2020 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 2021

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1.0 INTRODUCTION

This 2020 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 through 5 of this report:

Status Summary for Reporting Period (January 1 to December 31, 2020)	
Groundwater Monitoring Program in Effect as of January 1, 2020 - 257.90(e)(6)(i)	Assessment Monitoring (Sampling Event AM-4)
Groundwater Monitoring Program in Effect as of December 31, 2020 - 257.90(e)(6)(ii)	Assessment Monitoring (Sampling Events AM-5 and -6)
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-3)
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 2020
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 (2020) 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 must prepare an initial Annual Groundwater Monitoring and Corrective Action Report ("AGWMCA 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); and

(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).”

(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 2020 for the CCBDF and plans for the upcoming year. Section 3.0 presents Detection Monitoring (DM) results from groundwater sampling events completed in 2020. Section 4.0 presents Assessment Monitoring (AM) results from groundwater sampling events completed in 2019 and 2020. Finally, Section 5.0 presents a summary of the Selection of Remedy (SoR) activities that were performed for the CCR units during 2020.

2.0 GENERAL INFORMATION

This section provides an overview of the status of the CCR groundwater monitoring program through 2020 and key activities planned for 2021.

2.1 STATUS OF THE CCR GROUNDWATER MONITORING AND CORRECTIVE ACTION PROGRAM

During calendar year 2020 (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 AGWMCA Reports (accessible at http://ccrdocs.firstenergycorp.com/), the certified CCR monitoring well network 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, at this time, only GW-7 is being used for upgradient/background interwell comparisons based on the following:

- It was originally intended that upgradient wells GW-21 and GW-22, which are both screened in the Morgantown sandstone, would be grouped for statistical evaluation purposes. However, as documented in the 2018 AGWMCA Report, after both the background and the initial detection monitoring sampling events were completed, it was determined that the two wells did not have the level of statistical similarity needed for grouping and that the availability of sufficient volumes of recoverable water was a recurring problem for GW-21. As such, it was decided that only GW-22 would be used to establish background chemistry for the northern side of the CCR units since it exhibited lower concentrations of all the Appendix III parameters than those measured in GW-21 and it also provided a reliable water yield while GW-21 did not. GW-21 was left in place (i.e., it was not abandoned) and it has been sampled when sufficient volumes of recoverable water were available. GW-21's water levels have also continued to be used to verify groundwater flow patterns at the site. The current intent is to keep GW-21 as a part of the CCR monitoring network until a sufficiently sized data set can be compiled and used to

determine whether or not it's statistically appropriate to group its results with the data set for GW-22.

- The groundwater levels measured for the CCR compliance program indicated that the wells installed along the northern CCBDF boundary had continued a downward trend that began after they were first installed in 2016 and later redeveloped in 2017, but finally appeared to stabilize in 2019 and 2020. It's believed that this slow drop and stabilization of groundwater levels is attributable to the low permeability of the monitored aquifer along that side of the site. An updated evaluation of the site-wide groundwater level data in 2019 resulted in a modified interpretation of groundwater flow patterns along the northern boundary of the site than were described in the 2017 and 2018 AGWMCA Reports. As shown on Figures 2-1 and 2-2, the current understanding is that groundwater flow beneath the CCBDF still flows north, but primarily originates from the topographically higher areas located to the south of the impoundment, with a portion flowing to the northwest and a portion flowing to the northeast. This modification to the groundwater flow pattern is such that one upgradient well, GW-7, is now considered the appropriate upgradient/background well for both the western and northern boundaries of the CCR units based on its physical position and since it exhibited lower background concentrations of all the Appendix IV parameters than those measured in GW-22 except for fluoride and lithium. As such, the AM statistical evaluations that were performed in 2020 have incorporated Upper Prediction Limits (UPLs) associated with GW-7 for both boundaries.

Other than the discussions presented above, no other changes to the monitoring well network (i.e., new wells added, or existing wells abandoned) occurred during 2020.

2.1.2 Groundwater Monitoring Plan

Consistent with the work performed and summarized in previous AGWMCA Reports, the CCR unit's Groundwater Monitoring Plan (GWMP) was followed during all 2020 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 2020.

2.1.3 Background Groundwater Sampling

As documented in the 2017 and 2018 AGWMCA 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 2020.

2.1.4 Statistical Methods

As documented in the 2017 and 2018 AGWMCA 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 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 2020.

2.2 PROBLEMS ENCOUNTERED/RESOLVED

Consistent with some past sampling events, having a sufficient recoverable volume of groundwater to sample in downgradient well GW-26 continued to be a problem, even after the well's dedicated bladder pump was successfully reinstalled in 2019, with no groundwater samples being collected from GW-26 during AM-5. However, during the AM-6 event, the bladder pump was removed from the well and it was sampled with a Hydra-Sleeve. Additionally, a landslide occurred near the location of GW-22 sometime prior to the February 2020 sampling event and knocked over an overhead power line causing the line to fall onto GW-22. As such, out of safety concerns until repairs to the overhead line could be made, GW-22 was not sampled in February 2020. GW-22 was sampled in August 2020 with no notable issues observed either to the well or the sampling equipment as a result of the landslide.

Other than the sample volume issue for GW-26 and landslide affecting GW-22 noted above, there were no other significant problems encountered during 2020 with regard to the CCR groundwater monitoring program.

2.3 TRANSITION BETWEEN MONITORING PROGRAMS

As documented in the 2018 AGWMCA 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. The CCR unit has remained in Assessment Monitoring since that time, with two additional AM sampling events completed (AM-3 and AM-4) and statistical evaluations of the AM-1, -2, and -3 sampling events being

performed and documented in the 2019 AGWMCA Report. As discussed in the 2019 AGWMCA Report, statistical evaluations of the AM-1, -2, and -3 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 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 AGWMCA Report. Since that time and throughout 2020, the CCR unit remained in AM with ongoing SoR activities being performed as discussed in Section 5 of this report.

2.4 KEY ACTIVITIES PLANNED FOR THE UPCOMING YEAR

The following are the key CCR groundwater compliance activities planned for 2021:

- 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).
- 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 finalizing right-of-access and lease agreements to install additional monitoring wells on potentially affected downgradient, properties; installing additional monitoring wells downgradient of the facility boundary, both on and off AESC-owned property; evaluating the historic groundwater monitoring

dataset for relationships between key parameters affecting arsenic natural attenuation and arsenic concentrations in groundwater; 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 2021, 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 2020. As part of the AM program, all DM (Appendix III) parameters were also analyzed during each AM sampling event.

The need to statistically analyze the 2020 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 2020, so no statistical analysis of the data was necessary. The 2020 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 2020 consisted of two AM sampling events (AM-5 and AM-6) performed between February 5 and 17, 2020 and between August 20 and September 1, 2020, respectively. For both AM events, all Appendix III and all Appendix IV constituents were analyzed. This exceeds 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 April 22, 2020 and November 2, 2020 for AM-5 and AM-6, respectively. Table 3-1 presents the validated analytical results for these events.

Statistical evaluations of AM data performed in 2019 included sampling events AM-1, AM-2, and AM-3. As noted in the 2019 AGWMCA Report, evaluation of data from sampling event AM-4 ended up being completed in January 2020 since receipt of outstanding validated results occurred late in the fourth quarter of that year, and a 90-day period is allowed by the CCR Rule for statistical evaluation, which fell into the first quarter of 2020. As such, a discussion of the AM-4 data is included in this year's report. 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 AGWMCA 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-4, -5, and -6 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-4, -5, and -6 data were generally consistent with results of the AM-1, -2, and -3 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 and -24), and combined radium 226/228 (GW-23, -24, -25, and -26). As documented in the CCR unit's 2019 Appendix IV ASD, multiple lines of evidence (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-4 there was also a recurring SSL for molybdenum in GW-20 (this was first identified as an SSL during AM-3), but that parameter was subsequently measured at concentrations below its GWPS during events AM-5 and AM-6. There were also first-time SSLs identified for beryllium, cobalt, lead, and lithium in GW-26 during AM-4. The validity of these individual SSLs was questioned for GW-26, as the field log sheets indicated the well consistently presented moderate to strong petroleum/hydrocarbon odors and the samples regularly exhibited visible sheen and/or product and were typically extremely turbid. In addition, the difference between measured dissolved and total parameter concentrations was an order of magnitude between the unfiltered and filtered samples that were obtained. Statistical analysis of the AM-6 data confirm that the beryllium, cobalt, and lead SSLs for GW-26 identified during AM-4 (no samples were collected from GW-26 during AM-5 due to insufficient well yield) were anomalies and appear to be a result of the turbidity of the sample and impacts from historical and current oil and gas exploration and production activities that have occurred at the site. Statistical analysis of the AM-5 and AM-6 data in which molybdenum was below its GWPS in GW-20 for both events confirm that the molybdenum SSL for GW-20 identified in AM-4 was an anomaly and appears to be a result, in part, to the turbidity of the sample.

For the western boundary monitoring wells, results from statistical analysis of the AM-4, -5, and -6 data were consistent with results of the AM-1, -2, and -3 data, which includes a single recurring SSL for arsenic limited to downgradient well GW-29.

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, no other Appendix IV constituents other than those discussed herein were detected at SSLs above the their GWPS under the CCR units' AM program during the reporting period, and arsenic remains the only parameter that is the focus of ongoing SoR activities for the CCR units as discussed in Section 5 of this report.

5.0 SELECTION OF REMEDY

As previously noted in Section 2.3 of this report, throughout 2020 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 2020 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 A 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, six new downgradient monitoring wells, including three off-site locations, were identified, the current off-site landowners were contacted, and all of the proposed well locations were field staked.
- Negotiations commenced with the off-site landowners to establish right-of-access and lease agreements to install and sample those new wells. As of December 31, 2020, those negotiations remain in-progress.
- Technical specifications and a Request for Proposal (RFP) were prepared for installing, developing, and performing aquifer characterization testing of all the new wells (on-site and off-site). The RFPs were issued to multiple drilling firms and bids were received in December 2020, with work planned to commence in early 2021 once the off-site landowner agreements are finalized.
- Initiated 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.

- Initiated 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 August 2020 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.

Ongoing and/or new SoR activities that are planned for 2021 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 – 2020 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

Notes: SS = sandstone LS = limestone RB = red beds MSL = mean sea level bgs = below ground surface ID = inside diameter
PVC = polyvinyl chloride * = currently used only for water level measurements

TABLE 3-1
CCR RULE GROUNDWATER ASSESSMENT MONITORING ANALYTICAL RESULTS SUMMARY
McELROY'S RUN CCB DISPOSAL FACILITY - 2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

			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
15 (AM-5)	GW-7	2/6/2020	0.2757	2.68	116	8.13	8.38	0.108	1295	0.00107 U	0.00035	0.07903	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.0214	0.002 U	0.00113 U	0.034 U	0.00017 U	0.106 U	-0.0979 U
16 (AM-6)	GW-7	9/1/2020	0.2664	2.57	118	7.71	8.23 J	0.138 J	1305	0.00107 U	0.0014 U	0.07814	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.02153	0.00016 U	0.00113 U	0.0068 U	0.00017 U	0.0897	0.251 U
15 (AM-5)	GW-9	2/13/2020	0.1115 J	14.906	7.89 J-	0.26	7.85	121	772	0.00107 U	0.00061	0.05894	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.01665	0.002 U	0.00113 U	0.0034 UJ	0.00017 U	0.215 U	-0.0133 U
16 (AM-6)	GW-9	8/31/2020	0.06 J	13.986	7.83	0.254 J-	7.77 J	121	876	0.00107 U	0.00057 J	0.06183	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.01522	0.00016 U	0.00113 U	0.0034 U	0.00017 U	0.15	0.43 U
15 (AM-5)	GW-19	2/12/2020	0.2115	10.016	599	1.79	7.79 J	0.055 J	2450	0.00107 U	0.10665	1.20191	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.01516	0.002 U	0.00113 U	0.0034 UJ	0.00017 U	1.07	0.778
16 (AM-6)	GW-19	9/1/2020	0.1909 J	9.75	608	1.76	7.63 J	0.0386 U	2420	0.00107 U	0.12194	1.27148	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.01563	0.00016 U	0.00113 U	0.0136 U	0.00017 U	1.1	0.874
15 (AM-5)	GW-20	2/6/2020	0.2208	5.66	538	5.75	8.13 J	29	1826.667	0.00107 U	0.00186	0.21382	0.00022 U	0.00067 U	0.00231	0.00047 U	0.00052 U	0.01584	0.002 U	0.09588	0.025	0.00017 U	0.162	0.418 U
16 (AM-6)	GW-20	8/26/2020	0.2455	5.44	551	5.54	8.08 J	27.4 J-	1886.667	0.00107 U	0.00197	0.21606	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.01559	0.00016 U	0.09323	0.01433	0.00017 U	0.225	0.58 U
15 (AM-5)	GW-21	2/11/2020	0.1397 J	9.63	733	2.41	8.24 J	211 J-	2400	0.00107 U	0.01208	0.14507	0.00022 U	0.00067 U	0.00582	0.00068 J	0.00067	0.01183	0.002 U	0.22541	0.06318	0.00017 U	0.176	0.312 U
16 (AM-6)	GW-21	8/27/2020	0.1225 J	9.17	804	2.21 J-	8.14 J	199	2580	0.00107 U	0.01147	0.16063	0.00022 U	0.00067 UJ	0.00262	0.00047 U	0.00052 U	0.01387	0.00016 U	0.21179	0.05103	0.00017 U	0.102 U	0.107 U
15 (AM-5)	GW-22	3/11/2020	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
16 (AM-6)	GW-22	8/24/2020	0.2156	9.73	561	1.9	8.02 J	46.6 J-	1686.667	0.00107 U	0.16355	0.08556	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00091	0.01033	0.00016 U	0.08111	0.0034 U	0.00017 U	0.163	0.0728 U
15 (AM-5)	GW-23	2/10/2020	0.1778 J	835	13000	0.025 U	7.07 J	0.101 J	63600	0.0011	0.03074	14.93761	0.00022 U	0.00067 U	0.0029 U	0.00248	0.00052 U	0.14201	0.002 U	0.00731	0.00136 U	0.00017 U	36.2 J	53.2 J
16 (AM-6)	GW-23	8/27/2020	0.1055 J	792	13600	0.025 UJ	7.08 J	0.231	106000	0.00107 U	0.03297	13.85699	0.00022 U	0.00067 U	0.0058 U	0.00199 J	0.00058 J	0.12264	0.00016 U	0.00403 J	0.0136 U	0.00017 U	34.1 J	81.6 J
15 (AM-5)	GW-24	2/11/2020	0.2883	376	10200	0.025 U	7.07 J	0.261	41000	0.00107 U	0.02656	14.08565	0.00022 U	0.00067 U	0.0029 U	0.0019	0.00052	0.05213	0.002 U	0.00777	0.002 J	0.00017 U	10.4	36.1
16 (AM-6)	GW-24	8/31/2020	0.2796	365	9400	0.025 UJ	7.13 J	0.0386 U	69200	0.00107 U	0.02813	13.14589	0.00022 U	0.00067 U	0.0058 U	0.0016 J	0.00052 U	0.0499	0.00016 U	0.00471 J	0.0136 U	0.00017 U	16.3	33.4
15 (AM-5)	GW-25	2/10/2020	0.1479 J	338	7720	0.025 U	7.7 J	0.04 J	35900	0.00107 U	0.05353	8.86509	0.00022 U	0.00067 U	0.00983	0.00387	0.00333	0.0382	0.002 U	0.01337	0.00068 U	0.00017 U	13	18.7
16 (AM-6)	GW-25	8/20/2020	0.1335 J	320	8240	0.025 U	7.56 J	0.395	41200	0.00107 U	0.05302	9.34675	0.00022 U	0.00067 U	0.00867	0.00212	0.00225	0.03614	0.00016 U	0.01376	0.0034 U	0.00017 U	17.1	19.6
15 (AM-5)	GW-26	3/11/2020	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
16 (AM-6)	GW-26	8/26/2020	0.172 J	54.201	656	1.46	8.47 J	0.6 J-	19400	0.00107 U	0.01993	1.06984	0.00363	0.00067 U	0.07563	0.02492	0.03175	0.06515	0.00016 U	0.0107	0.01195 U	0.00026	2.96	3.88
15 (AM-5)	GW-27 (D)	2/5/2020	0.0869 J	54.282	137	0.303	7.64 J	1.78	620	0.00107 U	0.00035 U	0.97527	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.01541	0.002 U	0.00361	0.0034 U	0.00017 U	0.453	0.275 U
15 (AM-5)	GW-27	2/5/2020	0.0883 J	55.114	134	0.307	7.64 J	1.89	596	0.00107 U	0.00035 U	0.98749	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.01505	0.002 U	0.00367	0.0034 U	0.00017 U	0.452	-0.122 U
16 (AM-6)	GW-27	8/19/2020	0.0715 J	51.805	131	0.27	7.67 J	3.17	592	0.00107 U	0.00014 U	0.98213	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.01496	0.00016 U	0.00335	0.0034 U	0.00017 U	0.586	0.619
15 (AM-5)	GW-28	2/17/2020	0.2056	6.3	671	1.11 J-	8.08 J	0.192 J	2226.667	0.00107 U	0.00565	0.25197	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.01778	0.002 U	0.03405	0.0034 UJ	0.00017 U	0.144 U	-0.115 U
16 (AM-6)	GW-28	8/20/2020	0.1862 J	6.31	684	2.02	7.84 J	0.371	2230	0.00107 U	0.00428	0.26388	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.01883	0.00016 U	0.03363	0.0034 U	0.00017 U	0.336	0.747 U
15 (AM-5)	GW-29 (D)	2/5/2020	0.2865	12.523	983	1.22	7.85 J	1.34 J	2916	0.00107 U	0.01285	1.10395	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.03429	0.00016 U	0.00722	0.0034 U	0.00017 U	0.626	0.928
15 (AM-5)	GW-29	2/5/2020	0.3206	12.099	970	1.27	7.96 J	0.322	3640	0.00107 U	0.01156	1.1311	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.03909	0.002 U	0.00368	0.0034 U	0.00017 U	0.612	0.425 U
16 (AM-6)	GW-29	8/20/2020	0.2898	12.566	976	1.23	7.86 J	0.853 J	3700	0.00107 U	0.01266	1.12947	0.00022 U	0.00067 U	0.00145 U	0.00047 U	0.00052 U	0.03705	0.00016 U	0.00684	0.0034 U	0.00017 U	0.635	0.412 U

NOTES:
[1] Lab analyses were completed by Beta Lab and TestAmerica Laboratories, Inc., both of which are accredited/certified laboratories: Beta Lab ISO/IEC 17025 Cert No. 2489.01 (Exp. 11-30-20) and ISO/IEC 9001 Cert. No. 83761-IS7 (Exp. 01-16-21) and TestAmerica NELAP Identification Number: 68-00340, EPA Region: 3, Expiration Date: 08-31-20.
[2] Event Nos. 15 and 16 correspond to Assessment Monitoring (AM) sampling events AM-5 and AM-6, respectively.
[3] Field duplicate samples that were taken for Quality Control purposes are noted with a (D).
NS = not sampled. For GW-26 this occurred due to an insufficient volume of recoverable water in well. For GW-22 this occurred due to inaccesibility of well due to nearby downed overhead electric line.

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.

TABLE 4-1
CCR RULE INTERWELL COMPARISON OF SAMPLING EVENT AM-4, -5, AND -6 APPENDIX IV DATA
NORTHERN BOUNDARY

Northern Boundary							Event 14 (AM-4) Downgradient Wells							
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	<0.00107	<0.00107	<0.00107	<0.00533	<0.00533	<0.00533	<0.00107	
Arsenic	mg/L	Unknown	Poisson	0.00682	0.01	0.01	0.000525	0.11223	0.00253	0.03295	0.02649	0.05792	0.02522	
Barium	mg/L	Log−Normal	Parametric	0.0934	2	2	0.061535	1.23469	0.22915	12.71739	12.57961	9.75893	1.33341	
Beryllium	mg/L	Unknown[c]	DQ[d]	NA	0.004	0.004	<0.00022	<0.00022	<0.00022	<0.0011	<0.0011	<0.00022	0.00437	
Cadmium	mg/L	Unknown[c]	DQ[d]	NA	0.005	0.005	<0.00067	<0.00067	<0.00067	<0.00337	<0.00337	<0.00337	<0.00067	
T. Chromium	mg/L	Unknown[c]	DQ[d]	NA	0.1	0.1	<0.00145	<0.00145	0.00197	<0.00725	<0.00725	0.00915	0.09467	
Cobalt	mg/L	Unknown[c]	DQ[d]	NA	0.006	0.006	<0.00047	<0.00047	<0.00047	0.00325	<0.00238	0.00366	0.0343	
Fluoride	mg/L	Normal	Parametric	9.291	4	9.291	0.1985	1.69	*5.57*	<0.025	<1.25	<0.025	1.46	
Lead	mg/L	Unknown[c]	DQ[d]	NA	0.015	0.015	<0.00052	<0.00052	<0.00052	<0.0026	<0.0026	0.00313	0.03931	
Lithium	mg/L	Normal	Parametric	0.023374	0.04	0.04	0.01578	0.01601	0.01625	0.17117	0.05897	0.03791	0.08245	
Mercury	mg/L	Unknown	Poisson	0.00031	0.002	0.002	<0.00016	<0.00016	<0.00016	<0.00016	<0.00016	<0.00016	<0.00016	
Molybdenum	mg/L	Log−Normal	Parametric	0.006805	0.1	0.1	<0.00113	<0.00113	0.10137	0.00666	0.00609	0.01259	0.00968	
Selenium	mg/L	Unknown[c]	DQ[d]	NA	0.5	0.5	<0.0034	<0.0034	0.01529	<0.017	<0.017	<0.0034	<0.034	
Thallium	mg/L	Unknown[c]	DQ[d]	NA	0.002	0.002	<0.00017	<0.00017	<0.00017	<0.00087	<0.00087	<0.00017	0.00033	
Sum Ra226+Ra228[e]	pCi/L	Unknown	Poisson	0.58	5	5	NA	NA	NA	NA	NA	NA	NA	

Event 14 (AM-4) Upgradient Well GW-7	
<0.00107	U
<0.0007	U
0.08553	
<0.00022	U
<0.00067	U
<0.00145	U
<0.00047	U
8.38	
<0.00052	U
0.0216	
<0.00016	U
<0.00113	U
<0.0068	U
<0.00017	U
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-4.

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

Northern Boundary							Event 15 (AM-5) Downgradient Wells							
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[e]	
Antimony	mg/L	Unknown	Poisson	0.00133	0.006	0.006	<0.00107	<0.00107	<0.00107	0.0011	<0.00107	<0.00107	NS	
Arsenic	mg/L	Unknown	Poisson	0.00682	0.01	0.01	0.00061	0.10665	0.00186	0.03074	0.02656	0.05353	NS	
Barium	mg/L	Log−Normal	Parametric	0.0934	2	2	0.05894	1.20191	0.21382	14.93761	14.08565	8.86509	NS	
Beryllium	mg/L	Unknown[c]	DQ[d]	NA	0.004	0.004	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	NS	
Cadmium	mg/L	Unknown[c]	DQ[d]	NA	0.005	0.005	<0.00067	<0.00067	<0.00067	<0.00067	<0.00067	<0.00067	NS	
T. Chromium	mg/L	Unknown[c]	DQ[d]	NA	0.1	0.1	<0.00145	<0.00145	0.00231	<0.0029	<0.0029	0.00983	NS	
Cobalt	mg/L	Unknown[c]	DQ[d]	NA	0.006	0.006	<0.00047	<0.00047	<0.00047	0.00248	0.0019	0.00387	NS	
Fluoride	mg/L	Normal	Parametric	9.291	4	9.291	0.26	1.79	*5.75*	<0.025	<0.025	<0.025	NS	
Lead	mg/L	Unknown[c]	DQ[d]	NA	0.015	0.015	<0.00052	<0.00052	<0.00052	<0.00052	0.00052	0.00333	NS	
Lithium	mg/L	Normal	Parametric	0.023374	0.04	0.04	0.01665	0.01516	0.01584	0.14201	0.05213	0.0382	NS	
Mercury	mg/L	Unknown	Poisson	0.00031	0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NS	
Molybdenum	mg/L	Log−Normal	Parametric	0.006805	0.1	0.1	<0.00113	<0.00113	0.09588	0.00731	0.00777	0.01337	NS	
Selenium	mg/L	Unknown[c]	DQ[d]	NA	0.5	0.5	<0.0034	<0.0034	0.025	<0.00136	0.002	<0.00068	NS	
Thallium	mg/L	Unknown[c]	DQ[d]	NA	0.002	0.002	<0.00017	<0.00017	<0.00017	<0.00017	<0.00017	<0.00017	NS	
Sum Ra226+Ra228	pCi/L	Unknown	Poisson	0.58	5	5	<0.2017	1.848	0.371	89.4	46.5	31.7	NS	

Event 15 (AM-5) Upgradient Well GW-7	
<0.00107	U
0.00035	
0.07903	
<0.00022	U
<0.00067	U
<0.00145	U
<0.00047	U
8.13	
<0.00052	U
0.0214	
<0.002	U
<0.00113	U
<0.034	U
<0.00017	U
<0.0081	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.
[e]GW-26 not sampled (NS) due to insufficient recoverable water.

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

TETRA TECH

TABLE 4-1
CCR RULE INTERWELL COMPARISON OF SAMPLING EVENT AM-4, -5, AND -6 APPENDIX IV DATA
NORTHERN BOUNDARY

Northern Boundary							Event 16 (AM-6) Downgradient Wells								Event 16 (AM-6) 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[e]			
Antimony	mg/L	Unknown	Poisson	0.00133	0.006	0.006	<0.00107	<0.00107	<0.00107	<0.00107	<0.00107	<0.00107	<0.00107		<0.00107	U
Arsenic	mg/L	Unknown	Poisson	0.00682	0.01	0.01	0.00057	0.12194	0.00197	0.03297	0.02813	0.05302	0.01993		<0.0014	U
Barium	mg/L	Log−Normal	Parametric	0.0934	2	2	0.06183	1.28708	0.21606	13.85699	13.14589	9.34675	1.06984		0.08249	
Beryllium	mg/L	Unknown[c]	DQ[d]	NA	0.004	0.004	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	0.00363		<0.00022	U
Cadmium	mg/L	Unknown[c]	DQ[d]	NA	0.005	0.005	<0.00067	<0.00067	<0.00067	<0.00067	<0.00067	<0.00067	<0.00067		<0.00067	U
T. Chromium	mg/L	Unknown[c]	DQ[d]	NA	0.1	0.1	<0.00145	<0.00145	<0.00145	<0.0058	<0.0058	0.00867	0.07563		<0.00145	U
Cobalt	mg/L	Unknown[c]	DQ[d]	NA	0.006	0.006	<0.00047	<0.00047	<0.00047	0.00199	0.0016	0.00212	0.02492		<0.00047	U
Fluoride	mg/L	Normal	Parametric	9.291	4	9.291	0.254	1.76	***5.54***	<0.025	<0.025	<0.025	1.46		7.71	
Lead	mg/L	Unknown[c]	DQ[d]	NA	0.015	0.015	<0.00052	<0.00052	<0.00052	0.00058	<0.00052	0.00225	0.03175		<0.00052	U
Lithium	mg/L	Normal	Parametric	0.023374	0.04	0.04	0.01522	0.01594	0.01559	0.12264	0.0499	0.03614	0.06515		0.02153	
Mercury	mg/L	Unknown	Poisson	0.00031	0.002	0.002	<0.00016	<0.00016	<0.00016	<0.00016	<0.00016	<0.00016	<0.00016		<0.00016	U
Molybdenum	mg/L	Log−Normal	Parametric	0.006805	0.1	0.1	<0.00113	<0.00113	0.09454	0.00403	0.00471	0.01376	0.0107		<0.00113	U
Selenium	mg/L	Unknown[c]	DQ[d]	NA	0.5	0.5	<0.0034	<0.0136	0.01433	<0.0136	<0.0136	<0.0034	<0.01195		<0.0068	U
Thallium	mg/L	Unknown[c]	DQ[d]	NA	0.002	0.002	<0.00017	<0.00017	<0.00017	<0.00017	<0.00017	<0.00017	0.00026		<0.00017	U
Sum Ra226+Ra228	pCi/L	Unknown	Poisson	0.58	5	5	<0.365	1.974	0.515	115.7	49.7	36.7	6.84		0.2152	

[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]Filtered sample result for radium presented for Event AM-6 as total result not available.

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

= SSI < GWPS

= SSI > GWPS

= DQ Parameter with Verification Sampling Needed

TETRA TECH

TABLE 4-2
CCR RULE INTERWELL COMPARISON OF SAMPLING EVENT AM-4, -5, AND -6 APPENDIX IV DATA
WESTERN BOUNDARY

Western Boundary							Event 14 (AM-4) Downgradient Wells								Event 14 (AM-4) 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	<0.00107	<0.00107	<0.00107						<0.00107	U
Arsenic	mg/L	Unknown	Poisson	0.00682	0.01	0.01	<0.00035	0.00458	0.01422						<0.0007	U
Barium	mg/L	Log−Normal	Parametric	0.0934	2	2	0.99454	0.26772	1.17521						0.08553	
Beryllium	mg/L	Unknown[c]	DQ[d]	NA	0.004	0.004	<0.00022	<0.00022	<0.00022						<0.00022	U
Cadmium	mg/L	Unknown[c]	DQ[d]	NA	0.005	0.005	<0.00067	<0.00067	<0.00067						<0.00067	U
T. Chromium	mg/L	Unknown[c]	DQ[d]	NA	0.1	0.1	<0.00145	<0.00145	<0.00145						<0.00145	U
Cobalt	mg/L	Unknown[c]	DQ[d]	NA	0.006	0.006	<0.00047	<0.00047	<0.00047						<0.00047	U
Fluoride	mg/L	Normal	Parametric	9.291	4	9.291	0.239	2.09	1.25						8.38	
Lead	mg/L	Unknown[c]	DQ[d]	NA	0.015	0.015	<0.00052	<0.00052	<0.00052						<0.00052	U
Lithium	mg/L	Normal	Parametric	0.023374	0.04	0.04	0.01469	0.01931	0.03459						0.0216	
Mercury	mg/L	Unknown	Poisson	0.00031	0.002	0.002	<0.00016	<0.00016	<0.00016						<0.00016	U
Molybdenum	mg/L	Log−Normal	Parametric	0.006805	0.1	0.1	0.00389	0.03372	0.00416						<0.00113	U
Selenium	mg/L	Unknown[c]	DQ[d]	NA	0.5	0.5	<0.0034	<0.0034	<0.0034						<0.0068	U
Thallium	mg/L	Unknown[c]	DQ[d]	NA	0.002	0.002	<0.00017	<0.00017	<0.00017						<0.00017	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-4.

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

= SSI < GWPS

= SSI > GWPS

= DQ Parameter with Verification Sampling Needed

Western Boundary							Event 15 (AM-5) Downgradient Wells								Event 15 (AM-5) 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	<0.00107	<0.00107	<0.00107						<0.00107	U
Arsenic	mg/L	Unknown	Poisson	0.00682	0.01	0.01	<0.00035	0.00565	0.01156						0.00035	
Barium	mg/L	Log−Normal	Parametric	0.0934	2	2	0.98138	0.25197	1.1311						0.07903	
Beryllium	mg/L	Unknown[c]	DQ[d]	NA	0.004	0.004	<0.00022	<0.00022	<0.00022						<0.00022	U
Cadmium	mg/L	Unknown[c]	DQ[d]	NA	0.005	0.005	<0.00067	<0.00067	<0.00067						<0.00067	U
T. Chromium	mg/L	Unknown[c]	DQ[d]	NA	0.1	0.1	<0.00145	<0.00145	<0.00145						<0.00145	U
Cobalt	mg/L	Unknown[c]	DQ[d]	NA	0.006	0.006	<0.00047	<0.00047	<0.00047						<0.00047	U
Fluoride	mg/L	Normal	Parametric	9.291	4	9.291	0.305	1.11	1.27						8.13	
Lead	mg/L	Unknown[c]	DQ[d]	NA	0.015	0.015	<0.00052	<0.00052	<0.00052						<0.00052	U
Lithium	mg/L	Normal	Parametric	0.023374	0.04	0.04	0.01523	0.01778	0.03909						0.0214	
Mercury	mg/L	Unknown	Poisson	0.00031	0.002	0.002	<0.002	<0.002	<0.002						<0.002	U
Molybdenum	mg/L	Log−Normal	Parametric	0.006805	0.1	0.1	0.00364	0.03405	0.00368						<0.00113	U
Selenium	mg/L	Unknown[c]	DQ[d]	NA	0.5	0.5	<0.0034	<0.0034	<0.0034						<0.034	U
Thallium	mg/L	Unknown[c]	DQ[d]	NA	0.002	0.002	<0.00017	<0.00017	<0.00017						<0.00017	U
Sum Ra226+Ra228	pCi/L	Unknown	Poisson	0.58	5	5	0.52125	<0.029	0.8245						<0.0081	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

TABLE 4-2
CCR RULE INTERWELL COMPARISON OF SAMPLING EVENT AM-4, -5, AND -6 APPENDIX IV DATA
WESTERN BOUNDARY

Western Boundary							Event 16 (AM-6) Downgradient Wells								Event 16 (AM-6) 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	<0.00107	<0.00107	<0.00107						<0.00107	U
Arsenic	mg/L	Unknown	Poisson	0.00682	0.01	0.01	<0.00014	0.00428	0.012755						<0.0014	U
Barium	mg/L	Log−Normal	Parametric	0.0934	2	2	0.98213	0.26388	1.11671						0.08249	
Beryllium	mg/L	Unknown[c]	DQ[d]	NA	0.004	0.004	<0.00022	<0.00022	<0.00022						<0.00022	U
Cadmium	mg/L	Unknown[c]	DQ[d]	NA	0.005	0.005	<0.00067	<0.00067	<0.00067						<0.00067	U
T. Chromium	mg/L	Unknown[c]	DQ[d]	NA	0.1	0.1	<0.00145	<0.00145	<0.00145						<0.00145	U
Cobalt	mg/L	Unknown[c]	DQ[d]	NA	0.006	0.006	<0.00047	<0.00047	<0.00047						<0.00047	U
Fluoride	mg/L	Normal	Parametric	9.291	4	9.291	0.27	2.02	1.225						7.71	
Lead	mg/L	Unknown[c]	DQ[d]	NA	0.015	0.015	<0.00052	<0.00052	<0.00052						<0.00052	U
Lithium	mg/L	Normal	Parametric	0.023374	0.04	0.04	0.01496	0.01883	0.03567						0.02153	
Mercury	mg/L	Unknown	Poisson	0.00031	0.002	0.002	<0.00016	<0.00016	<0.00016						<0.00016	U
Molybdenum	mg/L	Log−Normal	Parametric	0.006805	0.1	0.1	0.00335	0.03363	0.00703						<0.00113	U
Selenium	mg/L	Unknown[c]	DQ[d]	NA	0.5	0.5	<0.0034	<0.0034	<0.0034						<0.0068	U
Thallium	mg/L	Unknown[c]	DQ[d]	NA	0.002	0.002	<0.00017	<0.00017	<0.00017						<0.00017	U
Sum Ra226+Ra228	pCi/L	Unknown	Poisson	0.58	5	5	1.205	0.7095	1.1975						0.2152	

[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_POWERSTATION_PROPOSED_FEB2020_CCR.MXD 1/28/2021 TIM.TEAFORD

References:
1. Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (©2014 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. Groundwater elevations from February 2020 and May 2020 were used to generate contours.

Sedimentation Ponds

GW-19 (716.20)
GW-26 (705.41)
GW-9 (689.98)
GW-3* (NM)
GW-25 (710.23)
GW-16A (652.66)
GW-27 (666.80)
GW-17 (652.73)
MP-4 (648.90)
MP-3 (643.79)
GW-28 (676.84)
GW-4* (746.10)
GW-24 (699.20)
GW-23 (640.27)
GW-20* (820.57)
GW-8 (761.81)
GW-29 (788.11)
MP-1B* (872.59)
GW-12 (670.18)
McElroy's Run Landfill
McElroy's Run Disposal Impoundment
GW-5* (892.15)
GW-7 (890.01)
GW-21 (807.68)
GW-22 (NM)

N

1,000 0 1,000 Feet

Legend

- Pre-CCR Rule Monitoring Well
- Post-CCR Rule Monitoring Well
- GW-#* Not Used for GW Contouring
- GW-# CCR Monitoring Well
- Approximate Waste Boundary
- Approximate Parcel Boundary
- Groundwater Elevation Contour (50-foot)
- (790.17) Groundwater Elevation February 2020 (NM = Not Monitored)
- Grafton Sandstone Outcrop
- Interpreted Groundwater Flow Direction
- Topographic Contour (10-foot)

Geologic Unit Groupings

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

TETRA TECH

CCR RULE GROUNDWATER MONITORING SYSTEM
INTERPRETED GROUNDWATER FLOW FEBRUARY 2020
PLEASANTS POWER STATION
McELROY'S RUN CCB DISPOSAL FACILITY

ALLEGHENY ENERGY SUPPLY COMPANY
GREENSBURG, PENNSYLVANIA

DRAWN BY: T. TEAFORD 01/28/2021
CHECKED BY: J. CLARA 01/28/2021
APPROVED BY: D. MOORE 01/28/2021

CONTRACT NUMBER: 212C-SW-00070

FIGURE NUMBER 2-1

REVISION 0

PGH P:\GIS\FIRST_ENERGY\MAPDOCS\PLEASANTS_POWERSTATION_PROPOSED_AUG2020_CCR.MXD 1/28/2021 TIM.TEAFORD

References:
1. Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (©2014 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. Groundwater elevations from August 2020 and November 2020 were used to generate contours.

Sedimentation Ponds

GW-19 (715.49)
GW-26 (705.22)
GW-9 (687.94)
GW-3* (NM)
GW-25 (710.61)
GW-16A (651.92)
MP-4 (646.85)
GW-17 (652.42)
GW-27 (666.58)
McElroy's Run Landfill
GW-4* (NM)
GW-24 (704.22)
MP-3 (642.13)
GW-28 (677.94)
GW-23 (649.21)
GW-8 (758.96)
GW-20* (825.72)
MP-1B* (848.69)
GW-29 (787.83)
McElroy's Run Disposal Impoundment
GW-12 (658.63)
GW-5* (891.48)
GW-7 (888.80)
GW-22 (752.44)
GW-21 (807.51)

N

1,000 0 1,000 Feet

Legend

- Pre-CCR Rule Monitoring Well
- Post-CCR Rule Monitoring Well
- GW-#* Not Used for GW Contouring
- GW-# CCR Monitoring Well
- Approximate Waste Boundary
- Approximate Parcel Boundary
- Groundwater Elevation Contour (50-foot)
- (790.17) Groundwater Elevation August 2020 (NM = Not Monitored)
- Grafton Sandstone Outcrop
- Interpreted Groundwater Flow Direction
- Topographic Contour (10-foot)

Geologic Unit Groupings

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

TETRA TECH

CCR RULE GROUNDWATER MONITORING SYSTEM
INTERPRETED GROUNDWATER FLOW AUGUST 2020
PLEASANTS POWER STATION
McELROY'S RUN CCB DISPOSAL FACILITY

ALLEGHENY ENERGY SUPPLY COMPANY
GREENSBURG, PENNSYLVANIA

DRAWN BY: T. TEAFORD 01/28/2021
CHECKED BY: D. LAPIKAS 01/28/2021
APPROVED BY: D. MOORE 01/28/2021

CONTRACT NUMBER: 212C-SW-00070

FIGURE NUMBER 2-2

REVISION 0

ATTACHMENT A

SEMI-ANNUAL SELECTION OF REMEDY (SoR) PROGRESS REPORT (Q1 and Q2 2020)

McELROY'S RUN COAL COMBUSTION BYPRODUCT DISPOSAL FACILITY

Pleasants Power Station
Pleasants County, West Virginia

Prepared for:

FirstEnergy

800 Cabin Hill Drive
Greensburg, PA 15601

Prepared by:

Tetra Tech, Inc.

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Tetra Tech Project No. 212C-SW-00070

August 2020

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 FirstEnergy Generation (FE) for the Coal Combustion Byproduct Disposal Facility ("CCBDF", "CCR unit", or "Site") at the Pleasants Power Station (hereinafter referred to as the "Station"). The Station and CCBDF 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 2020 (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 to date in selecting and designing the remedy for addressing arsenic concentrations in groundwater downgradient of the CCR unit 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 unit, 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 2019 Annual CCR Rule Groundwater Monitoring and Corrective Action Report (McElroy's Run CCB Disposal Facility 2019 Annual GWMCA Report). The following section provides background information as it relates to the SoR at the CCR unit.

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 unit 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 are 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 unit. 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 FE 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, ranks highest among the evaluated options. In September 2019, pursuant to 40 CFR 257.96(d), the ACM Report was posted in the CCR unit's 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:

- 40 CFR 257.95(g)(1)(i) requires that the extent of groundwater impacts be defined by installing additional monitoring wells as necessary. In order to fulfill this requirement, six new downgradient monitoring wells, including three off-site locations, have been identified and field staked. These new monitoring wells will serve to better characterize the extent of arsenic in groundwater and to evaluate potential natural attenuation impacts on arsenic concentrations downgradient of the CCR unit. For the proposed off-site well locations, FE is currently negotiating right-of-access and lease agreements with the landowners so the new wells can be installed.
- Initiating 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.

- Initiated a review of 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 2020, which included sampling of the site's eleven CCR monitoring wells with analyses for all Appendix III and Appendix IV parameters along with targeted general chemistry parameters to assist in evaluating potential natural attenuation impacts.
- Determined February 2020 groundwater flow patterns in the monitoring network area downgradient of the CCR unit and found they were 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:

- Continue evaluation of the historic groundwater monitoring data set for relationships between key parameters affecting arsenic natural attenuation and arsenic concentrations in groundwater.
- Complete development of the Arsenic Natural Attenuation Evaluation Work Plan.
- Install, develop, and sample the six additional downgradient groundwater monitoring wells for arsenic and natural attenuation parameters.
- 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), FE 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, FE 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), FE will specify, as part of the selected arsenic remedy, a schedule(s) for implementing and completing remedial activities.
- Complete the second scheduled 2020 AM sampling event at the Site.

Should the final remedy for the CCR unit not be selected during 3Q or 4Q 2020, 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 2020)

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

January 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 second two quarters (Q3 and Q4) of calendar year 2020 (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 2019 Annual CCR Rule Groundwater Monitoring and Corrective Action Report (McElroy's Run CCB Disposal Facility 2019 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:

- 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, six new downgradient monitoring wells, including three off-site locations, were identified, the current off-site landowners were contacted, and all of the proposed well locations were field staked during Q2 and Q3 2020. For the proposed off-site well locations, AESC also commenced negotiations with the off-site landowners to establish right-of-access and lease agreements to install and sample the proposed new wells. These negotiations continued throughout Q3 and Q4 and remain in-progress.
- Technical specifications and a Request for Proposal (RFP) were prepared for installing, developing, and performing aquifer characterization testing of all the proposed new monitoring wells (on-site and off-site). The RFPs were issued to

multiple drilling firms and bids were received in December 2020, with work planned to commence in early 2021 once the off-site landowner agreements are 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 August 2020, 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 August 2020 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:

- Continue evaluation of the historic groundwater monitoring data set for relationships between key parameters affecting arsenic natural attenuation and arsenic concentrations in groundwater.
- Complete development of the Arsenic Natural Attenuation Evaluation Work Plan.
- Finalize the right-of-access and lease agreements for the proposed new off-site monitoring locations and install, develop, and sample the six additional downgradient groundwater monitoring wells for arsenic and natural attenuation parameters.
- 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.
- Complete the scheduled 2021 AM sampling events at the site.

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).