2021 ANNUAL CCR RULE GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

COAL COMBUSTION BYPRODUCT LANDFILL

Harrison Power Station
Harrison County, West Virginia

Prepared for:

FirstEnergy

800 Cabin Hill Drive
Greensburg, PA 15601

Prepared by:

Tetra Tech, Inc.

400 Penn Center Boulevard, Suite 200
Pittsburgh, PA 15235
Phone: (412) 829-3600
Fax: (412) 829-3260

Tetra Tech Project No. 212C-SW-00069

January 2022

2021 ANNUAL CCR RULE GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

COAL COMBUSTION BYPRODUCT LANDFILL

HARRISON POWER STATION
HARRISON COUNTY, WEST VIRGINIA

Prepared for:

FirstEnergy

800 Cabin Hill Drive
Greensburg, PA 15601

Prepared by:

Tetra Tech, Inc.
400 Penn Center Boulevard, Suite 200
Pittsburgh, PA 15235
Phone: (412) 829-3600
Fax: (412) 829-3260

Tetra Tech Project No. 212C-SW-00069

January 2022

TABLE OF CONTENTS

TABLES

FIGURES

ATTACHMENTS

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 FirstEnergy (FE), for the Coal Combustion Byproduct Landfill ("CCBL", "CCR unit", or "site") at the Harrison Power Station (hereinafter referred to as the "Station"). The CCR unit and Station are located in Harrison 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 MW-20 (Same parameter and same well as Sampling Events AM-1 through AM-6)
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 facility's captive CCBL, which is located approximately 1.5 miles north of the Station. The landfill is an existing CCR unit that is regulated under West Virginia Department of Environmental Protection (WVDEP) Solid Waste/National Pollutant Discharge Elimination System (NPDES) Water Pollution Control Permit No. WV0075795

and under the CCR Rule. A WVDEP groundwater monitoring program for the landfill has been in effect since 1993 and a separate CCR Rule groundwater monitoring program has been in effect since 2017. The CCBL facility consists of three adjacent disposal areas; the Main Area (MA - approximately 150 acres), the Lower Area (LA - approximately 126 acres), and the Upper Area (UA - approximately 120 acres). Of this total combined area, approximately 310 acres are currently permitted for landfill operations. Historically, most landfilling operations were performed in the MA and LA disposal areas, with the UA disposal area more recently developed for use.

The MA disposal area, which has both unlined and lined portions, received CCRs from the Station when the first generating units began operating in 1972, and was closed from 1979 (when disposal operations shifted over to the LA) until being reactivated in 2005. The LA disposal area is still active and also has both unlined (pre-1994) and lined portions, with the liner system consisting of a 24-inch thick engineered compacted clay liner underlain by a leachate detection zone and overlain with a leachate collection system. The MA and UA have been used for CCR disposal since 2005 and 2011, respectively, with MA disposal being an overlay of the materials originally placed there, and UA disposal being in new, lined areas that utilize one of three different liner systems. Pre-CCR Rule areas in the UA have a liner consisting of either 24-inches of compacted clay or a layer of “enhanced” FGD by-product (amended with excess lime) that are underlain by a leachate detection zone and overlain with a leachate collection system. Starting in 2018, post-CCR Rule areas in the UA have a composite liner system comprised of a geomembrane and geosynthetic clay liner underlain by a leachate detection zone and overlain by a leachate collection system. Stormwater runoff and leachate from the CCBL discharge to a lined sedimentation pond, referred to as Sedimentation Pond No. 1.

Groundwater in the CCBL area occurs primarily within fractured bedrock and flow is controlled by a combination of topography and the bedrock structure (i.e., dip). The Lower Sewickley Sandstone has been identified as the uppermost aquifer for CCR Rule groundwater monitoring for the CCBL. This aquifer is situated approximately 60 to 70 feet above the Pittsburgh Coal which has been extensively deep mined across the site. In some localized areas, collapse of the abandoned mine workings is potentially resulting in overburden fracturing that could serve as a drain for groundwater in the Lower Sewickley Sandstone and other overlying rock units to migrate vertically into the abandoned mine workings, however, this is not believed to be significant on a large scale. Historic and recent groundwater level data indicate groundwater flow at the CCBL to be from west to east (approximating the dip of the Pittsburgh Coal), and that the flow exhibits 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 Table 4-1); 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 CCBL 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 unit 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 CCBL.

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 one upgradient (background) well (MW-5), and four downgradient wells (MW-17, -18, -19, and -20), as summarized in attached Table 2-1 and shown on attached Figures 2-1 and 2-2. However, the well network is currently being modified as noted below:

- One of the key planned activities outlined in the 2020 AGMCA Report and discussed in Section 2.2 of this report, was the redevelopment of MW-18. Due to having insufficient recoverable volumes of groundwater for the collection of samples, monitoring well MW-18 was redeveloped in October 2021 and then left to stabilize hydraulically and geochemically for the remainder of the calendar year. Sampling of MW-18 will be attempted during the AM-9 event scheduled for the first quarter of 2022. Should MW-18 subsequently fail to provide sufficient water for sampling, FE will make a determination as to the viability of replacing MW-18 with a new well at a position as close as practical to its existing location or abandoning and permanently removing it from the monitoring network.

- Another key planned activity discussed in the 2020 AGMCA Report was installing additional monitoring wells positioned both down-gradient and side-gradient of the facility boundary as part of the CCR unit's ongoing SoR work. However, it was determined that installation of the downgradient well (designated as MW-23) was of primary importance and, depending on the chemistry data from that well, one or both of the side-gradient wells (designated as MW-21 and MW-22) may not need to be installed. As such, this activity was partially completed in October 2021 with the installation and development of new downgradient monitoring well MW-23. This well has also been left to stabilize hydraulically and geochemically for the remainder of the calendar year and initial sampling will be

attempted during the AM-9 event scheduled for the first quarter of 2022. At that time the well will be added to the certified CCR monitoring well network.

As shown on Figure 2-2, MW-23 is located beyond the eastern facility boundary on property that is not owned by FE. Since groundwater flow in the uppermost aquifer at the CCR unit (Lower Sewickley Sandstone) approximates the dip of the bedrock at the site and flows primarily west to east, MW-23 is positioned downdip/downgradient of existing downgradient monitoring well MW-19. This location was established to monitor potential arsenic migration beyond the facility boundary that could affect the downgradient property.

The new well was drilled and installed between July 28 and August 13, 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 well was drilled using hollow-stem auger and air rotary/air hammer drilling techniques. The depth of the well was determined in the field by an on-site geologist based on the targeted formation (Lower Sewickley Sandstone) and was installed above the limestone unit that defines the base of this formation. A detailed log of the borehole was maintained, documenting the borehole lithology, water-bearing zones, and other pertinent information (see Attachment A). Upon completing and clearing the borehole by airlifting, packer tests were performed to determine the hydraulic conductivity of the targeted monitoring zone by evaluating two, 10-foot-thick packer intervals to aid in SoR activities. Specific details and results of the packer testing will be provided and summarized in the final SoR report that will be prepared for the site. Upon completing the packer tests the monitoring well was then installed in the borehole.

The new monitoring well was constructed of 4-inch diameter Schedule 80 polyvinyl chloride (PVC) well screen and casing. The larger diameter and thicker casing were utilized in the new well 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 well (approximately 385 feet below ground surface). The monitoring well was constructed with a 20-foot length of 0.010-inch slotted screen. The annulus around the 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. A steel protective casing with an aluminum lockable cap was installed at the surface, 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.

Following installation, a first attempt to develop the well was performed but could not be successfully completed due to repeated pump malfunctions. The well was then successfully developed on October 13, 2021, 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). The ground surface, top of PVC well casing, and top of the protective casing are scheduled to be surveyed during the first quarter of 2022 for 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 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

Consistent with past sampling events, having sufficient recoverable volumes of groundwater from downgradient well MW-18 continued to be a problem during 2021 with no groundwater samples being collected from MW-18 during AM-7 or AM-8. This well has been part of the WVDEP

groundwater monitoring program for several years and had historically been able to yield sufficient water, although it did require redevelopment in 2015 when its sampling volume yield decreased. The lack of sufficient recoverable water in MW-18 was first believed to be from overstressing the well due to the large number of background samples that had to be obtained prior to the required CCR groundwater DM startup date of October 2017. However, since October 2017, MW-18 has not recovered to its historical water levels or yields. Since the remaining CCR monitoring network still met the minimum required number of downgradient wells, MW-18's water levels continued to be measured and it was eventually designated for redevelopment in an attempt to make it viable for sampling once again, as discussed in the 2019 and 2020 AGMCA Reports. The water levels measured in MW-18 during the first and third quarters of 2021 are presented below:

Date	Depth to Water (ft)	Total Well Depth (ft)	Total Standing Water Depth (ft)
3/9/2021	265.54	266.80	1.26
8/25/2021	265.65	266.80	1.15

As part of the new monitoring well installation work discussed in Section 2.1.1 of this report, MW-18 was redeveloped on October 14, 2021. Redevelopment was accomplished by first surging the well with 250 gallons of potable water obtained from the Station, followed by pumping the well dry using a portable submersible pump. This surge/purge process was repeated three times (i.e., a total of 750 gallons of water was introduced and then removed from the well) with the turbidity reading at the end of the third pumping cycle being 0.0 Nephelometric Turbidity Units (NTUs). The well was then left to stabilize hydraulically and geochemically, and sampling will be attempted during the AM-9 event scheduled for the first quarter of 2022. Field records for the redevelopment work that was performed for MW-18 are included in Attachment A of this report. Should MW-18 subsequently fail to provide sufficient water for sampling, FE will make a determination as to the viability of replacing MW-18 with a new well at a position as close as practical to its existing location or abandoning and permanently removing it from the monitoring network.

In addition to MW-18, there was insufficient water available in MW-20 during AM-7 to allow sampling with a bladder pump, so sampling was attempted using Hydrasleeves. However, this method was only able to recover approximately 100 mL of water, so no AM-7 analyses were performed for MW-20. During AM-8 the water level in MW-20 was again too low to allow sampling with a bladder pump, so sampling was performed using a bailer, with a sufficient volume of water recovered to complete all of the AM-8 analyses.

Other than the available groundwater sampling volumes for downgradient wells MW-18, MW-19, and MW-20 noted 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 unit 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 (Appendix IV 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 also documented in the 2019 AGMCA Report. Since that time and throughout 2021, the CCR unit has 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).
- Should MW-18 fail to provide sufficient water for sampling following the redevelopment work completed in October 2021, a determination will be made as to the viability of replacing MW-18 with a new well at a position as close as practical to its existing location or to abandon and permanently remove it from the monitoring network.
- 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 unit 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 MW-23; evaluating the chemistry data from MW-23 to determine if one or both of the proposed side-gradient wells positioned on FE-owned property (MW-21 and MW-22) may not need to be installed; installing, surveying, and sampling MW-21 and MW-22) if it is determined they are needed; 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 40 CFR § 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 unit 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 March 9 and 10, 2021 and between August 25 and 30, 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, over the duration of the CCR program implemented at the site, combined radium 226/228 concentrations have either been below detectible limits or, when detected, measured at concentrations well below the associated GWPS in all of the wells that are part of the monitoring network. As such, the lack of radium data for AM-7 is not believed to have affected the 2021 AM program evaluations for the CCR unit. The analyses that were performed during AM-7 and AM-8 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 December 5, 2021 for AM-7 and AM-8, respectively. Table 3-1 presents the validated analytical results for these events.

Statistical evaluations of AM data performed in 2021 included sampling events AM-7 and AM-8. 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 unit 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 Table 4-1 and discussed below.

AM-7 and AM-8 data were generally consistent with the AM-1 to AM-6 data, with arsenic continuing to be the only parameter regularly found at SSLs above its GWPS in MW-20. Arsenic was also originally identified at SSLs in MW-19 during AM-1 and AM-3 but has consistently been below its GWPS from AM-4 through AM-8, a period of approximately 2-1/2 years. Molybdenum, which was identified in 2019 as a potential SSL in MW-20, also continued its downward trend below the GWPS, consistent with what was first observed in AM-3, a period of approximately 3 years. As documented in the 2020 AGMCA Report, during AM-6 a potential SSL for lead was

also identified for MW-20 but was ultimately determined to be an outlier due to the sampling method employed and the associated turbidity of the sample. This determination was substantiated during 2021 as lead was measured in MW-20 at concentrations well below its UPL, consistent with the results from AM-1 through AM-5.

One parameter that did exhibit a change during 2021 was lithium. During AM-8, it was found for the first time at a concentration (0.04003 mg/L) equivalent to its GWPS in MW-19. This result has been deemed anomalous as lithium has previously not been found at concentrations above its GWPS in any of the downgradient wells at the site, although lithium has exhibited a slight upward trend in MW-19 since AM-6. During AM-8, MW-19 was sampled with a Hydrasleeve and bailer due to operating issues with the well's dedicated bladder pump. This sampling methodology produced a sample set with high turbidity readings. Supplemental laboratory testing of a filtered sample fraction for MW-19 found that the dissolved lithium concentration for AM-8 was 0.032 mg/L, which is below the GWPS. Based on this finding, the increase in lithium concentration for AM-8 is considered to be an outlier due to the sampling method employed and the associated turbidity of the sample. Additionally, lithium occurs naturally at the site and from AM-1 through AM-8 has been measured in upgradient well MW-5 at concentrations between 0.012 and 0.018 mg/L, with the highest values in this range being measured during AM-7 and AM-8. As such, the measured lithium increases in MW-19 appear to be attributable to both sample methodology (turbidity) and the upward trending of background concentrations observed in MW-5. Additional data are needed to accurately assess if the lithium trends observed in MW-19 during the current reporting period are attributable to sample methodology, are anomalous, reflect an increase in natural (background) concentrations, or are due to some combination of these factors. This data will be obtained and evaluated as part of the 2022 AM program.

Taking into account the continued downward trend of molybdenum noted above and the data presented in Table 4-1, no other Appendix IV constituents other than those discussed herein were detected at SSLs above their GWPS under the CCR unit's AM program during the reporting period, and arsenic remains the only parameter that is the focus of ongoing SoR activities for the CCR unit as discussed in Section 5 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 unit's 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 unit, 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 have been 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 unit, the first of three proposed new monitoring wells (MW-23) was installed and developed and an existing monitoring well (MW-18) was redeveloped as detailed in Section 2.1.1 of this report.
- 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 March and August 2021 groundwater flow patterns in the monitoring network area downgradient of the CCR unit 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 other than arsenic at SSLs above the CCR unit's established GWPS.

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
HARRISON CCB LANDFILL- 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)							
MW-5	1993	Lower Sewickley SS	1283.98	208.5	148.5 – 208.5	1075.52 – 1135.52	4" - Sch. 40 PVC
Downgradient							
MW-17	1997	Lower Sewickley SS	1070.64	60.6	20.6 – 60.6	1010.04 – 1050.04	2" - Sch. 40 PVC
MW-18*	1997	Lower Sewickley SS	1265.91	264.8	224.8 – 264.8	1001.11 – 1041.11	4" - Sch. 40 PVC
MW-19	2016	Lower Sewickley SS	1462.87	513.9	503.9 – 513.9	948.99 – 958.99	2.5" - Sch. 80 PVC
MW-20	2016	Lower Sewickley SS	1414.28	364.0	349.0 – 364.0	1050.30 – 1065.30	2.5" - Sch. 80 PVC
MW-23**	2021	Lower Sewickley SS	1375***	385.0	365.0 – 385.0	990 – 1010***	4" – Sch. 80 PVC

Notes: SS = sandstone MSL = mean sea level bgs = below ground surface ID = inside diameter PVC = polyvinyl chloride
* = Only used 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
18 (AM-7)	MW-5	03/09/2021	0.1263 J	11.371	1.09	1.1	7.91 J	50.6 J-	532	0.002 U	0.00027 J	0.07842	0.0004 U	0.0012 U	0.003 U	0.002 U	0.001 U	0.01788	0.00075 U	0.00055 J	0.006 U	0.00036 U	NA	NA
18 (AM-7)	MW-5 (D)	03/09/2021	0.1142 J	10.902	1.09	1.11	7.96 J	50.5 J-	524	0.002 U	0.00022 J	0.07611	0.0004 U	0.0012 U	0.003 U	0.002 U	0.001 U	0.01768	0.00075 U	0.002 U	0.006 U	0.00036 U	NA	NA
19 (AM-8)	MW-5	08/26/2021	0.0969 J	19.596	1.05	0.43	7.64 J	51.5	428	0.005 U	0.00054 J	0.10027	0.0004 U	0.0017 U	0.0072 U	0.00026 J	0.00083 J	0.01757	0.00075 U	0.005 U	0.0068 U	0.0006 U	0.447	0.228 U
19 (AM-8)	MW-5 (D)	08/26/2021	0.0864 J	19.329	1.04	0.417	7.62 J	51.9	452	0.005 U	0.00047 J	0.10004	0.0004 U	0.0017 U	0.0072 U	0.00025 J	0.00082 J	0.01746	0.00075 U	0.005 U	0.0068 U	0.0006 U	0.321 U	0.167 U
18 (AM-7)	MW-17	03/09/2021	0.035 J	127	85.3	0.066 J	7.11 J	102 J-	588	0.002 U	0.00194	0.1015	0.0004 U	0.0012 U	0.00059 J	0.00026 J	0.00031 J	0.01945	0.00075 U	0.00047 J	0.006 U	0.00036 U	NA	NA
19 (AM-8)	MW-17	08/25/2021	0.0674 J	127	85.9	0.059 J	7.05 J	97.4	692	0.005 U	0.00143	0.17632	0.0004 U	0.0017 U	0.0072 U	0.00051 J	0.00074 J	0.02025	0.00075 U	0.005 U	0.0068 U	0.0006 U	0.631 U	-0.154 UJ
18 (AM-7)	MW-18[4]	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
19 (AM-8)	MW-18[4]	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-7)	MW-19	03/10/2021	0.2056	3.91	172	1.38	8.07 J	139	1730	0.005 U	0.00341	0.09035	0.001 U	0.0012 U	0.00214	0.00062 J	0.00077	0.02301	0.00075 U	0.01415	0.006 U	0.00036 U	NA	NA
19 (AM-8)	MW-19	08/30/2021	0.2397	8.91	181	1.17	7.95 J	37.7 J+	2480	0.005 U	0.00388	0.15158	0.00036	0.0017 U	0.00889	0.00369	0.00378	0.04003	0.00075 U	0.00686	0.0068 U	0.0006 U	0.877 UJ	1.4 UJ
18 (AM-7)	MW-20[4]	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
19 (AM-8)	MW-20	08/26/2021	0.5159	28.194	714	2.56	10.38 J	425	18000	0.0023 J	0.04907	0.08486	0.0004 U	0.0017 U	0.01415	0.00107	0.00169	0.03871	0.00075 U	0.0285	0.0068 U	0.0006 U	0.0178 U	0.699 UJ

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. 18 and 19 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 MW-18 this occurred due to an insufficient volume of recoverable water in the well during both AM events. For MW-20 there was an insufficient volume of recoverable water in the well during AM-7.

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.

TABLE 4-1
CCR RULE INTERWELL COMPARISON OF SAMPLING EVENT AM-7 AND -8 APPENDIX IV DATA

Lower Sewickley Sandstone							Event 18 (AM-7) Downgradient Wells						Event 18 (AM-7) Upgradient Well MW-5[e]	
Parameter	Units	Data Distribution for Upgradient Well MW-5	UPL Type	UPL Value[a,b]	Federal MCLs/RSLs	GWPS	MW-17[e]	MW-18[f]	MW-19[e]	MW-20[f]				
Antimony	mg/L	Unknown	Poisson	0.00143	0.006	0.006	<0.002	NS	<0.005	NS			<0.002	U
Arsenic	mg/L	Unknown	Non-parametric	0.0005	0.01	0.01	0.00194	NS	0.00341	NS			0.000245	J
Barium	mg/L	Normal	Parametric	0.152477	2	2	0.1015	NS	0.09035	NS			0.077265	
Beryllium	mg/L	Unknown	Poisson	0.00156	0.004	0.004	<0.0004	NS	<0.001	NS			<0.0004	U
Cadmium	mg/L	Unknown	Poisson	0.00143	0.005	0.005	<0.0012	NS	<0.0012	NS			<0.0012	U
T. Chromium	mg/L	Unknown	Poisson	0.00758	0.1	0.1	0.00059	NS	0.00214	NS			<0.003	U
Cobalt	mg/L	Unknown[c]	DQ[d]	NA	0.006	0.006	0.00026	NS	0.00062	NS			<0.002	U
Fluoride	mg/L	Normal	Parametric	2.251	4	4	0.066	NS	1.38	NS			1.105	
Lead	mg/L	Unknown	Poisson	0.00425	0.015	0.015	0.00031	NS	0.00077	NS			<0.001	U
Lithium	mg/L	Normal	Parametric	0.018835	0.04	0.04	0.01945	NS	0.02301	NS			0.01778	
Mercury	mg/L	Unknown	Poisson	0.00032	0.002	0.002	<0.00075	NS	<0.00075	NS			<0.00075	U
Molybdenum	mg/L	Log Normal	Parametric	0.01496	0.1	0.1	0.00047	NS	0.01415	NS			0.000775	
Selenium	mg/L	Unknown[c]	DQ[d]	NA	0.5	0.5	<0.006	NS	<0.006	NS			<0.006	U
Thallium	mg/L	Unknown	Poisson	0.00143	0.002	0.002	<0.00036	NS	<0.00036	NS			<0.00036	U
Sum Ra226+Ra228	pCi/L	Log Normal	Parametric	1.599	5	5	NA	NS	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 18.

[f]MW-18 and MW-20 not sampled (NS) due to insufficient water.

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

= SSI < GWPS

= SSI > GWPS

= DQ Parameter with Verification Sampling Needed

Lower Sewickley Sandstone							Event 19 (AM-8) Downgradient Wells						Event 19 (AM-8) Upgradient Well MW-5	
Parameter	Units	Data Distribution for Upgradient Well MW-5	UPL Type	UPL Value[a,b]	Federal MCLs/RSLs	GWPS	MW-17	MW-18[e]	MW-19	MW-20				
Antimony	mg/L	Unknown	Poisson	0.00143	0.006	0.006	<0.005	NS	<0.005	0.0023			<0.005	U
Arsenic	mg/L	Unknown	Non-parametric	0.0005	0.01	0.01	0.00143	NS	0.00388	0.04907			0.000505	J
Barium	mg/L	Normal	Parametric	0.152477	2	2	0.17632	NS	0.15158	0.08486			0.100155	
Beryllium	mg/L	Unknown	Poisson	0.00156	0.004	0.004	<0.0004	NS	0.00036	<0.0004			<0.0004	U
Cadmium	mg/L	Unknown	Poisson	0.00143	0.005	0.005	<0.0017	NS	<0.0017	<0.0017			<0.0017	U
T. Chromium	mg/L	Unknown	Poisson	0.00758	0.1	0.1	<0.0072	NS	0.00889	0.01415			<0.0072	U
Cobalt	mg/L	Unknown[c]	DQ[d]	NA	0.006	0.006	0.00051	NS	0.00369	0.00107			0.000255	J
Fluoride	mg/L	Normal	Parametric	2.251	4	4	0.059	NS	1.17	2.56			0.4235	
Lead	mg/L	Unknown	Poisson	0.00425	0.015	0.015	0.00074	NS	0.00378	0.00169			0.000825	J
Lithium	mg/L	Normal	Parametric	0.018835	0.04	0.04	0.02025	NS	0.04003	0.03871			0.017515	
Mercury	mg/L	Unknown	Poisson	0.00032	0.002	0.002	<0.00075	NS	<0.00075	<0.00075			<0.00075	U
Molybdenum	mg/L	Log Normal	Parametric	0.01496	0.1	0.1	<0.005	NS	0.00686	0.0285			<0.005	U
Selenium	mg/L	Unknown[c]	DQ[d]	NA	0.5	0.5	<0.0068	NS	<0.0068	<0.0068			<0.0068	U
Thallium	mg/L	Unknown	Poisson	0.00143	0.002	0.002	<0.0006	NS	<0.0006	<0.0006			<0.0006	U
Sum Ra226+Ra228	pCi/L	Log Normal	Parametric	1.599	5	5	<0.631	NS	<2.277	<0.7168			0.4025	

[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]MW-18 not sampled (NS) due to insufficient water.

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

= SSI < GWPS

= SSI > GWPS

= DQ Parameter with Verification Sampling Needed

TETRA TECH

FIGURES

PGH P:\GIS\FIRST_ENERGY\MAPDOCS\HARRISON\HARRISON_CCR_GWMONITORING_2021_03MAR.MXD 1/28/2022 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. Approximate Waste Boundary line was obtained from FirstEnergy Drawing No. C89506725, Rev. 1, dated 1/25/2011.
4. Monitoring well locations and the approximate Parcel Boundary line were obtained from FirstEnergy Drawing No. C8950199, Rev. B, dated 1/9/2003, and Drawing No. C8950153, Rev. 1, dated 3/27/2002.
5. Monitoring wells MW-19 and MW-20 were installed by Tetra Tech, Inc. in June 2016. As-built well locations were obtained by field survey performed by Tetra Tech, Inc. on 07/11/2016.

WELL NUMBER	NORTHING	EASTING
MW-5	330871.6	1731733.0
MW-17	328548.0	1736010.0
MW-18	329269.8	1736473.2
MW-19	330293.3	1736904.0
MW-20	331766.1	1735688.8

Coordinates are in NAD 1983 State Plane West Virginia North (feet)

N

MW-5 (1095.82)

MW-20 (1053.68)

MW-19 (959.16)

MW-18 (1002.88)

MW-17 (1037.54)

MW-23 (New Well - Not Part of 2021 CCR Program)

Upper Area

Main Area

Lower Area

Sedimentation Pond No. 1

1,000 0 1,000 Feet

Legend

- CCR/WVDEP Monitoring Well
- Approximate Waste Boundary
- Approximate Parcel Boundary
- Groundwater Elevation Contour (10-foot) (dashed where inferred)
- (1044.36) Groundwater Elevation March 2021
- Topographic Contour (10-foot)

TETRA TECH

CCR RULE GROUNDWATER MONITORING SYSTEM
INTERPRETED GROUNDWATER FLOW MARCH 2021
HARRISON POWER STATION
CCB LANDFILL

FIRSTENERGY CORPORATION
GREENSBURG, PENNSYLVANIA

DRAWN BY: T. TEAFORD 01/28/2022
CHECKED BY: J. MARLOW 01/28/2022
APPROVED BY: B. BAKER 01/28/2022

CONTRACT NUMBER: 212C-SW-00069

FIGURE NUMBER 2-1

REVISION 0

PGH P:\GIS\FIRST_ENERGY\MAPDOCS\HARRISON\HARRISON_CCR_GWMONITORING_2021_08AUG.MXD 1/28/2022 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. Approximate Waste Boundary line was obtained from FirstEnergy Drawing No. C89506725, Rev. 1, dated 1/25/2011.
4. Monitoring well locations and the approximate Parcel Boundary line were obtained from FirstEnergy Drawing No. C8950199, Rev. B, dated 1/9/2003, and Drawing No. C8950153, Rev. 1, dated 3/27/2002.
5. Monitoring wells MW-19 and MW-20 were installed by Tetra Tech, Inc. in June 2016. As-built well locations were obtained by field survey performed by Tetra Tech, Inc. on 07/11/2016.

WELL NUMBER	NORTHING	EASTING
MW-5	330871.6	1731733.0
MW-17	328548.0	1736010.0
MW-18	329269.8	1736473.2
MW-19	330293.3	1736904.0
MW-20	331766.1	1735688.8

Coordinates are in NAD 1983 State Plane West Virginia North (feet)

N

MW-5 (1089.51)
MW-17 (1033.10)
MW-18 (1002.77)
MW-19 (957.44)
MW-20 (1054.43)

Upper Area
Main Area
Lower Area

MW-23 (New Well - Not Part of 2021 CCR Program)

Sedimentation Pond No. 1

1,000 0 1,000 Feet

Legend

- CCR/WVDEP Monitoring Well
- Approximate Waste Boundary
- Approximate Parcel Boundary
- Groundwater Elevation Contour (10-foot) (dashed where inferred)
- (1044.36) Groundwater Elevation August 2021
- Topographic Contour (10-foot)

TETRA TECH

CCR RULE GROUNDWATER MONITORING SYSTEM
INTERPRETED GROUNDWATER FLOW AUGUST 2021
HARRISON POWER STATION
CCB LANDFILL

FIRSTENERGY CORPORATION
GREENSBURG, PENNSYLVANIA

DRAWN BY: T. TEAFORD 01/28/2022
CHECKED BY: J. MARLOW 01/28/2022
APPROVED BY: B. BAKER 01/28/2022

CONTRACT NUMBER: 212C-SW-00069

FIGURE NUMBER 2-2

REVISION 0

ATTACHMENT A

Tetra Tech
661 Andersen Drive Pittsburgh,
Pennsylvania 15220 Telephone:
412-921-7090

WELL NUMBER MW-23

CLIENT FirstEnergy
PROJECT NAME Harrison Station CCB Landfill
PROJECT NUMBER 212C-SW-00069
PROJECT LOCATION Harrison County, WV
DATE STARTED 7/28/21 **COMPLETED** 8/3/21
GROUND ELEVATION 1370 ft **HOLE SIZE** 10" OB / 6" BR
DRILLING CONTRACTOR Eichelbergers, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Air Rotary
AT TIME OF DRILLING 207.00 ft / Elev 1163.00 ft Return Water Observation
LOGGED BY D.Lapikas **CHECKED BY** J. Clara
AT END OF DRILLING ---
NOTES 8-Inch Steel casing (0-20' bgs) grouted in place
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
0					8-Inch Steel Stickup
			0.5 TOPSOIL w/ ORGANICS.	1369.5	4-Inch PVC Stickup
			SANDY CLAY, some SILT, homogeneous, angular, subangular, soft to medium dense, uniformly graded, medium plasticity, moist, dark brown to light tan.		
			5.0	1365.0	
			CLAYEY SAND, trace CLAYSTONE, angular, subangular, soft to medium hard dense, well graded, dry, light tan to light red.		
10			10.0	1360.0	8-Inch Steel Casing (0'-20')
			CLAYSTONE and SILT, some SAND, very dense, dry, homogeneous, uniformly graded, angular, subangular, very loose, light red to dark tan, residuum.		
			13.0	1357.0	
			SANDSTONE, some trace SHALE and interbedded CLAYSTONE, fine grained, hard, fresh, indistinct bedding, flat dip, tight joints, dry, dark gray.		
20					
			25.0	1345.0	
			SHALE, some interbedded SANDSTONE, fine grained, hard, fresh, indistinct bedding, tight joints, dry, dark gray.		
30					
			32.0	1338.0	
			COAL, hard, fresh, indistinct bedding, dry, dark black.		
			35.0	1335.0	
			SANDSTONE, some trace SHALE, fine grained, hard, fresh, indistinct bedding, tight joints, dark gray.		
			38.0	1332.0	
40			CLAYSTONE, very dense, dry, angular, subangular, light to dark red.		
			48.0	1322.0	
			SHALE, some interbedded SANDSTONE, fine grained, hard, fresh, indistinct bedding, tight joints, dry, dark gray.		
50					

(Continued Next Page)

Tetra Tech
661 Andersen Drive Pittsburgh,
Pennsylvania 15220 Telephone:
412-921-7090

WELL NUMBER MW-23

CLIENT FirstEnergy **PROJECT NAME** Harrison Station CCB Landfill

PROJECT NUMBER 212C-SW-00069 **PROJECT LOCATION** Harrison County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
50			SHALE, some interbedded SANDSTONE, fine grained, hard, fresh, indistinct bedding, tight joints, dry, dark gray. *(continued)*	
			55.0 1315.0	
			SANDSTONE, fine grained, hard, fresh, indistinct bedding, flat dip, tight joints, dry, gray.	
60				
70				
			78.0 1292.0	
			79.0 SHALE, fine grained, hard, fresh, indistinct bedding, tight joints, dry, dark gray to black. 1291.0	
80			SANDSTONE, lime cement, fine grained, hard, fresh, indistinct bedding, flat dip, tight joints, dry, gray, HCL reaction.	
90				
100				

(Continued Next Page)

Tetra Tech
661 Andersen Drive Pittsburgh,
Pennsylvania 15220 Telephone:
412-921-7090

WELL NUMBER MW-23

CLIENT FirstEnergy **PROJECT NAME** Harrison Station CCB Landfill

PROJECT NUMBER 212C-SW-00069 **PROJECT LOCATION** Harrison County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
110			SANDSTONE, lime cement, fine grained, hard, fresh, indistinct bedding, flat dip, tight joints, dry, gray, HCL reaction. *(continued)*	
			119.0 1251.0	
120			SHALE, lime cement, fine grained, hard, fresh, indistinct bedding, tight joints, dry, dark gray to black, HCL reaction.	
130				
140				
150				
			159.0 1211.0	
160			CLAYSTONE, some interbedded LIMESTONE and COAL, very dense to hard, fresh, indistinct bedding, tight joints, light red and brown to dark gray and black, COAL (Uniontown Coal) from 167' - 169', HCL reaction.	

(Continued Next Page)

Tetra Tech
661 Andersen Drive Pittsburgh,
Pennsylvania 15220 Telephone:
412-921-7090

WELL NUMBER MW-23

CLIENT FirstEnergy **PROJECT NAME** Harrison Station CCB Landfill

PROJECT NUMBER 212C-SW-00069 **PROJECT LOCATION** Harrison County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
170			CLAYSTONE, some interbedded LIMESTONE and COAL, very dense to hard, fresh, indistinct bedding, tight joints, light red and brown to dark gray and black, COAL (Uniontown Coal) from 167' - 169', HCL reaction. *(continued)*	
			169.0 1201.0	
			LIMESTONE, some interbedded SHALE, fine grained, hard, fresh, indistinct bedding, tight joints, dark gray to light gray, HCL reaction.	
			179.0 1191.0	
180			LIMESTONE, some interbedded SANDSTONE and COAL, fine grained, hard, fresh, indistinct bedding, flat dip, tight joints, dry, light gray to black and dark gray, COAL (Lower Uniontown) at 255', HCL reaction, GROUNDWATER at 207'.	Cement/Bentonite Grout (0'-355')
190				
200				
210			▽	
220				

(Continued Next Page)

Tetra Tech
661 Andersen Drive Pittsburgh,
Pennsylvania 15220 Telephone:
412-921-7090

WELL NUMBER MW-23

CLIENT FirstEnergy **PROJECT NAME** Harrison Station CCB Landfill

PROJECT NUMBER 212C-SW-00069 **PROJECT LOCATION** Harrison County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
230			LIMESTONE, some interbedded SANDSTONE and COAL, fine grained, hard, fresh, indistinct bedding, flat dip, tight joints, dry, light gray to black and dark gray, COAL (Lower Uniontown) at 255', HCL reaction, GROUNDWATER at 207'. *(continued)*	
240				
250				
260				
270				

(Continued Next Page)

Tetra Tech
661 Andersen Drive Pittsburgh,
Pennsylvania 15220 Telephone:
412-921-7090

WELL NUMBER MW-23

CLIENT FirstEnergy **PROJECT NAME** Harrison Station CCB Landfill

PROJECT NUMBER 212C-SW-00069 **PROJECT LOCATION** Harrison County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
280			LIMESTONE, some interbedded SANDSTONE and COAL, fine grained, hard, fresh, indistinct bedding, flat dip, tight joints, dry, light gray to black and dark gray, COAL (Lower Uniontown) at 255', HCL reaction, GROUNDWATER at 207'. *(continued)*	
290				
300				
310				
320				
330				

(Continued Next Page)

Tetra Tech
661 Andersen Drive Pittsburgh,
Pennsylvania 15220 Telephone:
412-921-7090

WELL NUMBER MW-23

CLIENT FirstEnergy **PROJECT NAME** Harrison Station CCB Landfill

PROJECT NUMBER 212C-SW-00069 **PROJECT LOCATION** Harrison County, WV

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
340			LIMESTONE, some interbedded SANDSTONE and COAL, fine grained, hard, fresh, indistinct bedding, flat dip, tight joints, dry, light gray to black and dark gray, COAL (Lower Uniontown) at 255', HCL reaction, GROUNDWATER at 207'. *(continued)*	
			339.0 1031.0	
			SANDSTONE, some interbedded SHALE, trace COAL (Lower Sewickley) at 355', fine grained, hard, fresh, indistinct bedding, flat dip, tight joints, dry, dark gray to greenish-gray, slight lime cement, slight HCL reaction.	
350				
360				Bentonite Seal (355'-360')
			369.0 1001.0	
370			SHALE, some interbedded SANDSTONE, CLAYSTONE layer at 378' fine grained, hard, fresh, indistinct bedding, flat dip, tight joints, dry, gray to greenish-gray.	20-40 Silica Sand Filter Pack (360'-386') 0.010 Screened Interval (365'-385')
			379.0 991.0	
380			SANDSTONE, some interbedded SHALE, hard, fresh, indistinct bedding, tight joints, flat dip, dry, dark gray to greenish-gray, some LIMESTONE at 389', slight lime cement and HCL reaction, coloration change to light gray.	
			389.0 981.0	Bentonite Seal (386'-389')

Bottom of borehole at 389.0 feet.

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: MW-23
Site: HARRISON
Date Installed: 7/28/21 - 8/11/21
Date Developed: 8/12/21
Dev. Method: LOW-FLOW
Pump Type: SUBMERSIBLE

Depth to Bottom (ft.): 386.0
Static Water Level Before (ft.): ~156.55
Static Water Level After (ft.): ~280.0
Screen Length (ft.): 20.0
Specific Capacity: 0.010"
Casing ID (in.): 4" SCHD. 80

Responsible Personnel: D. LAPKAS, C. KURTZ, T. WATTS
Drilling Co.: EICHELBERGERS, INC.
Project Name: HARRISON MW INSTALLATION
Project Number: 212C-SW-00069

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.) Flow Rate per min	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1045	NA	~0.25	156.55	25.57	6.45	0.814	300	CLEAR / SLIGHT GRAY
1050		1.25	158.20	25.71	6.39	0.792	172	COLORATION.
1055		2.5	162.10	25.80	6.36	0.726	154	
1100		3.75	168.75	26.54	6.48	0.618	127	
1110		6.25	177.75	25.32	6.97	0.581	66.9	
1120		8.75	183.42	24.48	6.82	0.564	57.5	
1130		11.25	187.10	24.32	7.01	0.548	50.8	
1200		18.75	NA	NA	NA	NA	NA	HORIBA TURNED OFF.
1230		26.25	197.50	NA	NA	NA	NA	PUMP ADJUSTED.
1300		33.75	204.25					
1330		41.25	214.80					PUMP ADJUSTED THROUGH 0 LOT
1400		48.75	220.65					- PUMP PSI = 140
1430		56.25	230.10					
1500		63.75	239.92					
1530		71.25	251.55					
1600		78.75	260.52					
1630		86.25	267.30					
1700		93.75	274.00					

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: MW-23
Site: HARRISON
Date Installed: 7/28/21 - 8/11/21
Date Developed: 8/12/21
Dev. Method: LOW-FLOW
Pump Type: SUBMERSIBLE

Depth to Bottom (ft.): 386.0
Static Water Level Before (ft.): ~156.55
Static Water Level After (ft.): ~280.0
Screen Length (ft.): 20.0'
Specific Capacity: 0.010"
Casing ID (in.): 4" SCH. 80

Responsible Personnel: D.LAPIKAS, C.KURTZ, T.WATTS
Drilling Co.: EICHELBERGERS, INC.
Project Name: HARRISON MW INSTALLATION
Project Number: 212C-SW-00069

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1730	↓	101.25	278.10	↓	↓	↓	↓	↓
1800	↓	108.75	~280.00	↓	↓	↓	↓	END DEVELOPMENT

ATTACHMENT B

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

COAL COMBUSTION BYPRODUCT LANDFILL

Harrison Power Station
Harrison County, West Virginia

Prepared for:

FirstEnergy

800 Cabin Hill Drive
Greensburg, PA 15601

Prepared by:

Tetra Tech, Inc.

400 Penn Center Boulevard, Suite 200
Pittsburgh, PA 15235
Phone: (412) 829-3600
Fax: (412) 829-3260

Tetra Tech Project No. 212C-SW-00069

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 FirstEnergy Generation (FE) for the Coal Combustion Byproduct Landfill ("CCBL", "CCR unit", or "site") at the Harrison Power Station (hereinafter referred to as the "Station"). The CCBL and Station are located near the town of Shinnston in Harrison 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 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 CCBL's publicly accessible website, the most recent of which being the 2020 Annual CCR Rule Groundwater Monitoring and Corrective Action Report (Harrison CCB Landfill 2020 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 and molybdenum 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 (Harrison CCB Landfill 2019 ACM Report) and determined that evidence exists that the CCR unit, combined with impacts from an as-yet unidentified alternate source (e.g., grout infiltration into the sand pack of the well), are likely the causes of elevated molybdenum concentrations observed in monitoring well MW-20, which was the only well to have a molybdenum SSL, 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 on the CCR unit, 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 (Harrison CCB Landfill 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 June, FE finalized a right-of-access and lease agreement with an off-site landowner to install and sample one of the three proposed new 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 unit. This off-site well (MW-23) is the most critical of the three proposed wells as it is positioned downgradient of the site boundary (the other two [MW-21 and -22] are side-gradient wells located on FE property).
- A contract was also executed with a drilling firm this June to install, develop, and perform aquifer characterization testing for the three proposed new on-site/off-site monitoring wells. However, it was determined that installation of off-site downgradient well MW-23 was of primary importance and, depending on the chemistry data from that well, one or both of the on-site side-gradient wells may not need to be installed. As such, mobilization of the drilling crew is scheduled for mid-July to install and develop MW-23.

- 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 March 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 March 2021 groundwater flow patterns in the monitoring network area downgradient of the CCR unit and found they remained consistent with historical flow patterns at the site.

3.0 PLANNED SOR ACTIVITIES

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

- Install, develop, and sample the additional off-site downgradient groundwater monitoring well (MW-23) for arsenic and natural attenuation parameters.
- Complete the second scheduled 2021 AM sampling event at the site.
- Evaluate the chemistry data from MW-23 in conjunction with historic and recent data from nearby upgradient wells to determine the need for installing the two additional proposed monitoring wells (MW-21 and -22).
- Conduct additional sampling and analysis for molybdenum to evaluate whether the downward trend in molybdenum concentrations measured in MW-20 over the last three years is statistically significant and remains below the associated GWPS of 100 ppb.
- 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), 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.

Should the final remedy for the CCR unit 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)

COAL COMBUSTION BYPRODUCT LANDFILL

Harrison Power Station
Harrison County, West Virginia

Prepared for:

FirstEnergy

800 Cabin Hill Drive
Greensburg, PA 15601

Prepared by:

Tetra Tech, Inc.

400 Penn Center Boulevard, Suite 200
Pittsburgh, PA 15235
Phone: (412) 829-3600
Fax: (412) 829-3260

Tetra Tech Project No. 212C-SW-00069

January 2022

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 Landfill ("CCBL", "CCR unit", or "site") at the Harrison Power Station (hereinafter referred to as the "Station"). The CCBL and Station are located near the town of Shinnston in Harrison 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 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 CCBL's publicly accessible website, the most recent of which being the 2020 Annual CCR Rule Groundwater Monitoring and Corrective Action Report (Harrison CCB Landfill 2020 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 and molybdenum 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 (Harrison CCB Landfill 2019 ACM Report) and determined that evidence existed that the CCR unit, combined with impacts from an unidentified alternate source (e.g., grout infiltration into the sand pack of the well), were likely the causes of elevated molybdenum concentrations observed in monitoring well MW-20, which was the only well to have a molybdenum SSL, 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 on the CCR unit, 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 (Harrison CCB Landfill 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 July and August, the first of three proposed new monitoring wells (MW-23) was installed and developed, and in October an existing monitoring well (MW-18) was redeveloped in order to better characterize the extent of arsenic in groundwater at across the site and to evaluate potential natural attenuation impacts on arsenic concentrations downgradient of the CCR unit. Both 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 new well will be added to the certified CCR monitoring well network.
- Aquifer characterization testing (packer tests in new monitoring well MW-23 and rising and falling head slug tests in MW-23 and existing monitoring wells MW-5 and MW-17) were performed in August to determine the hydraulic conductivity of

the targeted monitoring zone in MW-23 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 August 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 August 2021 groundwater flow patterns in the monitoring network area downgradient of the CCR unit and found they remained consistent with historical 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 downgradient monitoring well MW-23.
- Evaluate the chemistry data from MW-23, in conjunction with historic and recent data from nearby upgradient wells, to determine the need for installing the two proposed sidegradient monitoring wells (MW-21 and -22). If it is determined that these wells are needed, update the pricing with the existing contracted drilling firm and install, develop, and perform aquifer characterization testing for monitoring wells MW-21 and -22.
- Should MW-18 fail to provide sufficient water for sampling following the redevelopment work completed in October, a determination will be made as to the viability of replacing MW-18 with a new well at a position as close as practical to its existing location or to abandon and permanently remove it from the CCR monitoring network.
- Conduct additional sampling and analysis for molybdenum to evaluate whether the downward trend in molybdenum concentrations measured in MW-20 over the last

three years is statistically significant and remains below the associated GWPS of 100 ppb.

- 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), 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.

Should the final remedy for the CCR unit not be selected during Q1 or Q2 2022, then another Semi-Annual SoR Report will be prepared as required by 40 CFR 257.97(a).