U
Cadmium	mg/L	Unknown[c]	DQ[d]	NA	0.005	0.005	<0.0006	<0.0006	0.00017	<0.0006	<0.015	<0.015	NS		<0.0006	U
T. Chromium	mg/L	Unknown[c]	DQ[d]	NA	0.1	0.1	<0.0075	<0.0075	0.00075	<0.03	<0.0375	<0.0375	NS		0.00036	J
Cobalt	mg/L	Unknown[c]	DQ[d]	NA	0.006	0.006	<0.001	<0.001	0.00014	0.00053	0.00063	0.00035	NS		<0.001	U
Fluoride	mg/L	Normal	Parametric	9.291	4	9.291	0.279	1.9	*5.94*	<0.1	<0.1	<0.1	NS		8.36	
Lead	mg/L	Unknown[c]	DQ[d]	NA	0.015	0.015	<0.0005	0.00025	0.00029	<0.0025	<0.0125	<0.0125	NS		<0.0005	U
Lithium	mg/L	Normal	Parametric	0.023374	0.04	0.04	0.01664	0.01749	0.01915	0.08286	0.05197	0.04358	NS		0.02755	
Mercury	mg/L	Unknown	Poisson	0.00031	0.002	0.002	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	NS		<0.00075	U
Molybdenum	mg/L	Log–Normal	Parametric	0.006805	0.1	0.1	<0.001	<0.001	0.10791	0.00398	0.00357	0.00518	NS		<0.001	U
Selenium	mg/L	Unknown[c]	DQ[d]	NA	0.5	0.5	<0.015	<0.015	0.01644	<0.015	<0.015	<0.015	NS		<0.003	U
Thallium	mg/L	Unknown[c]	DQ[d]	NA	0.002	0.002	<0.00018	<0.00018	<0.00018	<0.0009	<0.0045	<0.0045	NS		<0.00018	U
Sum Ra226+Ra228[e]	pCi/L	Unknown	Poisson	0.58	5	5	NA	NA	NA	NA	NA	NA	NS		NA	

[a]Prediction Limits calculated using 5% alpha.

[b]Upper Prediction Limit used for all parameters.

[c]Data distribution set to Unknown if all values non-detect in upgradient well.

[d]DQ is Double Quantification Rule. If two successive, independent detected values occur, that would be an SSI and also an SSL if > GWPS. However, if value was detected in upgradient well during the same sampling event, would use Poisson PL instead.

[e]Radium not analyzed (NA) during Event AM-7.

[f]GW-26 not sampled (NS) due to insufficient recoverable water.

#.#### = UPL > Result > MCL/RSL

= SSI < GWPS

= SSI > GWPS

= DQ Parameter with Verification Sampling Needed

Northern Boundary							Event 18 (AM-8) Downgradient Wells								Event 18 (AM-8) Upgradient Well GW-7	
Parameter	Units	Data Distribution for Upgradient Well GW-7	UPL Type	UPL Value[a,b]	Federal MCLs/RSLs	GWPS	GW-9	GW-19	GW-20	GW-23	GW-24	GW-25	GW-26			
Antimony	mg/L	Unknown	Poisson	0.00133	0.006	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.025	<0.005		<0.005	U
Arsenic	mg/L	Unknown	Poisson	0.00682	0.01	0.01	0.00067	0.11504	0.00187	0.0434	0.02458	0.0388	0.0174		0.00052	J
Barium	mg/L	Log–Normal	Parametric	0.0934	2	2	0.05822	1.19747	0.19031	14.4687	13.1897	10.3942	1.71966		0.08124	
Beryllium	mg/L	Unknown[c]	DQ[d]	NA	0.004	0.004	<0.0004	<0.0004	<0.0004	<0.0004	<0.002	<0.0004	0.00727		<0.0004	U
Cadmium	mg/L	Unknown[c]	DQ[d]	NA	0.005	0.005	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0085	<0.0017		<0.0017	U
T. Chromium	mg/L	Unknown[c]	DQ[d]	NA	0.1	0.1	<0.0072	<0.0072	<0.0072	<0.09	<0.09	<0.036	0.14025		<0.00072	U
Cobalt	mg/L	Unknown[c]	DQ[d]	NA	0.006	0.006	<0.002	<0.002	<0.002	0.00114	0.00126	0.00124	0.0476		<0.002	U
Fluoride	mg/L	Normal	Parametric	9.291	4	9.291	0.291	1.94	*5.894*	<0.1	<0.1	<0.1	1.701		8.154	
Lead	mg/L	Unknown[c]	DQ[d]	NA	0.015	0.015	<0.0018	<0.0018	<0.0018	<0.0225	<0.009	<0.009	0.04438		<0.0018	U
Lithium	mg/L	Normal	Parametric	0.023374	0.04	0.04	0.02056	0.02071	0.02028	0.08929	0.0607	0.05761	0.13566		0.02785	
Mercury	mg/L	Unknown	Poisson	0.00031	0.002	0.002	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075		<0.00075	U
Molybdenum	mg/L	Log–Normal	Parametric	0.006805	0.1	0.1	0.00126	0.00132	0.10538	0.00824	0.00523	0.01001	0.00886		<0.005	U
Selenium	mg/L	Unknown[c]	DQ[d]	NA	0.5	0.5	<0.0068	<0.0068	0.01288	<0.034	<0.034	<0.034	<0.085		<0.0068	U
Thallium	mg/L	Unknown[c]	DQ[d]	NA	0.002	0.002	<0.0006	<0.0006	<0.0006	<0.003	<0.0006	<0.003	0.00058		<0.0006	U
Sum Ra226+Ra228	pCi/L	Unknown	Poisson	0.58	5	5	<0.567	2.335	<0.488	107.6	55.6	38.4	0.6465		<0.5515	U

[a]Prediction Limits calculated using 5% alpha.

[b]Upper Prediction Limit used for all parameters.

[c]Data distribution set to Unknown if all values non-detect in upgradient well.

[d]DQ is Double Quantification Rule. If two successive, independent detected values occur, that would be an SSI and also an SSL if > GWPS. However, if value was detected in upgradient well during the same sampling event, would use Poisson PL instead.

#.#### = UPL > Result > MCL/RSL

= SSI < GWPS

= SSI > GWPS

= DQ Parameter with Verification Sampling Needed

TETRA TECH

Western Boundary							Event 17 (AM-7) Downgradient Wells								Event 17 (AM-7) Upgradient Well GW-7	
Parameter	Units	Data Distribution for Upgradient Well GW-7	UPL Type	UPL Value[a,b]	Federal MCLs/RSLs	GWPS	GW-27	GW-28	GW-29							
Antimony	mg/L	Unknown	Poisson	0.00133	0.006	0.006	<0.001	<0.001	0.00037						<0.001	U
Arsenic	mg/L	Unknown	Poisson	0.00682	0.01	0.01	0.00043	0.00437	0.01291						0.00059	
Barium	mg/L	Log–Normal	Parametric	0.0934	2	2	0.99025	0.19867	1.3291						0.07638	
Beryllium	mg/L	Unknown[c]	DQ[d]	NA	0.004	0.004	<0.0002	<0.0002	<0.001						<0.0002	U
Cadmium	mg/L	Unknown[c]	DQ[d]	NA	0.005	0.005	<0.0006	<0.0006	<0.0006						<0.0006	U
T. Chromium	mg/L	Unknown[c]	DQ[d]	NA	0.1	0.1	0.00034	<0.0015	<0.0075						0.00036	J
Cobalt	mg/L	Unknown[c]	DQ[d]	NA	0.006	0.006	0.0001	<0.001	0.00012						<0.001	U
Fluoride	mg/L	Normal	Parametric	9.291	4	9.291	0.322	2.12	1.3						8.36	
Lead	mg/L	Unknown[c]	DQ[d]	NA	0.015	0.015	<0.0005	<0.0005	<0.0005						<0.0005	U
Lithium	mg/L	Normal	Parametric	0.023374	0.04	0.04	0.01805	0.01989	0.04127						0.02755	
Mercury	mg/L	Unknown	Poisson	0.00031	0.002	0.002	<0.00075	<0.00075	<0.00075						<0.00075	U
Molybdenum	mg/L	Log–Normal	Parametric	0.006805	0.1	0.1	0.0043	0.03067	0.00409						<0.001	U
Selenium	mg/L	Unknown[c]	DQ[d]	NA	0.5	0.5	<0.003	<0.003	<0.0015						<0.003	U
Thallium	mg/L	Unknown[c]	DQ[d]	NA	0.002	0.002	<0.00018	<0.00018	<0.00018						<0.00018	U
Sum Ra226+Ra228[e]	pCi/L	Unknown	Poisson	0.58	5	5	NA	NA	NA						NA	

[a]Prediction Limits calculated using 5% alpha.

[b]Upper Prediction Limit used for all parameters.

[c]Data distribution set to Unknown if all values non-detect in upgradient well.

[d]DQ is Double Quantification Rule. If two successive, independent detected values occur, that would be an SSI and also an SSL if > GWPS. However, if value was detected in upgradient well during the same sampling event, would use Poisson PL instead.

[e]Radium not analyzed (NA) during Event AM-7.

#.#### = UPL > Result > MCL/RSL
= SSI < GWPS
= SSI > GWPS
= DQ Parameter with Verification Sampling Needed

Western Boundary							Event 18 (AM-8) Downgradient Wells								Event 18 (AM-8) Upgradient Well GW-7	
Parameter	Units	Data Distribution for Upgradient Well GW-7	UPL Type	UPL Value[a,b]	Federal MCLs/RSLs	GWPS	GW-27	GW-28	GW-29							
Antimony	mg/L	Unknown	Poisson	0.00133	0.006	0.006	<0.005	<0.005	<0.005						<0.005	U
Arsenic	mg/L	Unknown	Poisson	0.00682	0.01	0.01	<0.0013	0.00485	0.01062						0.00052	J
Barium	mg/L	Log–Normal	Parametric	0.0934	2	2	0.93473	0.24653	1.14405						0.08124	
Beryllium	mg/L	Unknown[c]	DQ[d]	NA	0.004	0.004	<0.0004	<0.0004	<0.0004						<0.0004	U
Cadmium	mg/L	Unknown[c]	DQ[d]	NA	0.005	0.005	<0.0017	<0.0017	<0.0017						<0.0017	U
T. Chromium	mg/L	Unknown[c]	DQ[d]	NA	0.1	0.1	<0.0072	<0.0072	<0.036						<0.00072	U
Cobalt	mg/L	Unknown[c]	DQ[d]	NA	0.006	0.006	<0.002	<0.002	<0.002						<0.002	U
Fluoride	mg/L	Normal	Parametric	9.291	4	9.291	0.324	2.007	1.267						8.154	
Lead	mg/L	Unknown[c]	DQ[d]	NA	0.015	0.015	<0.0018	<0.0018	<0.0018						<0.0018	U
Lithium	mg/L	Normal	Parametric	0.023374	0.04	0.04	0.01732	0.0252	0.05314						0.02785	
Mercury	mg/L	Unknown	Poisson	0.00031	0.002	0.002	<0.00075	<0.00075	<0.00075						<0.00075	U
Molybdenum	mg/L	Log–Normal	Parametric	0.006805	0.1	0.1	0.00473	0.03656	0.00762						<0.005	U
Selenium	mg/L	Unknown[c]	DQ[d]	NA	0.5	0.5	<0.0068	<0.0068	<0.0068						<0.0068	U
Thallium	mg/L	Unknown[c]	DQ[d]	NA	0.002	0.002	<0.0006	<0.0006	<0.0006						<0.0006	U
Sum Ra226+Ra228	pCi/L	Unknown	Poisson	0.58	5	5	13.2	<0.893	<1.465						<0.5515	U

[a]Prediction Limits calculated using 5% alpha.

[b]Upper Prediction Limit used for all parameters.

[c]Data distribution set to Unknown if all values non-detect in upgradient well.

[d]DQ is Double Quantification Rule. If two successive, independent detected values occur, that would be an SSI and also an SSL if > GWPS. However, if value was detected in upgradient well during the same sampling event, would use Poisson PL instead.

#.#### = UPL > Result > MCL/RSL
= SSI < GWPS
= SSI > GWPS
= DQ Parameter with Verification Sampling Needed

TETRA TECH

FIGURES

PGH P:\GIS\FIRST_ENERGY\MAPDOCS\PLEASANTS_POWER_STATION\PLEASANTS_CCR_GWMONITORING_2021_02FEB_20220121.MXD 1/31/2022 TIM.TEAFORD

References:
1. Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (©2021 ESRI and its data suppliers).
2. Contours obtained from the West Virginia GIS Technical Center.
3. Monitoring well locations were obtained from "Groundwater Quality at the Pleasants and Willow Island Power Plants, Pleasants County, West Virginia"; EPRI Research Project: 9106; Site Investigation Report; dated April 1999.
4. Approximate Waste Boundary lines were obtained from FirstEnergy Drawing Nos. C7950106, Rev. A (Sheets 1 and 2) and C79508868, Rev. A.
5. Approximate Parcel Boundary obtained from FirstEnergy Drawing No. C7950064, Rev. A (Sheets 1 through 3), dated 2/14/1997.
6. Monitoring wells GW-21 through GW-29 were installed by Tetra Tech, Inc. in July/August 2016. As-built well locations were obtained by field survey performed by Tetra Tech, Inc. on 8-12-2016.
7. Monitoring wells GW-31 through GW-34 were installed by Tetra Tech, Inc. from August to December 2021.
8. Groundwater elevations from February 2021 were used to generate contours.
9. Groundwater elevations from April 2021 were not used to generate contours. However, groundwater elevation contours were inferred from historical data where February measurements were not collected.

GW-31 (New Well - Not Part of 2021 CCR Program)

In November 2021, AESC Acquired 83.4 Acres of Adjoining Property Along This Portion of Facility Boundary

GW-19 (716.10)

GW-26 (NM)

GW-9 (689.38)

GW-3* (NM)

GW-25 (710.65)

GW-4* (789.40)

Sedimentation Ponds

GW-16A** (651.74)

GW-27 (666.53)

MP-4** (647.80)

GW-17** (652.41)

McElroy's Run Landfill

MP-3** (642.60)

GW-28 (678.15)

GW-24 (706.66)

GW-23 (657.41)

GW-32 (New Well - Not Part of 2021 CCR Program)

GW-8** (758.10)

GW-29 (788.28)

GW-12** (666.50)

MP-1B* (858.75)

McElroy's Run Disposal Impoundment

GW-20* (829.69)

GW-33A (New Well - Not Part of 2021 CCR Program)

GW-5* (890.96)

GW-7 (890.40)

GW-22 (739.78)

GW-21 (807.21)

GW-34 (New Well - Not Part of 2021 CCR Program)

N

1,000 0 1,000 Feet

Legend

- Pre-CCR Rule Monitoring Well
- Post-CCR Rule Monitoring Well
- GW-# CCR Monitoring Well

Monitoring Wells Not Used For Contouring

- GW-#* Not Used For Contouring Due To Different Groundwater Flow Zone Being Monitored
- GW-#** Non-CCR Well Groundwater Elevation From 4/2021
- Approximate Waste Boundary
- Approximate Parcel Boundary
- Groundwater Elevation Contour (50-foot)
- (790.17) Groundwater Elevation February 2021 (NM = Not Monitored)
- Grafton Sandstone Outcrop
- Interpreted Groundwater Flow Direction
- Topographic Contour (10-foot)

Geologic Unit Groupings

- Lower Connellsville SS/ Lower Clarksburg RB
- Morgantown SS/Birmingham RB
- Birmingham RB/Grafton SS/ Ames LS
- Grafton SS
- Ames LS/Jane Lew SS/ Pittsburgh RB
- Saltsburg SS/Alluvium

TETRA TECH

CCR RULE GROUNDWATER MONITORING SYSTEM
INTERPRETED GROUNDWATER FLOW FEBRUARY 2021
PLEASANTS POWER STATION
McELROY'S RUN CCB DISPOSAL FACILITY

ALLEGHENY ENERGY SUPPLY COMPANY
GREENSBURG, PENNSYLVANIA

DRAWN BY: T. TEAFORD 01/31/2022
CHECKED BY: J. MARLOW 01/31/2022
APPROVED BY: B. BAKER 01/31/2022

CONTRACT NUMBER: 212C-SW-00070

FIGURE NUMBER 2-1

REVISION 0

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References:
1. Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (©2021 ESRI and its data suppliers).
2. Contours obtained from the West Virginia GIS Technical Center.
3. Monitoring well locations were obtained from "Groundwater Quality at the Pleasants and Willow Island Power Plants, Pleasants County, West Virginia"; EPRI Research Project: 9106; Site Investigation Report; dated April 1999.
4. Approximate Waste Boundary lines were obtained from FirstEnergy Drawing Nos. C7950106, Rev. A (Sheets 1 and 2) and C79508868, Rev. A.
5. Approximate Parcel Boundary obtained from FirstEnergy Drawing No. C7950064, Rev. A (Sheets 1 through 3), dated 2/14/1997.
6. Monitoring wells GW-21 through GW-29 were installed by Tetra Tech, Inc. in July/August 2016. As-built well locations were obtained by field survey performed by Tetra Tech, Inc. on 8-12-2016.
7. Monitoring wells GW-31 through GW-34 were installed by Tetra Tech, Inc. from August to December 2021.
8. Groundwater elevations from September 2021 were used to generate contours.
9. Groundwater elevations from November 2021 were not used to generate contours. However, groundwater elevation contours were inferred from historical data where September measurements were not collected.

GW-31 (New Well - Not Part of 2021 CCR Program)

In November 2021, AESC Acquired 83.4 Acres of Adjoining Property Along This Portion of Facility Boundary

GW-19 (716.42)
GW-26 (704.27)
GW-9 (687.80)
GW-3* (NM)
GW-25 (710.87)
GW-4* (819.59)
Sedimentation Ponds
GW-16A** (652.13)
GW-27 (666.28)
MP-4** (647.55)
GW-17** (652.43)
McElroy's Run Landfill
GW-28 (677.92)
MP-3** (642.58)
GW-24 (710.21)
GW-23 (665.63)
GW-32 (New Well - Not Part of 2021 CCR Program)
GW-12** (661.99)
GW-8** (762.12)
GW-29 (787.55)
GW-20* (830.49)
MP-1B* (849.06)
McElroy's Run Disposal Impoundment
GW-5* (891.35)
GW-33A (New Well - Not Part of 2021 CCR Program)
GW-7 (890.40)
GW-22 (738.45)
GW-21 (807.57)
GW-34 (New Well - Not Part of 2021 CCR Program)

Legend

- Pre-CCR Rule Monitoring Well
- Post-CCR Rule Monitoring Well
- GW-# CCR Monitoring Well

Monitoring Wells Not Used For Contouring

- GW-#* Not Used For Contouring Due To Different Groundwater Flow Zone Being Monitored
- GW-#** Non-CCR Well Groundwater Elevation From 11/2021

- Approximate Waste Boundary
- Approximate Parcel Boundary
- Groundwater Elevation Contour (50-foot)
- (790.17) Groundwater Elevation September 2021 (NM = Not Monitored)
- Grafton Sandstone Outcrop
- Interpreted Groundwater Flow Direction
- Topographic Contour (10-foot)

Geologic Unit Groupings

- Lower Connellsville SS/ Lower Clarksburg RB
- Morgantown SS/Birmingham RB
- Birmingham RB/Grafton SS/ Ames LS
- Grafton SS
- Ames LS/Jane Lew SS/ Pittsburgh RB
- Saltsburg SS/Alluvium

1,000 0 1,000 Feet

TETRA TECH

CCR RULE GROUNDWATER MONITORING SYSTEM
INTERPRETED GROUNDWATER FLOW SEPTEMBER 2021
PLEASANTS POWER STATION
McELROY'S RUN CCB DISPOSAL FACILITY

ALLEGHENY ENERGY SUPPLY COMPANY
GREENSBURG, PENNSYLVANIA

DRAWN BY: T. TEAFORD 01/31/2022
CHECKED BY: J. MARLOW 01/31/2022
APPROVED BY: B. BAKER 01/31/2022

CONTRACT NUMBER: 212C-SW-00070

FIGURE NUMBER 2-2

REVISION 0

ATTACHMENT A

Tetra Tech, Inc.
661 Andersen Drive, Suite 2
Pittsburgh, PA 15220
Telephone: 412-921-7096

WELL NUMBER GW-31

CLIENT FirstEnergy
PROJECT NAME McElroy's Run CCB Disposal Facility
PROJECT NUMBER 212C-SW-00070
PROJECT LOCATION Pleasants County, WV
DATE STARTED 10/11/21 **COMPLETED** 10/13/21
GROUND ELEVATION 1043.5 ft **HOLE SIZE** 10" OB / 6" BR
DRILLING CONTRACTOR Eichelberger's
GROUND WATER LEVELS:
DRILLING METHOD Air Rotary
AT TIME OF DRILLING 187.00 ft / Elev 856.50 ft
LOGGED BY J. Clara **CHECKED BY** T. Higby
AT END OF DRILLING ---
NOTES 8-Inch Steel casing (0-20' bgs) grouted in place
24hrs AFTER DRILLING 329.25 ft / Elev 714.25 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION		Environmental Data	WELL DIAGRAM
0						8-Inch Steel Stickup
			SANDY CLAY, stiff, moist, medium plasticity, brownish orange.			4-Inch PVC Stickup
				4.0 / 1039.5		
5			SANDSTONE, soft, medium grained, tan.			
10				11.0 / 1032.5		8-Inch Steel Casing (0'-20')
			CLAYSTONE, soft, fine grained, red.			
				14.0 / 1029.5		
15			SILTSTONE, soft, fine grained, brown.			
				16.0 / 1027.5		
			SANDSTONE, soft, medium grained, tan to brown.			
20				23.0 / 1020.5		
			SILTSTONE, soft, fine grained, tan.	24.0 / 1019.5		
25			CLAYSTONE, soft, fine grained, light brown.			4-Inch Schedule 80 PVC Riser (0'-340')
				26.0 / 1017.5		
			SILTSTONE, soft, fine grained, purple.			
				28.0 / 1015.5		
30			CLAYSTONE, soft, fine grained, light brown.			
				32.0 / 1011.5		
			SILTSTONE, soft, fine grained, purple.			
				34.0 / 1009.5		
35			LIMESTONE, hard, fine grained, gray, strong HCL reaction.	35.0 / 1008.5		

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101017 GEOTECH - GINT STD US.GDT - 1/28/22 14:43 - O:\SE PROJECTS\2015\PROJECTS\212C-SW-00070 FE - CCR RULE GW COMPLIANCE (PLEASANTS)\GROUNDWATER\NEW CCR WELLS\2021 FIELD NOTES\BORING LOGS\GINT LOGS\FE MCELROY'S CCR.GPJ

Tetra Tech, Inc.
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Telephone: 412-921-7096

WELL NUMBER GW-31

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
35			CLAYSTONE, soft, fine grained, red.		
			37.0 1006.5		
			SANDSTONE, medium hard, medium grained, tan.		
40					
			44.0 999.5		
			LIMESTONE, hard, fine grained, gray, strong HCL reaction.		
45					
			48.0 995.5		
			SILTSTONE w/ interbedded LIMESTONE, soft-hard, fine grained, gray, moderate HCL reaction.		
50					
55					
60			60.0 983.5		
			CLAYSTONE, soft, fine grained, brown to red.		
65					
			68.0 975.5		
			SILTSTONE, soft, fine grained, light red.		
70					
			71.0 972.5		
			LIMESTONE, hard, fine grained, gray, strong HCL reaction.		
			73.0 970.5		
			SHALE, soft, fine grained, fissile, red.		
75					

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101017 GEOTECH - GINT STD US.GDT - 1/28/22 14:43 - O:\SE PROJECTS\2015\PROJECTS\212C-SW-00070 FE - CCR RULE GW COMPLIANCE (PLEASANTS)\GROUNDWATER\NEW CCR WELLS\2021 FIELD NOTES\BORING LOGS\GINT LOGS\FE MCELROY'S CCR.GPJ

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WELL NUMBER GW-31

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
75			SHALE, soft, fine grained, fissile, red. *(continued)*		
			76.0 967.5		
			SILTSTONE, soft, fine grained, purple.		
80					
85					
90			90.0 953.5		
			SANDSTONE to SILTY SANDSTONE, medium hard, fine to medium grained, green gray, micaceous (muscovite/biotite)		
95					
100					
105					
110			110.0 933.5		
			SHALEY SILTSTONE, w/ trace red CLAYSTONE, soft to hard, fine grained, green to olive.		
			petroleum hydrocarbon odor @ 120'.		
115					

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WELL NUMBER GW-31

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
115			SHALEY SILTSTONE, w/ trace red CLAYSTONE, soft to hard, fine grained, green to olive. petroleum hydrocarbon odor @ 120'. *(continued)*	PID = 0.2	
120					
125					
130			130.0		
			SANDSTONE, minor green SILTSTONE, soft-medium hard, medium grained, tan. more sandy @ 140'. no siltstone @ 160'.		
135					
140					
145					
150					
155					

(Continued Next Page)

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WELL NUMBER GW-31

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
155			SANDSTONE, minor green SILTSTONE, soft-medium hard, medium grained, tan. more sandy @ 140'. no siltstone @ 160'. *(continued)*		
160			160.0 883.5 SANDSTONE (MORGANTOWN), medium hard, medium grained, greenish gray. becoming shaley @ 171'.		
165					Benseal EZ-Mud Slurry (0'-326')
170					
175					
180			180.0 863.5 SHALEY LIMESTONE, hard, fine grained, green gray, moderate HCL reaction.		
185			▽ 188.0 855.5		
190			CLAYSTONE and SILTSTONE, soft to hard, fine grained, red.		
195			194.0 849.5		

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101017 GEOTECH - GINT STD US.GDT - 1/28/22 14:43 - O:\SE PROJECTS\2015\PROJECTS\212C-SW-00070 FE - CCR RULE GW COMPLIANCE (PLEASANTS)\GROUNDWATER\NEW CCR WELLS\2021 FIELD NOTES\BORING LOGS\GINT LOGS\FE MCELROY'S CCR.GPJ

Tetra Tech, Inc.
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Pittsburgh, PA 15220
Telephone: 412-921-7096

WELL NUMBER GW-31

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
195			SHALEY SILTSTONE, hard, fine grained, green gray. 1/8 gal of water @ 187'. *(continued)*		
200			201.0 842.5 LIMEY SANDSTONE, medium hard, medium grained, green gray, moderate HCL reaction.		
205			204.0 839.5 SILTSTONE, hard, fine grained, green and purple.		
210					
215					
220					
225					
230			229.0 814.5 Loss of Returns (Air, Cuttings, and Water) from 229-255.		
235					

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101017 GEOTECH - GINT STD US.GDT - 1/28/22 14:43 - O:\SE PROJECTS\2015\PROJECTS\212C-SW-00070 FE - CCR RULE GW COMPLIANCE (PLEASANTS)\GROUNDWATER\NEW CCR WELLS\2021 FIELD NOTES\BORING LOGS\GINT LOGS\FE MCELROY'S CCR.GPJ

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WELL NUMBER GW-31

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
235			Loss of Returns (Air, Cuttings, and Water) from 229-255. *(continued)*		
240					
245					
250					
255			255.0 788.5 SILTSTONE, hard, fine grained, green.		
260					
265			265.0 778.5 SHALEY LIMESTONE, hard, fine grained, green, strong HCL reaction.		
270					
275			271.0 772.5 SILTSTONE, hard, fine grained, green.		

(Continued Next Page)

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WELL NUMBER GW-31

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
275			SILTSTONE, hard, fine grained, green. *(continued)*		
			279.0 764.5		
280			SANDSTONE, medium hard, medium grained, greenish gray.		
			becoming shaley @ 291'.		
285					
290					
295			295.0 748.5		
			SHALE, soft, fine grained, fissile, red.		
300					
			304.0 739.5		
305			SANDY SILTSTONE, hard, fine to medium grained, green.		
			more sandy @ 315'.		
			more shaley @ 322'.		
310					
315					

(Continued Next Page)

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WELL NUMBER GW-31

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
315			SANDY SILTSTONE, hard, fine to medium grained, green.		
			more sandy @ 315'.		
			more shaley @ 322'. *(continued)*		
320					
325					
330					Bentonite Seal (326'-333')
335			335.0	PID = 6.2	
			SANDSTONE (GRAFTON), medium hard, medium grained, green gray.		
			petroleum hydrocarbon odor @ 333'.	PID = 23.5	
			micaceous (muscovite) @ 335'		
			coarser @ 348'.	PID = 28.6	
340			very strong petroleum hydrocarbon odor @ 350', used fan to divert air.	PID = 60.8	
			biotite @ 356'.		
345				PID = 104.6	
				PID = 143.7	20-40 Silica Sand Filter Pack (333'-360')
350					0.010 Screened Interval (340'-360')
				PID = 233.5	
355			708.5		

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Tetra Tech, Inc.
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Telephone: 412-921-7096

WELL NUMBER GW-31

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
355					
360				PID = 325	Slough
			360.8 682.7		
			361.0 LIMESTONE (AMES), hard, fine grained, gray, strong HCL reaction. 682.5		
			Bottom of borehole at 361.0 feet.		

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WELL NUMBER GW-32

CLIENT FirstEnergy
PROJECT NAME McElroy's Run CCB Disposal Facility
PROJECT NUMBER 212C-SW-00070
PROJECT LOCATION Pleasants County, WV
DATE STARTED 9/7/21 **COMPLETED** 10/20/21
GROUND ELEVATION 941 ft **HOLE SIZE** 10" OB / 6" BR
DRILLING CONTRACTOR Eichelberger's
GROUND WATER LEVELS:
DRILLING METHOD Air Rotary
AT TIME OF DRILLING 70.00 ft / Elev 871.00 ft
LOGGED BY J. Clara **CHECKED BY** T. Higby
AT END OF DRILLING ---
NOTES 8-Inch Steel casing (0-20' bgs) grouted in place
288hrs AFTER DRILLING 400.50 ft / Elev 540.50 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
0			CLAY, stiff, fine grained, fat, yellowish brown.		8-Inch Steel Stickup; 4-Inch PVC Stickup
3.0				938.0	
			CLAYSTONE, soft, fine grained, brown.		
12.0				929.0	8-Inch Steel Casing (0'-20')
			SILTY SANDSTONE, soft to hard, medium grained, gray.		
20.0				921.0	
			LIMEY SANDSTONE, hard, fine to medium grained, micaceous, strong HCL reaction, gray.		4-Inch Schedule 80 PVC Riser (0'-404')
35.0				906.0	

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WELL NUMBER GW-32

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
35			SILTSTONE, soft, fine grained, dark brown.		
			39.0 902.0		
40			CLAYSTONE, soft, fine grained, red.		
45					
50					
55					
			59.0 882.0		
60			SILTSTONE, soft, fine grained, green.		
65					
			66.0 875.0		
			CLAYSTONE, soft, fine grained, red.		
			1/2 gal of water @ 70'		
70			▽		
			71.0 870.0		
			SILTY SANDSTONE, soft, fine to medium grained, brown.		
			74.0 867.0		
75			SILTY SANDSTONE, soft, fine to medium grained, gray.		

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WELL NUMBER GW-32

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
75			SILTY SANDSTONE, soft, fine to medium grained, gray. *(continued)*		
80			84.0 857.0		
85			SHALEY SANDSTONE, soft, fine to medium grained, dark gray.		
90			94.0 847.0		
95			SILTSTONE, hard, fine grained, green.		
			98.0 843.0		
100			SHALEY SILTSTONE, soft, fine grained, purple.		
			100.0 841.0		
105			SANDY SILTSTONE to SILTSTONE, soft, fine grained, green.		
110					
115					

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WELL NUMBER GW-32

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
115			SANDY SILTSTONE to SILTSTONE, soft, fine grained, green. *(continued)*		
			117.0 824.0		
			CLAYSTONE, soft, fine grained, red.		
120			123.0 818.0		
			SHALEY SILTSTONE, soft, fine grained, gray.		
125					
130			130.0 811.0		
			SILTY SANDSTONE, hard, medium grained, green w/ variegated purple and tan.		
			more silty @ 142'.		
			more sandy @ 154'.		
135			micaceous @ 163'.		
140					
145					
150					
155					

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WELL NUMBER GW-32

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PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
155			SILTY SANDSTONE, hard, medium grained, green w/ variegated purple and tan. more silty @ 142'. more sandy @ 154'. micaceous @ 163'. *(continued)*		
160					
165					
170					
175			175.0 766.0 SILTY SANDSTONE to SANDY SILTSTONE, hard, fine to medium grained, green w/ variegated purple and brown more silty @ 190'. micaceous @ 230'.		
180					
185					
190					
195					

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WELL NUMBER GW-32

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
195			SILTY SANDSTONE to SANDY SILTSTONE, hard, fine to medium grained, green w/ variegated purple and brown more silty @ 190'. micaceous @ 230'. *(continued)*		Benseal EZ-Mud Slurry (0'-390')
200					
205					
210					
215					
220					
225					
230					
235					

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WELL NUMBER GW-32

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
235			SILTY SANDSTONE to SANDY SILTSTONE, hard, fine to medium grained, green w/ variegated purple and brown more silty @ 190'. micaceous @ 230'. *(continued)*		
240			240.0 — 701.0 SILTY SANDSTONE w/ interbedded SHALE, soft to hard, fine to medium grained, variegated dark gray, green, and purple.		
245					
250			250.0 — 691.0 SILTY SANDSTONE, hard, fine to medium grained, green w/ variegated purple, brown, and tan.		
255					
260			260.0 — 681.0 SILTY SANDSTONE and LIMESTONE, hard, fine to medium grained, strong HCL reaction, gray and green.		
265					
270					
275					

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WELL NUMBER GW-32

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
275			SILTY SANDSTONE and LIMESTONE, hard, fine to medium grained, strong HCL reaction, gray and green. *(continued)*		
280					
285					
290					
			294.0 647.0		
295			SILTY SANDSTONE w/ trace CLAYSTONE, soft to hard, fine to medium grained, green, purple, and red. more clayey @ 310.		
300					
305					
310					
315					

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WELL NUMBER GW-32

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PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
315			SILTY SANDSTONE w/ trace CLAYSTONE, soft to hard, fine to medium grained, green, purple, and red.		
320			more clayey @ 310. *(continued)*		
325					
330					
335			335.0		
340			SILTSTONE, hard, fine grained, green.		
345			342.0 — 599.0 SANDSTONE to SILTY SANDSTONE, hard, medium grained, greenish gray. micaceous @ 340'. more silty @ 352'. limey @ 359'.		
350					
355					

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PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
355			SANDSTONE to SILTY SANDSTONE, hard, medium grained, greenish gray. micaceous @ 340'. more silty @ 352'. limey @ 359'. *(continued)*		
360					
365					
			367.0		
			SHALEY SILTSTONE, soft to hard, fine grained, dark green.		
370					
			372.0		
			SILTY SANDSTONE, hard, fine to medium grained, green.		
375					
380					
385					
390			390.0		
			SHALEY SILTSTONE, hard, fine grained, gray.		
395					Bentonite Seal (390'-398')

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WELL NUMBER GW-32

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PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
395			SHALEY SILTSTONE, hard, fine grained, gray. *(continued)*		
400			402.0		
405			SILTY SANDSTONE (GRAFTON), hard, medium grained, micaceous, greenish gray. more sandy @ 410'. pyritic @ 410'. petroleum hydrocarbon odor @ 410'-424'. larger fragments @ 420'.	PID = 22.5	20-40 Silica Sand Filter Pack (398'-426')
410					
415				PID = 27.8	0.010 Screened Interval (404'-424')
420				PID = 105.8 PID = 265.8	
425			425.5	PID = 288.8 PID = 305.6	
430			LIMESTONE (AMES), hard, fine grained, gray, strong HCL reaction.		
435			539.0		

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PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
435			LIMESTONE (AMES), hard, fine grained, gray, strong HCL reaction. *(continued)*		Bentonite Seal (426'-447')
440					
445			447.0 494.0		

Bottom of borehole at 447.0 feet.

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WELL NUMBER GW-33A

CLIENT FirstEnergy
PROJECT NAME McElroy's Run CCB Disposal Facility
PROJECT NUMBER 212C-SW-00070
PROJECT LOCATION Pleasants County, WV
DATE STARTED 10/5/21 **COMPLETED** 11/3/21
GROUND ELEVATION 1063 ft **HOLE SIZE** 10" OB / 6" BR
DRILLING CONTRACTOR Eichelberger's
GROUND WATER LEVELS:
DRILLING METHOD Air Rotary
AT TIME OF DRILLING 130.00 ft / Elev 933.00 ft
LOGGED BY J. Clara **CHECKED BY** T. Higby
AT END OF DRILLING ---
NOTES 8-Inch Steel casing (0-20' bgs) grouted in place
360hrs AFTER DRILLING 447.78 ft / Elev 615.22 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
0			SILTY CLAY, stiff, moist, medium plasticity, brownish orange.		8-Inch Steel Stickup; 4-Inch PVC Stickup
4.0			1059.0		
5			CLAYSTONE, soft, fine grained, brown and red.		
10					8-Inch Steel Casing
15					
17.0			1046.0		
			SILTSTONE, soft, fine grained, red.		
20			20.0 1043.0		
			CLAYSTONE, soft, fine grained, yellow.		
22.0			1041.0		
			SILTSTONE, soft, fine grained, green and gray.		
25					4-Inch PVC Schedule 80
28.0			1035.0		
			SHALEY SILTSTONE, soft, fine grained, gray.		
30					
35					

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WELL NUMBER GW-33A

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION		Environmental Data	WELL DIAGRAM
35			SHALEY SILTSTONE, soft, fine grained, gray. *(continued)*			
			36.0	1027.0		
			SANDSTONE, medium hard, medium grained, greenish gray.			
40						
			43.0	1020.0		
			CLAYSTONE, soft, fine grained, red.			
45			46.0	1017.0		
			SILTSTONE, soft, fine grained, greenish gray.			
			48.0	1015.0		
			LIMESTONE, medium hard, fine grained, gray, strong HCL reaction.			
50			51.0	1012.0		
			CLAYSTONE and SILTSTONE, soft, fine grained, light red to dark red, alternating sequence.			
55						
60						
65						
70						
75						

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WELL NUMBER GW-33A

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
75			76.0 987.0 SILTSTONE, hard, fine grained, purple. 79.0 984.0		
80			CLAYSTONE, soft, fine grained, red.		
85					
90					
			92.0 971.0 SHALE, soft, fine grained, fissile, red.		
95					
100					
			101.0 962.0 SANDY SILTSTONE w/ trace CLAYSTONE, soft to hard, fine grained, green and red. 104.0 959.0		
105			SHALEY SILTSTONE, w/ trace CLAYSTONE, soft to hard, fine grained, green and red.		
110					
			111.0 952.0 SANDSTONE and LIMESTONE, medium hard to hard, medium grained, greenish gray, strong HCL reaction, micaceous throughout. Shaley @ 115'.		
115					

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WELL NUMBER GW-33A

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
115			SANDSTONE and LIMESTONE, medium hard to hard, medium grained, greenish gray, strong HCL reaction, micaceous throughout. Shaley @ 115'. *(continued)*		
120			121.0 942.0		
125			SILTSTONE, w/ trace CLAYSTONE, soft to hard, fine grained, green and red. 1/2 gpm @ ~ 130.		
130			▽		
135			134.0 929.0 SILTSTONE to SANDY SILTSTONE, hard, fine grained, variegated purple, green, and olive. more silty @ 148'. more sandy/coarsening @ 158.		
140					
145					
150					
155					

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WELL NUMBER GW-33A

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
155			SILTSTONE to SANDY SILTSTONE, hard, fine grained, variegated purple, green, and olive. more silty @ 148'. more sandy/coarsening @ 158. *(continued)*		
			159.0 — 904.0		
160			LIMEY SANDSTONE, hard, medium grained, greenish gray, strong HCL reaction.		
			164.0 — 899.0		
165			SANDY SILTSTONE to SHALEY SILTSTONE, hard, fine grained, green and purple. more shaley @ 174.		
170					
175					
			178.0 — 885.0		
180			SILTSTONE, hard, fine grained, green and purple.		
185					
190					
195					

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WELL NUMBER GW-33A

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
195			SILTSTONE, hard, fine grained, green and purple. *(continued)*		
200					
205					
210					
215					Benseal EZ-Mud Slurry
			219.0	844.0	
220			SHALEY SILTSTONE to SANDY SILTSTONE, hard, fine grained, green.		
			minor limestone nodules @ 226-232. moderate HCL reaction.		
			more sandy @ 232.		
			pyritic @ 235.		
225					
230					
235					

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WELL NUMBER GW-33A

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
235					
			239.0 824.0 SHALEY SANDSTONE to SANDSTONE, soft to hard, medium grained, green.		
240			more sandy @ 251'.		
245					
250					
			254.0 809.0 LIMESTONE w/ interbedded SANDSTONE, hard, medium grained, greenish gray, strong HCL reaction.		
255					
260			260.0 803.0 SILTY SANDSTONE to SANDY SILTSTONE, hard, fine to medium grained, green and purple.		
			more sandy @ 272'.		
			more silty @ 283'.		
265			more sandy @ 302'.		
270					
275					

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WELL NUMBER GW-33A

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
275			SILTY SANDSTONE to SANDY SILTSTONE, hard, fine to medium grained, green and purple.		
			more sandy @ 272'.		
			more silty @ 283'.		
280			more sandy @ 302'. *(continued)*		
285					
290					
295					
300					
305					
310			310.0 753.0		
			SHALEY SILTSTONE, hard, fine grained, green.		
315			315.0 748.0		

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WELL NUMBER GW-33A

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
315			SHALEY SILTSTONE and LIMESTONE, hard to very hard, fine grained, greenish gray, moderate HCL reaction.		
320			320.0		
			SHALEY SILTSTONE to SANDY SILTSTONE, hard, fine to medium grained, green and purple.		
			more sandy @ 334'.		
			more shaley @ 356'.		
325			trace red claystone fragments beginning @ 380'.		
			more sandy @ 386'.		
			more shaley @ 400'.		
			more sandy @ 416, micaceous and trace pyrite.		
330			more shaley @ 425'.		
			petroleum hydrocarbon odor @ 431'.		
335					
340					
345					
350					
355					

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WELL NUMBER GW-33A

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
355			SHALEY SILTSTONE to SANDY SILTSTONE, hard, fine to medium grained, green and purple.		
			more sandy @ 334'.		
			more shaley @ 356'.		
360			trace red claystone fragments beginning @ 380'.		
			more sandy @ 386'.		
			more shaley @ 400'.		
			more sandy @ 416, micaceous and trace pyrite.		
365			more shaley @ 425'.		
			petroleum hydrocarbon odor @ 431'. *(continued)*		
370					
375					
380					
385					
390					
395					

(Continued Next Page)

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WELL NUMBER GW-33A

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
395			SHALEY SILTSTONE to SANDY SILTSTONE, hard, fine to medium grained, green and purple.		
			more sandy @ 334'.		
			more shaley @ 356'.		
400			trace red claystone fragments beginning @ 380'.		
			more sandy @ 386'.		
			more shaley @ 400'.		
			more sandy @ 416, micaceous and trace pyrite.		
405			more shaley @ 425'.		
			petroleum hydrocarbon odor @ 431'. *(continued)*		
410					
415					
420					
425					
430					Bentonite Seal
			433.0 630.0	PID = 6.2	
435					20-40 Silica

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WELL NUMBER GW-33A

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
435			SILTY SANDSTONE to SANDSTONE (MORGANTOWN), medium hard to hard, medium grained, greenish gray.	PID = 23.5	Sand Filter Pack
			coarsening @ 441'.		
			sheen @ 450'. *(continued)*	PID = 28.6	
440				PID = 33.8	
				PID = 60.8	
445				PID = 104.6	
				PID = 143	
450					
				PID = 235	0.010-Inch Screened Interval
			454.0 609.0		
455			SHALEY SILTSTONE (MORGANTOWN), hard, fine grained, green.		
			larger fragments @ 457'.	PID = 325	
460					
465			468.0 595.0		Slough
			469.0 594.0		
			LIMESTONE (ELK LICK), hard, fine grained, gray, strong HCL reaction.		
			Bottom of borehole at 469.0 feet.		

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WELL NUMBER GW-33B

CLIENT FirstEnergy
PROJECT NAME McElroy's Run CCB Disposal Facility
PROJECT NUMBER 212C-SW-00070
PROJECT LOCATION Pleasants County, WV
DATE STARTED 8/19/21 **COMPLETED** 11/19/21
GROUND ELEVATION 1063 ft **HOLE SIZE** 10" OB / 6" BR
DRILLING CONTRACTOR Eichelberger's
GROUND WATER LEVELS:
DRILLING METHOD Air Rotary
AT TIME OF DRILLING 145.00 ft / Elev 918.00 ft
LOGGED BY J. Clara **CHECKED BY** T. Higby
AT END OF DRILLING 468.00 ft / Elev 595.00 ft
NOTES Borehole was abandoned with Benseal/EZ Mud Slurry on 11/19/21.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
0			SILTY CLAY, stiff, moist, medium plasticity, brownish orange.		8-Inch Steel Casing (-1'-20'), cut below grade
			3.0 1060.0		
			CLAYSTONE, soft, fine grained, brown.		
5					
10					
15					
			16.0 1047.0		
			SILTSTONE, soft, fine grained, green.		Benseal EZ-Mud Slurry (0'-650')
20					
			22.0 1041.0		
			CLAYSTONE, soft, fine grained, brown to light brown.		
			24.0 1039.0		
25			SANDSTONE, soft, medium grained, tan.		
			27.0 1036.0		
			SILTSTONE, soft, fine grained, light green.		
			28.0 1035.0		
			CLAYSTONE, soft, fine grained, brown.		
30					
			32.0 1031.0		
			SILTSTONE, soft, fine grained, olive.		
			34.0 1029.0		
35			CLAYSTONE, soft to hard, fine grained, brown to red.		

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CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
35			CLAYSTONE, soft to hard, fine grained, brown to red. *(continued)*		
50			50.0 1013.0		
			LIMESTONE, hard, fine grained, gray, strong HCL reaction.		
			54.0 1009.0		
55			SILTSTONE, soft, fine grained, light red.		
			56.0 1007.0		
			CLAYSTONE, soft, fine grained, red.		
			59.0 1004.0		
60			SILTSTONE, soft, fine grained, light red.		
			61.0 1002.0		
			CLAYSTONE, soft, fine grained, red.		
			63.0 1000.0		
			SILTSTONE, soft, fine grained, light red.		
65			65.0 998.0		
			LIMESTONE, hard, fine grained, gray, strong HCL reaction.		
70			70.0 993.0		
			CLAYSTONE, soft, fine grained, red.		
75					

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WELL NUMBER GW-33B

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
75			CLAYSTONE, soft, fine grained, red. *(continued)*		
93.0				970.0	
			SILTSTONE, hard, fine grained, light red.		
98.0				965.0	
			CLAYSTONE, soft, fine grained, red.		
110.0				953.0	
			SILTSTONE w/ interbedded SHALE, soft to hard, fine grained, gray to dark gray.		
114.0				949.0	
			SHALEY SILTSTONE, soft, dark gray.		

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WELL NUMBER GW-33B

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
115			SHALEY SILTSTONE, soft, dark gray. *(continued)*		
120			122.0 941.0		
125			LIMESTONE w/ interbedded SHALE, hard, fine grained, gray.		
130					
135					
140					
145			144.0 919.0 CLAYSTONE, soft, fine grained, red. ▽ 1/2 gpm @ 145'.		
150			150.0 913.0 SILTSTONE, w/ trace red CLAYSTONE, soft to hard, fine grained, green.		
155					

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DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
155			SILTSTONE, w/ trace red CLAYSTONE, soft to hard, fine grained, green. *(continued)*		
160					
			163.0	900.0	
			SANDSTONE, medium hard, medium grained, tan.		
165					
170			170.0	893.0	
			SILTY SANDSTONE, w/ trace red CLAYSTONE, soft to hard, medium grained, green and purple.		
175					
180					
185					
190					
195					

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WELL NUMBER GW-33B

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PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
195			SILTY SANDSTONE, w/ trace red CLAYSTONE, soft to hard, medium grained, green and purple. *(continued)*		
200					
205					
210					
215					
220			220.0		
			SANDSTONE w/ interbedded LIMESTONE, hard, fine to medium grained, gray, moderate HCL reaction.		
225					
230			230.0		
			SHALEY SILTSTONE w/ interbedded LIMESTONE, hard, fine grained, gray, moderate HCL reaction.		
235					

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PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
235			SHALEY SILTSTONE w/ interbedded LIMESTONE, hard, fine grained, gray, moderate HCL reaction. *(continued)*		
240			240.0		
			SANDY SILTSTONE to SILTY SANDSTONE, hard, fine to medium grained, green gray and purple.		
245			more sandy @ 270' w/ muscovite/biotite.		
250					
255					
260					
265					
270					
275					

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WELL NUMBER GW-33B

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PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
275			SANDY SILTSTONE to SILTY SANDSTONE, hard, fine to medium grained, green gray and purple.		
			more sandy @ 270' w/ muscovite/biotite. *(continued)*		
280					
285					
290					
295					
300					
305					
310			310.0 753.0		
			SHALE, soft, fine grained, fissile, dark gray.		
			314.0 749.0		
315					

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PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
315			SANDY SILTSTONE w/ interbedded SHALE, soft to hard, fine to medium grained, greenish brown. *(continued)*		
320					
325					
330			330.0		
			SANDY SILTSTONE, soft to hard, medium grained, greenish gray. more silty @ 330. more sandy @ 340'.		
335					
340					
345					
350			350.0		
			SANDY SILTSTONE w/ interbedded SHALE, soft to hard, fine grained, green		
355					

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PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
355			SANDY SILTSTONE w/ interbedded SHALE, soft to hard, fine grained, green *(continued)*		
360			360.0		
			SILTY SANDSTONE, hard, medium grained, green and purple.		
365					
370			370.0 693.0		
			SILTSTONE, hard, fine grained, green.		
375					
380			380.0 683.0		
			SANDY SILTSTONE w/ trace red CLAYSTONE, soft to hard, fine grained, green and purple.		
385					
390					
395					

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WELL NUMBER GW-33B

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
395			SANDY SILTSTONE w/ trace red CLAYSTONE, soft to hard, fine grained, green and purple. *(continued)*		
400					
405					
410			410.0		
			SHALEY SILTSTONE to SANDY SILTSTONE, hard, fine to medium grained, green and purple.		
415			strong petroleum hydrocarbon odor @ 440'.		
420					
425					
430					
435			653.0	PID = 57.4	

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WELL NUMBER GW-33B

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PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
435			SHALEY SILTSTONE to SANDY SILTSTONE, hard, fine to medium grained, green and purple.	PID = 107.6	
			strong petroleum hydrocarbon odor @ 440'. *(continued)*		
440				PID = 37.6	
445					
450			450.0		
			SILTY SANDSTONE to SANDSTONE, soft to hard, fine to medium grained, greenish gray and purple.	PID = 6.8	
			1/2 gpm @ 468'.		
			larger fragments @ 469'.		
455			pyritic @ 476'.		
			becoming shaley @ 480'.	PID = 2.2	
460					
465					
			▼		
470					
475			613.0		

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WELL NUMBER GW-33B

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
475			SILTY SANDSTONE to SANDSTONE, soft to hard, fine to medium grained, greenish gray and purple.		
			1/2 gpm @ 468'.		
			larger fragments @ 469'.		
480			pyritic @ 476'.		
			becoming shaley @ 480'. *(continued)*		
485			486.0		
			SHALEY SILTSTONE w/ LIMESTONE nodules, soft to hard, fine grained, greenish gray, moderate HCL reaction.		
490					
495					
500					
505			505.0		
			SANDY SILTSTONE to SILTSTONE, hard, fine grained, green and purple.		
510					
515					

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WELL NUMBER GW-33B

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
515			SANDY SILTSTONE to SILTSTONE, hard, fine grained, green and purple. *(continued)*		
520			520.0		
525			CLAYSTONE, soft to hard, fine grained, red		
530					
535					
540			540.0		
545			SILTSTONE and CLAYSTONE, soft to hard, fine grained, red and green.		
550					
555					

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WELL NUMBER GW-33B

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
555					
			556.0 SILTSTONE and CLAYSTONE, soft to hard, fine grained, red and green. *(continued)* 507.0		
			SANDSTONE to SHALEY SANDSTONE, medium hard, medium grained, greenish gray.		
			more shaley @ 564'.		
560					
565					
570					
			572.0 491.0		
			SANDY SILTSTONE w/ trace red CLAYSTONE, soft to hard, fine to medium grained, green.		
575					
580					
585					
590					
595					

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WELL NUMBER GW-33B

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
595			SANDY SILTSTONE w/ trace red CLAYSTONE, soft to hard, fine to medium grained, green. *(continued)*		
			597.0 466.0		
			SANDY SILTSTONE, hard, fine to medium grained, green.		
			pyritic @ 605'.		
600					
605					
610			610.0 453.0		
			SILTY SANDSTONE to SANDSTONE (GRAFTON), medium hard, medium grained, greenish gray.		
			micaceous(muscovite)/coarsening @ 614'.		
			pyrite returning @ 630'.		
615			larger fragments @ 638'.		
			petroleum hydrocarbon odor beginning @ 645'.		
620					
625					
630					
635					

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WELL NUMBER GW-33B

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data	WELL DIAGRAM
635			SILTY SANDSTONE to SANDSTONE (GRAFTON), medium hard, medium grained, greenish gray.		
			micaceous(muscovite)/coarsening @ 614'.		
			pyrite returning @ 630'.		
640			larger fragments @ 638'.		
			petroleum hydrocarbon odor beginning @ 645'. *(continued)*		
645				PID = 57.8	
				PID = 35.2	
650			649.8 413.2		
			650.0 LIMESTONE, hard, fine grained, gray, strong HCL reaction. 413.0	PID = 5.7	
			Bottom of borehole at 650.0 feet.		

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WELL NUMBER GW-34

CLIENT FirstEnergy
PROJECT NAME McElroy's Run CCB Disposal Facility
PROJECT NUMBER 212C-SW-00070
PROJECT LOCATION Pleasants County, WV
DATE STARTED 12/1/21 **COMPLETED** 12/9/21
GROUND ELEVATION 1043.5 ft **HOLE SIZE** 10" OB / 6" BR
DRILLING CONTRACTOR Eichelberger's
GROUND WATER LEVELS:
DRILLING METHOD Air Rotary
AT TIME OF DRILLING 355.50 ft / Elev 688.00 ft
LOGGED BY F. Ramser **CHECKED BY** T. Higby
AT END OF DRILLING ---
NOTES 8-Inch Steel casing (0-19' bgs) grouted in place
192hrs AFTER DRILLING 523.45 ft / Elev 520.05 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
0					8-Inch Steel Stickup
			CLAY and GRAVEL, dry, red brown.		4-Inch PVC Stickup
9.0				1034.5	
			SANDY SILTSTONE, medium hard, light tan.		8-Inch Steel Casing (0'-20')
14.0				1029.5	
			CLAYSTONE and MUDSTONE, medium soft, red brown.		
27.0				1016.5	4-Inch Schedule 80 PVC Riser
			SANDY SILTSTONE, medium soft to medium hard, red to greenish gray.		

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WELL NUMBER GW-34

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
35			SANDY SILTSTONE, medium soft to medium hard, red to greenish gray. *(continued)*		
40					
45					
50			50.0	993.5	
			SANDSTONE, medium hard, grey.		
			53.0	990.5	
			COAL SEAM		
			54.0	989.5	
55			LIMEY SANDSTONE, medium hard, grey.		
60					
65					
70			70.0	973.5	
			MUDSTONE, medium soft to medium hard, red to grey green, limey @ 78'-97'.		
75					

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WELL NUMBER GW-34

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75			MUDSTONE, medium soft to medium hard, red to grey green, limey @ 78'-97'. *(continued)*	
80				
85				
90				
95				
			97.0 946.5	
			MUDSTONE, medium soft, dark red.	
100				
105				
			107.0 936.5	
			SANDSTONE, dark gray.	
			108.0 935.5	
110			SILTSTONE interbedded with MUDSTONE, medium soft to medium hard, red to grey green, limey @ 116'. coarsening @ 120'.	
115				

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WELL NUMBER GW-34

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
115			SILTSTONE interbedded with MUDSTONE, medium soft to medium hard, red to grey green, limey @ 116'. coarsening @ 120'. *(continued)*	
120				
125			125.0	918.5
			SANDY SILTSTONE, medium hard, very fine grain to fine grained, reddish brown to dark green.	
130				
135				
			138.0	905.5
			SILTY SANDSTONE, medium hard, very fine grained to fine grained, dark green, more shaley @ 150'-155'. fining downwards @ 163'.	
140				
145				
150				
155				

(Continued Next Page)

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WELL NUMBER GW-34

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
155			SILTY SANDSTONE, medium hard, very fine grained to fine grained, dark green, more shaley @ 150'-155'. fining downwards @ 163'. *(continued)*	
160				
165				
			169.0 874.5	
170			SANDSTONE and SILTSTONE, medium hard, green grey, shaley @ 183', red siltstone @ 185'.	
175				
180				
185				
			188.0 855.5	
			SHALEY SILTSTONE, medium hard, red.	
190			190.0 853.5	
			SANDSTONE interbedded w/ SHALEY SILTSTONE, medium soft to medium hard, very fine grained to fine grained, coarsening/micaceous @ 190, reddish clay seams @ 210'.	
195				

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CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
195			SANDSTONE interbedded w/ SHALEY SILTSTONE, medium soft to medium hard, very fine grained to fine grained, coarsening/micaceous @ 190, reddish clay seams @ 210'. *(continued)*	
200				
205				
210				
215				
220				
224.0				819.5
225			SANDSTONE, medium hard, very fine grained to fine grained, grey green, micaceous @ 229'-232, 242'-258', interbedded Siltstone @ 232'- 242'.	
230				
235				

(Continued Next Page)

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WELL NUMBER GW-34

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
235			SANDSTONE, medium hard, very fine grained to fine grained, grey green, micaceous @ 229'-232, 242'-258', interbedded Siltstone @ 232'- 242'. *(continued)*	
240				
245				
250				
255				
258.0 / 785.5				Benseal EZ-Mud Slurry
260			SILTSTONE and MUDSTONE, medium soft, dark red brown (10R 3/4), shaley.	
260.0 / 783.5			LIMESTONE, medium hard, brown black (5YR 2/1), micritic.	
265				
267.0 / 776.5			SANDY SILTSTONE, medium soft to medium hard, dark green w/ variegated brown, gray, and red.	
270			more sandy/micaceous @ 277'.	
			carbonaceous @ 289 w/ minor biotite.	
275				

(Continued Next Page)

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WELL NUMBER GW-34

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
275			SANDY SILTSTONE, medium soft to medium hard, dark green w/ variegated brown, gray, and red.	
			more sandy/micaceous @ 277'.	
280			carbonaceous @ 289 w/ minor biotite. *(continued)*	
285				
290				
			294.0	
295			SILTSTONE and MUDSTONE, interbedded, medium soft, variegated red/grey/black.	
			interbedded SILTSTONE and LIMESTONE w/ some SANDSTONE @ 310-320'.	
300			Drill bit clogged from Sands	
305				
310				
315				

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CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
315				
			SILTSTONE and MUDSTONE, interbedded, medium soft, variegated red/grey/black.	
			interbedded SILTSTONE and LIMESTONE w/ some SANDSTONE @ 310-320'.	
			Drill bit clogged from Sands *(continued)*	
320			320.0	
			SANDSTONE and SILTSTONE, interbedded, medium hard, coarse, variegated red, grey, and dark green.	
			becoming shaly @ 340'.	
325				
330				
335				
340				
345				
350				
355				

723.5

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101017 GEOTECH - GINT STD US.GDT - 1/28/22 14:43 - O:\SE PROJECTS\2015\PROJECTS\212C-SW-00070 FE - CCR RULE GW COMPLIANCE (PLEASANTS)\GROUNDWATER\NEW CCR WELLS\2021 FIELD NOTES\BORING LOGS\GINT LOGS\FE MCELROY'S CCR.GPJ

Tetra Tech, Inc.
661 Andersen Drive, Suite 2
Pittsburgh, PA 15220
Telephone: 412-921-7096

WELL NUMBER GW-34

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
355				
			356.0 ▽	
			SILTSTONE and CLAYSTONE, interbedded, medium soft, red brown and grey, shaly, carbonaceous @ 362'.	
360				
365				
370				
375				
			379.0 687.5	
380			SANDY SILTSTONE w/ interbedded red CLAYSTONE, medium soft to medium hard, grey green, micaceous @ 385'.	
			fining downward/becoming shaly @ 390',	
385				
390				
395				

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WELL NUMBER GW-34

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
395			SANDY SILTSTONE w/ interbedded red CLAYSTONE, medium soft to medium hard, grey green, micaceous @ 385'.	
			fining downward/becoming shaly @ 390', *(continued)*	
400				
405				
			407.0 636.5	
			SANDSTONE and SILTSTONE, trace LIMESTONE, medium hard to hard, grey green w/ variegated red, brown, and black, carbonaceous	
410			coarsening @ 420'.	
415				
420				
425				
430				
435				

(Continued Next Page)

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WELL NUMBER GW-34

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
435			SANDSTONE and SILTSTONE, trace LIMESTONE, medium hard to hard, grey green w/ variegated red, brown, and black, carbonaceous coarsening @ 420'. *(continued)*	
440				
445				
450				
455				
460				
465				
470				
475				

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WELL NUMBER GW-34

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
475			SANDSTONE and SILTSTONE, trace LIMESTONE, medium hard to hard, grey green w/ variegated red, brown, and black, carbonaceous coarsening @ 420'. *(continued)*	
480				
485				
			486.0 — 557.5 SANDSTONE and SILTSTONE, medium hard, blocky, very fine grain to fine grain, grayish red, coarsening with depth.	
490				
495				
500				
505				
			508.0 — 535.5 SILTSTONE and SANDSTONE, interbedded, medium soft, very fine grain to fine grain, green grey and red grey.	
510				
			513.0 — 530.5	Bentonite Seal (511'-515')
515				

(Continued Next Page)

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WELL NUMBER GW-34

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
515			SANDSTONE (GRAFTON), medium hard, very fine grained to fine grained, grey green.	
			coarsening @ 520'.	
			becoming shaley @ 535'. *(continued)*	
520				
525				
530				
535				
540				
			544.0	499.5
545			SILTSTONE, trace SANDSTONE, medium soft, grey green and red brown, pyritic.	
550			551.0	492.5
			SANDSTONE, medium hard, very fined grained, grayish green.	
			coarsening/micaceous @ 560'	
			becoming shaly @ 563'.	
555				

20-40 Silica Sand Filter Pack (515'-548')
0.010 Screened Interval (523.5'-545.5')

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101017 GEOTECH - GINT STD US.GDT - 1/28/22 14:43 - O:\SE PROJECTS\2015\PROJECTS\212C-SW-00070 FE - CCR RULE GW COMPLIANCE (PLEASANTS)\GROUNDWATER\NEW CCR WELLS\2021 FIELD NOTES\BORING LOGS\GINT LOGS\FE MCELROY'S CCR.GPJ

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WELL NUMBER GW-34

CLIENT FirstEnergy **PROJECT NAME** McElroy's Run CCB Disposal Facility

PROJECT NUMBER 212C-SW-00070 **PROJECT LOCATION** Pleasants County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
555			SANDSTONE, medium hard, very fined grained, grayish green.	
			coarsening/micaceous @ 560'	Bentonite Seal (548'-566')
560			becoming shaly @ 563'. *(continued)*	
565				
			566.0 477.5	

Bottom of borehole at 566.0 feet.

Tetra Tech, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: MW-33A
Site: Pleasants Power Station
Date Installed: _____
Date Developed: 11/10/21 - 11/11/21
Dev. Method: Pump
Pump Type: 3" Submersible, Franklin

Depth to Bottom (ft.): _____
Static Water Level Before (ft.): 364.99
Static Water Level After (ft.): _____
Screen Length (ft.): 40'
Specific Capacity: _____
Casing ID (in.): _____

Responsible Personnel: H. Landis
Drilling Co.: Eichelberger's
Project Name: McElroy's Run
Project Number: 212C-SW-00070

Pump on @ 15:54 / water @ 15:57

Rate ~ $\frac{2\text{gal}}{47\text{s}}$ = 6.4 gal/m

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)	ORP (mv)	Salinity (ppt)
15:58		~39.4	NM	16.57	7.52	1.50	>1000	Brown, slight petroleum odor, sheen noted	130	0.7
16:03		~70.4		15.15	8.26	1.63	>1000	" , no odor or sheen noted	103	0.8
16:08		~102.4		14.82	8.07	1.43	956	" "	101	0.7
~~16:13~~ 16:10		~115.2	dry					wait 30 min		
~~16:42~~										
16:42			NM	14.80	7.86	0.938	286	Slightly cloudy, white sheen, Cloudy, white	101	0.5
16:44				14.44	7.89	0.869	196	Cloudy, white	100	0.4
16:46				14.55	07.88	0.853	272		101	0.4
16:48				14.97	7.83	1.03	>1000	Brown	101	0.5
16:49	dry									
17:19	dry			14.83	7.80	1.23	>1000	Brown	95	0.6
Surge ~200 gal										
17:32				15.31	7.95	1.49	>1000	Brown	80	0.7
17:37				15.52	7.86	0.829	649	Cloudy, grey	81	0.4
17:42				15.96	7.84	0.826	87.4		95	0.4
17:45	dry							start again @17:49 ?		
17:50				15.96	7.80	0.827	60.3	Clear to the eye	109	0.4
17:55	Shut down 17:52 - 17:58, 18:02 - 18:01			16.04	7.79	0.830	58.4	"	113	0.3
18:02					7.77	0.832	74.1	" DO = 5.16	118	0.4

Tetra Tech, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: MW-33A
Site: Pleasants Power Station
Date Installed: _____
Date Developed: 11/10/21 - 11/11/21
Dev. Method: Pump
Pump Type: 3" Submersible, Franklin

Depth to Bottom (ft.): _____
Static Water Level Before (ft.): 364.99
Static Water Level After (ft.): _____
Screen Length (ft.): 40'
Specific Capacity: _____
Casing ID (in.): _____

Responsible Personnel: H. Landis
Drilling Co.: Eichelberger's
Project Name: McElroy's Run
Project Number: 212C-SWJ-00070

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	~~Water Level Readings~~ (Ft. below TOC) DO	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)	ORP	Sal
18:08			4.95	15.85	7.77	0.933	66.6	Pump turn 18:04-18:05;	121	0.4
18:16			4.93	15.65	7.79	0.849	293	Pump turn ~ 4 min; cloudy gray	120	0.3
	dry									
	Leave over night, restart 11/11/21 @ 08:21				30					
08:22			6.19	13.40	~~6.89~~ 7.68	0.822	0.0	Clear, no odor	244	0.4
	dry after 2.5 min.									
	Development complete									

Tetra Tech, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: GW-34
Site: McElroys Run
Date Installed: 12-2-21
Date Developed: 12-16-21
Dev. Method: Purge + Surge
Pump Type: Grundfos

Depth to Bottom (ft.): 543.5'
Static Water Level Before (ft.): NA
Static Water Level After (ft.): DRY
Screen Length (ft.): 20
Specific Capacity: —
Casing ID (in.): 4

Responsible Personnel: J. CLARA
Drilling Co.: Eichelbergers
Project Name: McElroys Run CCR Well Install
Project Number: 212C-SW-00070

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1502		280	NA	10.75	7.79	0.776	31	150 gal Added
1504		295		10.81	7.77	0.777	39	
1506		310		10.85	7.77	0.773	32	
1508		325		11.09	7.76	0.773	24	
1510		340		11.14	7.73	0.769	20	
1512		355		11.19	7.67	0.771	18	
1514		370		11.25	7.67	0.769	29	
1516		385		11.31	7.65	0.771	12	
1518		400		11.41	7.65	0.773	19	
1520		415		11.50	7.66	0.775	22	
1522		430		12.34	7.66	0.785	10.8	
1524		445		12.43	7.69	0.780	9.8	
1526		460	DRY	—	—	—	—	
—	—	—	—	—	—	—	—	Left Overnight to recover
836		460	NA	12.87	7.94	0.824	12.5	
838		472	DRY	—	—	—	—	END

12-15-21

ATTACHMENT B

SEMI-ANNUAL SELECTION OF REMEDY (SoR) PROGRESS REPORT (Q1 and Q2 2021)

McELROY'S RUN COAL COMBUSTION BYPRODUCT DISPOSAL FACILITY

Pleasants Power Station
Pleasants County, West Virginia

Prepared for:

Allegheny Energy Supply Company
A Wholly Owned Subsidiary of FirstEnergy

800 Cabin Hill Drive
Greensburg, PA 15601

Prepared by:

Tetra Tech, Inc.

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Tetra Tech Project No. 212C-SW-00070

July 2021

TABLE OF CONTENTS

1.0 INTRODUCTION

This Semi-Annual Selection of Remedy (SoR) Progress Report was prepared by Tetra Tech, Inc. (Tetra Tech) on behalf of Allegheny Energy Supply Company (AESC) for the Coal Combustion Byproduct Disposal Facility ("CCBDF", "CCR units", or "site") associated with the Pleasants Power Station (hereinafter referred to as the "Station"). The CCR units and Station are located near the town of Belmont in Pleasants County, West Virginia. The period covered by this report is the first two quarters (Q1 and Q2) of calendar year 2021 (January 1st through June 30th).

As per 40 CFR 257.97(a), once a Coal Combustion Residual (CCR) unit has completed an Assessment of Corrective Measures (ACM) and transitions to SoR, "The owner or operator must prepare a semiannual report describing the progress in selecting and designing the remedy." Accordingly, this report summarizes the progress during the current reporting period in selecting and designing the remedy for addressing arsenic concentrations in groundwater downgradient of the CCR units and also includes a summary of anticipated SoR activities which will be conducted over the next SoR reporting period.

Detailed background information on the CCR units, hydrogeologic site conditions, and CCR monitoring results can be found in various other documents on the CCBDF's publicly accessible website, the most recent of which being the 2020 Annual CCR Rule Groundwater Monitoring and Corrective Action Report (McElroy's Run CCB Disposal Facility 2020 Annual GWMCA Report). The following section provides background information as it relates to the SoR at the CCR units.

1.1 Background

Groundwater Assessment Monitoring (AM) conducted at the site in accordance with the federal CCR Rule identified arsenic, barium, lithium, and radium concentrations in certain downgradient CCR monitoring wells which were at Statistically Significant Levels (SSLs) above their corresponding Groundwater Protection Standards (GWPS). Pursuant to 40 CFR 257.95(g)(3)(ii), Tetra Tech performed an Alternative Source Demonstration (ASD) to assess if the Appendix IV SSLs determined for sampling events AM-1, -2, and -3 were attributable to a release from the CCR units or from a demonstrable alternative source(s). The Appendix IV ASD is included as Attachment A of the ACM Report prepared for the Site (McElroy's Run CCB Disposal Facility 2019 ACM Report) and determined that the barium and radium SSLs can be attributed to historical and current oil and gas exploration and production activities that have occurred at the site; that the source of the lithium SSLs is currently indeterminate but there is a high potential they are also attributable to oil and gas impacts at the site; and that the arsenic SSLs could not be attributed to sources other

than the CCR units. As such, a transition to Nature and Extent (N&E) of release characterization and ACM for arsenic per 40 CFR 257.96 of the CCR Rule were implemented.

As required by 40 CFR 257.96(c), the ACM conducted by Tetra Tech on behalf of AESC included an analysis of the effectiveness of potential corrective measures in meeting the remedy requirements and objectives as described under 40 CFR 257.97. The ACM Report evaluated the following corrective measures against the criteria referenced in 40 CFR 257.96(c): Source Control, Groundwater Extraction and Treatment, In-Situ Technologies, and Monitored Natural Attenuation (MNA).

Based on the evaluation of viable remediation technologies, MNA, combined with source control by the eventual installation of a final cover system on the CCR units, ranks highest among the evaluated options. In September 2019, pursuant to 40 CFR 257.96(d), the ACM Report was posted in the CCR units' Operating Record, and then subsequently posted to the facility's publicly accessible website on October 16, 2019 (McElroy's Run CCB Disposal Facility 2019 ACM Report).

1.2 SoR Regulatory Basis

SoR activities must be completed in compliance with 40 CFR 257.97(a), which states that as soon as feasible after completion of the ACM, a remedy must be selected that, at a minimum, meets the performance standards listed in 40 CFR 257.97(b), and considers the evaluation factors listed in 40 CFR 257.97(c).

2.0 CURRENT STATUS OF THE SELECTION OF REMEDY PROGRAM

The following activities have been performed during the current reporting period as part of selecting the remedy at the site:

- AESC continued negotiations with the three off-site landowners contacted during the previous reporting period to establish right-of-access and lease agreements to install and sample three of the six proposed new downgradient monitoring wells that will be used to better characterize the extent of arsenic in groundwater and to evaluate potential natural attenuation impacts on arsenic concentrations downgradient of the CCR units. Agreements with two of the three off-site landowners were finalized this June and the negotiations with the third landowner remain in-progress.
- A contract was executed with a drilling firm this June to install, develop, and perform aquifer characterization testing for all the proposed new monitoring wells (on-site and off-site). Mobilization of the drilling crew is currently on hold until negotiations with the remaining off-site landowner are completed, with work

planned to commence at the five accessible well locations no later than August even if an agreement with the remaining landowner has not been finalized.

- Continued development of a Natural Attenuation Evaluation Work Plan that includes evaluating historic concentrations of parameters which can affect the natural attenuation of arsenic (e.g., iron, pH, ORP, etc.) as well as planning the sampling and analysis program that would be associated with future MNA activities.
- Continued reviewing candidate technologies with regard to their potential to meet the performance standards listed in 40 CFR 257.97(b) and the evaluation factors listed in 40 CFR 257.97(c).
- Continued AM with a sampling event in February 2021, which included sampling of the site's CCR monitoring well network with analyses for all Appendix III and Appendix IV parameters along with targeted general chemistry parameters to assist in evaluating potential natural attenuation impacts.
- Assessed the February 2021 groundwater flow patterns in the monitoring network areas downgradient of the CCR units and found they remained consistent with established flow patterns at the site.

3.0 PLANNED SOR ACTIVITIES

The following activities are planned as part of the ongoing SoR process:

- Finalize the right-of-access and lease agreement for the one remaining proposed off-site monitoring location and install, develop, and sample all six additional downgradient groundwater monitoring wells for arsenic and natural attenuation parameters.
- Complete the second scheduled 2021 AM sampling event at the site.
- Continue development of the Arsenic Natural Attenuation Evaluation Work Plan, including a review of the historic groundwater monitoring data set for relationships between key parameters affecting arsenic natural attenuation and arsenic concentrations in groundwater.
- Continue evaluating the candidate technologies identified in the ACM against the performance standards listed in 40 CFR 257.97(b) and the evaluation factors listed in 40 CFR 257.97(c).
- As required by 40 CFR 257.96(e), AESC will discuss the results of the corrective measures assessment at least 30 days prior to the final selection of remedy, in a public meeting.

- Upon completion of all required SoR activities, AESC will prepare a final report describing the selected remedy and how it, at a minimum, meets the performance standards listed in 40 CFR 257.97(b) and considers the evaluation factors listed in 40 CFR 257.97(c).
- As required by 40 CFR 257.97(d), AESC will specify, as part of the selected arsenic remedy, a schedule(s) for implementing and completing remedial activities.

Should the final remedy for the CCR units not be selected during Q3 or Q4 2021, then another Semi-Annual SoR Report will be prepared as required by 40 CFR 257.97(a).

SEMI-ANNUAL SELECTION OF REMEDY (SoR) PROGRESS REPORT (Q3 and Q4 2021)

McELROY'S RUN COAL COMBUSTION BYPRODUCT DISPOSAL FACILITY

Pleasants Power Station
Pleasants County, West Virginia

Prepared for:

Allegheny Energy Supply Company
A Wholly Owned Subsidiary of FirstEnergy

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Greensburg, PA 15601

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Tetra Tech Project No. 212C-SW-00070

January 2022

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1.0 INTRODUCTION

This Semi-Annual Selection of Remedy (SoR) Progress Report was prepared by Tetra Tech, Inc. (Tetra Tech) on behalf of Allegheny Energy Supply Company (AESC) for the Coal Combustion Byproduct Disposal Facility ("CCBDF", "CCR units", or "site") associated with the Pleasants Power Station (hereinafter referred to as the "Station"). The CCR units and Station are located near the town of Belmont in Pleasants County, West Virginia. The period covered by this report includes the last two quarters (Q3 and Q4) of calendar year 2021 (July 1st through December 31st).

As per 40 CFR 257.97(a), once a Coal Combustion Residual (CCR) unit has completed an Assessment of Corrective Measures (ACM) and transitions to SoR, "The owner or operator must prepare a semiannual report describing the progress in selecting and designing the remedy." Accordingly, this report summarizes the progress during the current reporting period in selecting and designing the remedy for addressing arsenic concentrations in groundwater downgradient of the CCR units and also includes a summary of anticipated SoR activities which will be conducted over the next SoR reporting period.

Detailed background information on the CCR units, hydrogeologic site conditions, and CCR monitoring results can be found in various other documents on the CCBDF's publicly accessible website, the most recent of which being the 2020 Annual CCR Rule Groundwater Monitoring and Corrective Action Report (McElroy's Run CCB Disposal Facility 2020 Annual GWMCA Report). The following section provides background information as it relates to the SoR at the CCR units.

1.1 Background

Groundwater Assessment Monitoring (AM) conducted at the site in accordance with the federal CCR Rule identified arsenic, barium, lithium, and radium concentrations in certain downgradient CCR monitoring wells which were at Statistically Significant Levels (SSLs) above their corresponding Groundwater Protection Standards (GWPS). Pursuant to 40 CFR 257.95(g)(3)(ii), Tetra Tech performed an Alternative Source Demonstration (ASD) to assess if the Appendix IV SSLs determined for sampling events AM-1, -2, and -3 were attributable to a release from the CCR units or from a demonstrable alternative source(s). The Appendix IV ASD is included as Attachment A of the ACM Report prepared for the Site (McElroy's Run CCB Disposal Facility 2019 ACM Report) and determined that the barium and radium SSLs could be attributed to historical and current oil and gas exploration and production activities that have occurred at the site; that the source of the lithium SSLs was indeterminate but there is a high potential they are also attributable to oil and gas impacts at the site; and that the arsenic SSLs could not be attributed to

sources other than the CCR units. As such, a transition to Nature and Extent (N&E) of release characterization and ACM for arsenic per 40 CFR 257.96 of the CCR Rule were implemented.

As required by 40 CFR 257.96(c), the ACM conducted by Tetra Tech on behalf of AESC included an analysis of the effectiveness of potential corrective measures in meeting the remedy requirements and objectives as described under 40 CFR 257.97. The ACM Report evaluated the following corrective measures against the criteria referenced in 40 CFR 257.96(c): Source Control, Groundwater Extraction and Treatment, In-Situ Technologies, and Monitored Natural Attenuation (MNA).

Based on the evaluation of viable remediation technologies, MNA, combined with source control by the eventual installation of a final cover system on the CCR units, ranks highest among the evaluated options. In September 2019, pursuant to 40 CFR 257.96(d), the ACM Report was posted in the CCR units' Operating Record, and then subsequently posted to the facility's publicly accessible website on October 16, 2019 (McElroy's Run CCB Disposal Facility 2019 ACM Report).

1.2 SoR Regulatory Basis

SoR activities must be completed in compliance with 40 CFR 257.97(a), which states that as soon as feasible after completion of the ACM, a remedy must be selected that, at a minimum, meets the performance standards listed in 40 CFR 257.97(b), and considers the evaluation factors listed in 40 CFR 257.97(c).

2.0 CURRENT STATUS OF THE SELECTION OF REMEDY PROGRAM

The following activities have been performed during the current reporting period as part of selecting the remedy at the site:

- Between August and December, four of six proposed new monitoring wells were installed and developed, three of which are positioned downgradient of the CCR units on property owned by AESC (GW-31, -32, and -33A) and one of which is positioned sidegradient on privately owned property (GW-34). These new wells will be used to better characterize the extent of arsenic in groundwater and to evaluate potential natural attenuation impacts on arsenic concentrations downgradient of the CCR units. The new wells were left to stabilize hydraulically and geochemically for the remainder of the calendar year and initial sampling will be attempted during the AM event scheduled for the first quarter of 2022. At that time the wells will be added to the certified CCR monitoring well network.
- An attempt was made to install a fifth downgradient monitoring well on AESC property (GW-33B) but, due to recurring formation instability issues at depth (collapse), the borehole was abandoned and sealed and the drilling program was

suspended. In addition, the sixth proposed downgradient monitoring well (GW-30), which is positioned on private property, could not be installed due to protracted negotiation of access rights and a lease agreement with the landowner. Negotiations with this landowner remain in-progress.

- In November and December, aquifer characterization testing consisting of rising and falling head slug tests in new monitoring wells GW-31, -32, and -33A and in existing monitoring wells GW-9 and -19 were performed to determine the hydraulic conductivity of the targeted monitoring zones in the new wells and to correlate the results to historical hydraulic conductivity measurements at the site.
- Continued development of a Natural Attenuation Evaluation Work Plan that includes evaluating historic concentrations of parameters which can affect the natural attenuation of arsenic (e.g., iron, pH, ORP, etc.) as well as planning the sampling and analysis program that would be associated with future MNA activities.
- Continued reviewing candidate technologies with regard to their potential to meet the performance standards listed in 40 CFR 257.97(b) and the evaluation factors listed in 40 CFR 257.97(c).
- Continued AM with a sampling event in September 2021, which included sampling of the site's CCR monitoring well network with analyses for all Appendix III and Appendix IV parameters along with targeted general chemistry parameters to assist in evaluating potential natural attenuation impacts.
- Assessed the September 2021 groundwater flow patterns in the monitoring network areas downgradient of the CCR units and found they remained consistent with established flow patterns at the site.

3.0 PLANNED SOR ACTIVITIES

The following activities are planned as part of the ongoing SoR process:

- Complete the first scheduled 2022 AM sampling event at the site including new monitoring wells GW-31, -32, -33A, and 34.
- Attempt to develop alternative drilling methods to prevent borehole collapse and facilitate the successful installation of GW-33B. If a viable option(s) can be developed, install, develop, and sample the new well for arsenic and natural attenuation parameters.
- Finalize the right-of-access and lease agreement for the one remaining proposed off-site monitoring location and install, develop, and sample the new well for arsenic and natural attenuation parameters.

- Continue development of the Arsenic Natural Attenuation Evaluation Work Plan, including a review of the historic groundwater monitoring data set for relationships between key parameters affecting arsenic natural attenuation and arsenic concentrations in groundwater.
- Continue evaluating the candidate technologies identified in the ACM against the performance standards listed in 40 CFR 257.97(b) and the evaluation factors listed in 40 CFR 257.97(c).
- As required by 40 CFR 257.96(e), AESC will discuss the results of the corrective measures assessment at least 30 days prior to the final selection of remedy, in a public meeting.
- Upon completion of all required SoR activities, AESC will prepare a final report describing the selected remedy and how it, at a minimum, meets the performance standards listed in 40 CFR 257.97(b) and considers the evaluation factors listed in 40 CFR 257.97(c).
- As required by 40 CFR 257.97(d), AESC will specify, as part of the selected arsenic remedy, a schedule(s) for implementing and completing remedial activities.

Should the final remedy for the CCR units not be selected during Q1 or Q2 2021, then another Semi-Annual SoR Report will be prepared as required by 40 CFR 257.97(a).