Disposal of Coal Combustion Residuals from Electric Utilities Rule

ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

PREFACE

Report Requirements

This report documents the status of the groundwater monitoring and corrective action program in place under the federal Coal Combustion Residuals (CCR) Rule. Containing data for the previous calendar year, it must be placed in the facility operating record by January 31 and posted publicly by March 2. It summarizes key actions completed, describes any challenges and how they were addressed, and projects key activities for the upcoming year. It must include a map or diagram depicting the CCR unit and all the wells in the monitoring network, identifying any that were decommissioned or installed in the previous year. In addition, it contains the monitoring data summary, a narrative discussing any transitions between detection monitoring and assessment monitoring and the reasons for those transitions.

What the Report Is

This report describes the first step in a phased, prescriptive process for monitoring groundwater near CCR storage facilities. It is a snap shot in time, showing how the data obtained during the report year compare to all the background data that have been obtained to date, and whether further monitoring for additional substances should be performed based on that comparison.

What the Report Is Not

The report does not make any determinations regarding potential environmental impact to or contamination of groundwater, and neither the raw data nor the initial statistical analysis should be independently or collectively interpreted in that way.

Report Methodology

Data comparison is done through a test to determine if monitoring results from wells adjacent to the CCR facility are statistically higher than background levels for that site. Therefore, as the data set increases over time, so does the confidence that any one result represents a statistically significant increase (SSI) over the background data. Groundwater moves slowly and both natural and man-made sources can impact groundwater. Therefore, the federal rule uses a phased approach with data verification steps in between. In this initial annual report, if a data result yields an SSI, the groundwater monitoring effort transitions from the detection program (measuring substances that move most rapidly in groundwater to identify a potential impact) to the assessment program (measuring substances that are of more concern including several that have regulatory standards).

2017 ANNUAL CCR GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

McELROY's RUN COAL COMBUSTION BYPRODUCT DISPOSAL FACILITY

Pleasants Power Station
Pleasants County, West Virginia

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Tetra Tech Project No. 212C-SW-00070

January 2018

2017 ANNUAL CCR GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

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1.0 INTRODUCTION

This 2017 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 McElroy's Run Coal Combustion Byproduct Disposal Facility (CCBDF or "CCR unit") at the Pleasants Power Station (hereinafter referred to as the "Station"). The Station is located in Pleasants County, West Virginia. The report was developed to comply with requirements of 40 CFR § 257.90(e).

1.1 BACKGROUND AND SITE CHARACTERISTICS

CCRs produced at the Station are placed in the facility's captive 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. A WVDEP groundwater monitoring program for the landfill has been in effect since 1994. As per the CCR Rule, the landfill and impoundment are considered two separate, existing CCR units that share a common boundary (i.e., the impoundment dam). As provided by the CCR Rule, a multiunit 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 about 250 acres. The impoundment dam was constructed with a clay-filled cutoff trench at the upstream toe and a clay blanket on the upstream slope for a low permeability barrier. The downstream portion of the dam was constructed using compacted fly ash and periodic layers of bottom ash for blanket drains connected to sloping chimney drains that collect 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 to the dam. The landfill consists of three primary development stages (I, II, and III in the original 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 of 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 utilized. Leachate and contact stormwater runoff from the Stage 1 and 2 disposal areas are managed in Sedimentation Pond Nos. 1 and 2, which are 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 (in descending order): 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, fine-grained rock units (e.g., redbeds) typically serve as aquitards to limit vertical groundwater migration, while 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 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 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 flow north from the topographically higher areas located to the south and southeast of the impoundments. 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. A representative set of water level data from the current reporting period (2017) were used for contouring groundwater flow patterns at the site as shown on Figure 2-1. 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 Annual Groundwater Monitoring and Corrective Action 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 (5), 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 Figure 2-1);
>
> (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 2.1.3 and 2.1.5 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."

In addition, the Owner and 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 operating record as required by § 257.106(h)(1), and place the report on the facility's publically accessible website, also within 30 days of placing the report in the operating record.

1.3 OVERVIEW OF REPORT CONTENTS

Section 1.0 of this report provided an overview of the 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 completed during 2017 for the CCBDF and plans for the upcoming year. Section 3.0 presents Detection Monitoring results from groundwater sampling events completed in 2017.

2.0 GENERAL INFORMATION

This section provides an overview of the status of the CCR groundwater monitoring program through 2017 and key activities planned for 2018.

2.1 STATUS OF THE GROUNDWATER MONITORING AND CORRECTIVE ACTION PROGRAM

During calendar years 2016 and 2017, the following key actions were completed with regard to the CCR groundwater monitoring program for the CCBDF.

2.1.1 Establishing a CCR Groundwater Monitoring Well System

Tetra Tech was contracted by FirstEnergy to review existing groundwater monitoring system information and site hydrogeologic data for the CCBDF to evaluate the suitability of the existing system, determine whether additional monitoring wells were needed, and to install and develop any new wells to establish a system that meets the applicable requirements and performance standards for groundwater monitoring under 40 CFR §257.91.

Upon completing this review, nine additional groundwater monitoring wells were installed in July and August of 2016 to fill data gaps and to develop a network in compliance with CCR Rule requirements. The CCR monitoring well network consists of three upgradient (background) wells (GW-7, -21, and -22), six downgradient wells to monitor the northern side of the combined CCR units (GW-19, -20, -23, -24, -25, and -26), and four downgradient wells to monitor the western side of the combined CCR units (GW-9, -27, -28, and -29), as summarized in attached Table 2-1 and shown on attached Figure 2-1. A CCR Groundwater Monitoring System Evaluation Report (Tetra Tech, Inc., October, 2017), which discusses the basis for development of the monitoring well network and includes detailed information on the site geology, hydrogeology, and well completion records, was placed in the facility's Operating Record.

As required by § 257.91(f), the CCR groundwater monitoring well network was certified by a Professional Engineer to be in compliance with the applicable requirements of § 257.91. The subject certification was placed in both the facility's Operating Record and on the publically accessible website (http://ccrdocs.firstenergycorp.com/) on October 17, 2017.

2.1.2 Development of a Groundwater Monitoring Plan

On behalf of FE, Tetra Tech prepared a "Groundwater Monitoring Plan" to comply with applicable requirements of the CCR Rule. The document provides the sampling and analytical

methodologies and procedures for collecting and reporting representative groundwater quality data from CCR monitoring wells at the CCBDF. As required by § 257.93(a), the document provides procedures and techniques for the following:

- Sample collection;
- Sample preservation and shipment;
- Analytical procedures;
- Chain-of-custody control; and
- Quality assurance (QA) and quality control (QC).

In addition, the document includes the statistical plan describing the process for evaluating groundwater monitoring data developed from the CCR sampling and analysis program [§ 257.93(f)].

2.1.3 Completion of Background Groundwater Sampling

To fulfill the applicable requirements of § 257.94(b), eight independent rounds of background groundwater samples for analyzing all Appendix III and IV parameters from each of the CCR monitoring wells were collected prior to October 17, 2017. The sampling events were conducted on the following dates:

Sampling Event	Dates
1	10/25 to 11/7/16
2	1/4 to 1/16/17
3	2/28 to 3/13/17
4	4/6 to 4/17/17
5	5/16 to 5/24/17
6	6/20 to 6/27/17
7	7/19 to 7/26/17
8	8/21 to 8/24/17

2.1.4 Selection of Statistical Methods

Based on the attributes of the data set from the eight rounds of background sampling, statistical methods were selected among the available methods referenced in § 257.93(f) which met the performance standards referenced in § 257.93(g). Data from the first eight rounds of groundwater analytical results collected at the upgradient and downgradient CCR network wells at the site were evaluated in terms of percent non-detects and data distributions to select the appropriate

statistical method for each parameter to identify any Statistically Significant Increases (SSIs) over background concentrations [§ 257.93(h)].

As required by § 257.91(f)(6), the statistical method selection was certified by a Professional Engineer as currently appropriate for evaluating the groundwater monitoring data for the CCBDF at the Pleasants Power Station and as meeting the applicable requirements of § 257.93(f). The subject certification was placed in both the facility's Operating Record and on the publically accessible website on October 17, 2017.

2.1.5 Initial Detection Monitoring Sampling Event

In accordance with § 257.94, FirstEnergy collected the first round of Detection Monitoring samples from the upgradient and downgradient CCR groundwater monitoring wells from September 26 to October 3, 2017 as summarized in the table below. The samples were analyzed for Appendix III parameters, with the laboratory analyses completed by October 17, 2017. The laboratory results are discussed in Section 3.0 of this report.

Monitoring Well	Location	Date Sampled	Purpose
GW-21	Upgradient/Background - Northern Boundary	9/26/17	Not Sampled – Insufficient Water
GW-22		10/3/17	Detection Monitoring
GW-7	Upgradient/Background - Western Boundary	9/27/17	Detection Monitoring
GW-19	Downgradient – Northern Boundary	10/3/17	Detection Monitoring
GW-20		10/2/17	Detection Monitoring
GW-23		10/2/17	Detection Monitoring
GW-24		10/2/17	Detection Monitoring
GW-25		9/26/17	Not Sampled – Insufficient Water
GW-26		9/26/17	Not Sampled – Insufficient Water
GW-9	Downgradient – Western Boundary	9/28/17	Detection Monitoring
GW-27		9/28/17	Detection Monitoring
GW-28		9/28/17	Detection Monitoring
GW-29		9/27/17	Detection Monitoring

2.2 PROBLEMS ENCOUNTERED/RESOLVED

During the eight background sampling events, having sufficient recoverable volumes of groundwater from one of the new upgradient (GW-21) and three of the new downgradient (GW-23, -24, and -25) wells was found to be increasingly problematic as each subsequent sampling event occurred. These four wells were noted to have low to very low yields during their installation and development which was anticipated given that historical well borings drilled at the site under the WVDEP groundwater monitoring program were abandoned over time due to a lack of water in the same rock units. In order to eliminate improper construction and development as a reason behind the increasingly low groundwater yields, all of the aforementioned wells were redeveloped in May of 2017 by completing multiple cycles (six minimum) of surging and purging with potable water. These redevelopment activities resulted in marginal increases in the groundwater yields from the wells. During the initial Detection Monitoring sampling event, sufficient recoverable groundwater volumes were found to be available in GW-23 and -24 but an insufficient sampling volume was also found for downgradient well GW-26.

It's believed that the sampling frequency (approximately every four to six weeks) required to obtain the eight background and initial Detection Monitoring samples in time to meet the CCR groundwater compliance milestone date of October 17, 2017 overstressed the low yield wells at the site. It's also believed that some or all of these wells remain viable for use in the site's CCR groundwater monitoring system as the required sampling frequency under the CCR Rule (semi-annual) is now in effect. As such, and since the remaining CCR monitoring system still exceeds the minimum required number of upgradient and downgradient wells, the water levels in the low yield wells and well GW-26 will be monitored on a quarterly basis during 2018. This additional water level data will be used to determine the viability of using GW-21, -23, -24, and -25 as part of the site's CCR groundwater monitoring system and, if necessary, help establish the basis for preparing a demonstration - in accordance with § 257.94(d) - that the low yield wells (and also possibly well GW-26) must be sampled at a frequency between six months and one year in order to have recoverable groundwater volumes available. If such a demonstration needs to be prepared it will be placed in the landfill's operating record when complete, and included as part of the 2018 CCR Groundwater Monitoring and Corrective Action Report.

Other than the low yield wells noted above, there were no other significant problems (e.g., quality control issues) encountered during 2017 with regard to the CCR groundwater monitoring program.

2.3 TRANSITION BETWEEN MONITORING PROGRAMS (IF ANY)

During 2016 and 2017, the eight rounds of background sampling for all Appendix III and IV parameters were conducted followed by initiation of Detection Monitoring with collection of the first Detection Monitoring samples in September and October of 2017. There was no transition between monitoring programs (e.g., Detection to Assessment Monitoring) during 2017.

2.4 KEY ACTIVITIES PLANNED FOR THE UPCOMING YEAR

The following are the key CCR groundwater compliance activities planned for 2018:

- Complete the statistical evaluation of the initial round of Detection Monitoring data to determine if there are any Appendix III parameter concentrations in downgradient wells exhibiting SSIs above background.
- If there are no SSIs, then continue with Detection Monitoring by conducting two semi-annual rounds of sampling and analysis for Appendix III constituents [per § 257.94(c)].
- If any SSIs are identified, then potentially conduct an Alternate Source Determination (ASD) [per § 257.94(e)(2)] to determine if a source other than the CCR unit may be causing the SSIs.
- If any SSI's are identified and an ASD indicates that an alternate source is not responsible for all the SSI's identified, then initiate Assessment Monitoring for Appendix IV constituents [per § 257.94(e)(1)].
- Obtain quarterly water levels in low yield wells GW-21, -23, -24, and -25 to determine if one or more of the wells are viable for use in the CCR groundwater monitoring system and if any of the wells require a sampling frequency of between six months and one year. Should it be determined that a demonstration for a modified sampling frequency is needed, it will be prepared in accordance with § 257.94(d).
- Obtain quarterly water levels in well GW-26 to determine if it may also require a sampling frequency of between six months and one year and, if so, prepare a demonstration of the need for such a modified sampling frequency in accordance with § 257.94(d).

3.0 DETECTION MONITORING INFORMATION

3.1 GROUNDWATER ANALYTICAL RESULTS SUMMARY

As referenced above, the CCR groundwater sampling and analysis program implemented through the end of 2017 consists of the eight background sampling rounds conducted between August 2016 and August 2017 for all Appendix III and IV parameters, and the initial Detection Monitoring round of sampling conducted in September 2017 for all Appendix III parameters. Table 3-1 presents the analytical results for these events. As previously noted, statistical evaluation of the Appendix III Detection Monitoring data in Table 3-1 remains in-progress as of the end of the 2017 reporting period (lab results were received in the fourth quarter of 2017 and a 90 day period is allowed by the CCR Rule for statistical evaluation which falls in the first quarter of 2018). If any Appendix III SSIs are identified, ASD or Assessment Monitoring activities will be undertaken as appropriate, and associated recordkeeping, notification, and reporting will be performed in accordance with the applicable requirements of 40 CFR §§ 257.94, 95, 105, 106, and 107.

TABLES

TABLE 2-1
CCR RULE GROUNDWATER MONITORING SYSTEM WELL SUMMARY
McELROY's RUN CCB DISPOSAL FACILITY – 2017 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

TABLE 3-1
CCR RULE GROUNDWATER MONITORING ANALYTICAL RESULTS SUMMARY
McELROY's RUN CCB DISPOSAL FACILITY - 2017 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

			APPENDIX III (all Chemical Constituents sampled as TOTAL RECOVERABLE)[1]							APPENDIX IV (all Chemical Constituents sampled 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
1	MW-07	11/3/2016	0.318	2.8	101	7.66	7.9	0.499	1255	0.00042 J	0.0005 J	0.08871	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.02214 J	0.00004 U	0.00442 J	0.0022 U	0.000175 U	0.551 U	0.636 U
2	MW-07	1/11/2017	0.337	2.63	98.1	7.83	8	0.228	1250	0.000175 U	0.00131 J	0.08731	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.02061 J	0.00004 U	0.00192 J	0.0044 U	0.000175 U	0.265 U	0.55 U
3	MW-07	3/2/2017	0.364	2.64	101	8.64	8.17	0.233	1250	0.000175 U	0.00075 U	0.07669	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.02027 J	0.00004 U	0.00092 J	0.0055 U	0.000175 U	0.128	0.46
4	MW-07	4/6/2017	0.354	3.08	100	8.5	8.2	0.109 J	1260	0.000175 U	0.004 U	0.07763	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.02108 J	0.00004 U	0.00056 J	0.0044 U	0.000175 U	0.103	0.246 U
5	MW-07	5/16/2017	0.33	2.61	103	8.49	8.27	0.174 J	1240	0.00018 J	0.0006 U	0.08027	0.00022 U	0.00017 U	0.005 U	0.00047 U	0.00052 U	0.02173 J	0.00006 J	0.00051 J	0.0044 U	0.00017 U	0.0981 U	0.486 U
6	MW-07	6/22/2017	0.317	2.68	102	8.39	8.29	0.174 J	1195	0.00017 U	0.0015 U	0.07678	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01862 J	0.00004 U	0.00094 J	0.0044 U	0.00017 U	0.0294 U	-0.289 U
7	MW-07	7/19/2017	0.303	2.62	104	8.48	8.13	0.166 J	1260	0.00024 J	0.0006 U	0.07542	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01998 J	0.00004 U	0.00057 J	0.0044 UJ	0.00017 U	0.136	-0.28 U
8	MW-07 (D)	8/21/2017	0.307	2.72	100	8.13	8.2	0.185 J	1240	0.00017 U	0.0006 U	0.08609	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.02002 J	0.00004 U	0.00039 J	0.0044 UJ	0.00017 UJ	1 U	0.0419 U
8	MW-07	8/21/2017	0.311	2.6	101	8.13	8.19	0.173 J	1230	0.00017 U	0.0006 U	0.07132	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01929 J	0.00004 U	0.00043 J	0.0044 U	0.00017 U	1 U	0.344 U
9 (DM-1)	MW-07	9/27/2017	0.28	2.5	85.6	7.28	8.17	0.151 J	1235	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1	MW-09	11/7/2016	0.121 J	18	8.43	0.213	7.7	135	764	0.000175 U	0.00054 J	0.06275	0.00022 U	0.000175 U	0.00111 J	0.000475 U	0.00052 U	0.01559 J	0.00004 U	0.00049 J	0.0011 U	0.000175 U	0.354 U	0.617 U
2	MW-09	1/16/2017	0.113 J	18.1	8.57	0.214	7.59	136	768	0.000175 U	0.001 U	0.061	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.01678 J	0.00007 J	0.0003 J	0.0011 UJ	0.000175 U	0.511 U	0.708 U
3	MW-09	3/13/2017	0.128 J	16.4	8.14	0.194	7.63	125	748	0.0009 U	0.0003 J	0.06358	0.00022 U	0.000175 U	0.00006 U	0.000475 U	0.00052 U	0.01498 J	0.00004 U	0.000285 U	0.0011 U	0.000175 U	0.13 U	0.19 U
4	MW-09	4/17/2017	0.133 J	16.2	7.92	0.191 J-	7.75	135	752	0.000175 U	0.001 U	0.06053	0.00022 U	0.000175 U	0.005 U	0.000475 U	0.00052 U	0.01558 J	0.00004 U	0.000285 U	0.0011 UJ	0.000175 U	0.249	-0.102 U
5	MW-09	5/22/2017	0.134 J	18.3	8.1	0.207 J-	7.72	128	796	0.00017 U	0.0005 J	0.06343	0.00022 U	0.00017 U	0.0003 U	0.00047 U	0.00052 U	0.01412 J	0.00009 J	0.00028 U	0.0011 U	0.00017 U	0.0416 U	-0.264 U
6	MW-09	6/27/2017	0.113 J	16.8	8.21	0.211	7.79	130	748	0.00017 U	0.00031 J	0.05359	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01518 J	0.00004 U	0.00028 U	0.0011 U	0.00017 U	0.153	0.19 U
7	MW-09 (D)	7/26/2017	0.105 J	15.8	8.09	0.213	7.74	128	816	0.00017 U	0.0004 J	0.05524	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01457 J	0.00004 U	0.00028 U	0.0011 U	0.00017 U	0.112 U	0.33 U
7	MW-09	7/26/2017	0.109 J	16.3	8.17	0.213	7.8	131	820	0.00017 U	0.00053 J	0.05722	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01428 J	0.00004 U	0.00028 U	0.0011 U	0.00017 U	1 U	0.608
8	MW-09	8/23/2017	0.0686 J	16.5	7.96	0.211	7.64	127	764	0.00017 U	0.00038 J	0.06068	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01523 J	0.00004 U	0.00034 J	0.0011 UJ	0.00017 UJ	0.288	0.115 U
9 (DM-1)	MW-09	9/28/2017	0.0945 J	15.3	7.54	0.221	7.68	119	744	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1	MW-19	11/2/2016	0.262	10.1	563	1.59	7.52	1.07	2280	0.00042 J	0.17397	0.98084	0.00022 U	0.000175 U	0.001 J	0.00065 J	0.00144 J	0.01434 J	0.00004 U	0.00588	0.0022 U	0.000175 U	1.39	1.35
2	MW-19	1/12/2017	0.262	9.85	552	1.59	7.51	0.248	2300	0.000175 U	0.18781	1.13883	0.00022 U	0.000175 U	0.001 J	0.000475 U	0.00052 U	0.01309 J	0.00004 U	0.00125 J	0.0022 U	0.000175 U	1.56	1.33
3	MW-19	3/13/2017	0.274	9.02	573	1.66	7.65	0.031 U	2233	0.000175 U	0.03236	0.03738	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.01241 J	0.00004 U	0.000285 U	0.0044 U	0.000175 U	1.29	1.03
4	MW-19	4/17/2017	0.267	9.4	569	1.55 J-	7.48	0.036 J	2287	0.000175 U	0.15901	1.21077	0.00022 U	0.000175 U	0.00611 U	0.000475 U	0.00052 U	0.01355 J	0.00004 U	0.000285 U	0.0022 UJ	0.000175 U	1.14	0.694
5	MW-19	5/22/2017	0.287	10.3	595	1.62 J-	7.66	0.031 U	2413	0.00122 U	0.16641	0.98867	0.00088 J	0.00092	0.00183 J	0.00009 U	0.00111 J	0.01337 J	0.00009 J	0.00143 J	0.0044 U	0.00092	1.54	0.846
6	MW-19	6/26/2017	0.272	9.97	579	1.44	7.63	0.309	2140	0.00017 U	0.20142	1.08053	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.0125 J	0.00007 J	0.00028 U	0.0011 U	0.00017 U	0.945	1.01
7	MW-19	7/26/2017	0.245	9.56	604	1.56	7.68	0.056 J	2300	0.0009 U	0.17467	1.08362	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01248 J	0.00004 U	0.00028 U	0.0044 U	0.00017 U	1.2 U	1.29
8	MW-19	8/24/2017	0.201	9.59	567	1.57	7.56	0.046 J	2307	0.00017 U	0.17972	1.24456	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01397 J	0.00004 U	0.00028 U	0.0044 UJ	0.00017 UJ	1.22	2.26
9 (DM-1)	MW-19	10/3/2017	0.226	10.1	571	1.47	7.63	0.14 J	2320	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1	MW-20	11/1/2016	0.241	5.46	419	5.92	7.96	32.4 J-	1656	0.00024 J	0.00236	0.21385 J+	0.00022 U	0.0002 J	0.0003 U	0.000475 U	0.00135 J	0.01448 J	0.00004 U	0.09706	0.01343	0.000175 U	0.501 U	0.604 U
2	MW-20	1/12/2017	0.265	4.88	411	4.65	8.06	31.8	1707	0.00072 J	0.0033	0.19684	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.01307 J	0.00004 U	0.09588	0.01487	0.000175 U	0.331 U	0.515 U
3	MW-20	3/7/2017	0.284	4.91	410	5.52	8.03	33.1	1580	0.00045 J	0.00217	0.19691	0.00006 J	0.000175 UJ	0.0038 J	0.000475 U	0.00052 U	0.01463 J	0.00004 U	0.10306	0.01028	0.000175 U	0.162	0.205 U
4	MW-20	4/10/2017	0.294	5.46	403	5.79	7.89	32.6	1733	0.00021 J	0.00204	0.19017	0.00022 U	0.00019 J	0.00041 J	0.000475 U	0.00064 J	0.01403 J	0.00004 U	0.0903	0.01619	0.000175 U	0.147	0.493 U
5	MW-20	5/23/2017	0.261	5.27	429	4.81	7.83	33.1	1700	0.00017 U	0.00217	0.1772	0.00004 U	0.00026 J	0.00129 J	0.00047 U	0.00055 J	0.0112 J	0.0001 J	0.09763	0.0148	0.00017 U	0.173	0.748 U
6	MW-20	6/22/2017	0.26	5.26	420	5.22	8.03	32	1700	0.00033 J	0.0023	0.20642	0.00022 U	0.00017 J	0.00179 J	0.0006 J	0.00123 J	0.01284 J	0.00004 U	0.09076	0.015	0.00017 U	0.29	0.281 U
7	MW-20	7/20/2017	0.242	5.3	431	5.78	7.88	31.8	1853	0.00042 J	0.00185	0.20735	0.00023 J	0.00026 J	0.00335 J	0.00053 J	0.00065 J	0.01257 J	0.00004 U	0.09094	0.01271	0.00017 U	0.15	0.451
8	MW-20	8/23/2017	0.225	5.15	431	5.36	7.97	31.2	1773	0.0009 U	0.00187	0.21416	0.00022 U	0.00028 J	0.00221 J	0.00057 J	0.00119 J	0.01417 J	0.00004 U	0.08857	0.01485 J-	0.00017 UJ	0.223	0.593
9 (DM-1)	MW-20	10/2/2017	0.229	5.38	490	4.8	8.11	28.6	1785	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1	MW-21	11/3/2016	0.2 J	32.9	232	2.84	7.6	919	2056	0.00124	0.05619	0.11122	0.00022 U	0.00021 J	0.00317 J	0.00095 J	0.00057 J	0.00525 J	0.00004 J	0.36496	0.08361	0.000175 U	0.918	1.38 U
2	MW-21	1/12/2017	0.209	23.8	112	1.76	7.99	1000	2167	0.00039 J	0.05553	1.53945	0.0022 U	0.00025 J	0.01458 J	0.01541 J	0.01386	0.05 U	0.00007 J	0.18621	0.04304	0.0002 J	1.46	1.61 U
3	MW-21	3/6/2017	0.212	21.9	316	2.55	7.92	776	2100	0.0009 U	0.03574	0.14417	0.00022 U	0.000175 U	0.00064 J	0.00144 J	0.00272	0.00541 J	0.00004 U	0.15886	0.0178	0.000175 U	1.23	1.03
4	MW-21	4/12/2017	0.219	20	351	2.27	8.1	780	2140	0.0003 J	0.03709	1.22841	0.00044 U	0.00028 J	0.00726 J	0.0074 J	0.00747	0.02 U	0.00004 U	0.20387	0.01731	0.000175 U	2.17	1.52 U
1	MW-22	11/7/2016	0.19 J	4.49	199	2.2	8.2	50.9	876	0.00022 J	0.09745	0.03812 J	0.00022 U	0.000175 U	0.00303 J	0.000475 U	0.00056 J	0.005 U	0.00004 U	0.09985	0.0011 U	0.000175 U	0.288 U	0.617 U
2	MW-22	1/16/2017	0.197 J	3.5	197	2.24	8.3	46.7	892	0.0009 U	0.10626	0.02433	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.005 U	0.00004 U	0.09002	0.0011 UJ	0.000175 U	0.374 U	0.617 U
3	MW-22	3/6/2017	0.126 J	11.5	29.1	0.688	7.71	36.8	432	0.00241	0.21283	0.0547	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.007 J	0.00004 U	0.03931	0.0011 U	0.000175 U	0.0468 U	0.303 U
4	MW-22 (D)	4/13/2017	0.139 J	11.4	25.8	0.651	7.76	37.3	468	0.00259 U	0.22822 J+	0.06053	0.00022 U	0.0009 U	0.005 U	0.000475 U	0.00052 UJ	0.00676 J	0.00004 U	0.04238	0.0011 U	0.000175 UJ	0.163 U	0.0301 U
4	MW-22	4/13/2017	0.145 J	11.3	26.6	0.652	7.83	37.2	468	0.00224 U	0.22961 J+	0.05299	0.00022 U	0.0018 U	0.005 U	0.000475 U	0.00052 UJ	0.00753 J	0.00004 U	0.03597	0.0011 U	0.000175 UJ	0.0478 U	-0.0943 U
5	MW-22	5/23/2017	0.133 J	14	30.6	0.655	7.85	38	464	0.00191 U	0.20788	0.08089	0.00022 U	0.00017 J	0.0003 U	0.00047 U	0.00052 U	0.0067 J	0.00009 J	0.05066	0.0011 U	0.00017 U	0.128 U	0.0561 U
6	MW-22	6/26/2017	0.163 J	8.6	158	1.6	8.29	31.1	772	0.00177 U	0.17934	0.05998	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.00535 J	0.00004 U	0.05692	0.0011 U	0.00017 U	0.132	0.0762 U
7	MW-22	7/25/2017	0.175 J	5.62	208	1.94 J	8.4	27.1	904	0.0004 J	0.12182	0.03805	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.005 U	0.00004 U	0.06065	0.0011 UJ	0.00017 U	0.0342 U	0.277 U
8	MW-22	8/24/2017	0.141 J	6.1	153	1.55	8.52	78	1084	0.00027 J	0.08907	0.0527	0.00027 J	0.00017 U	0.00045 U	0.00047 J	0.00083 J	0.00865 J	0.00004 U	0.08717	0.0011 UJ	0.00017 UJ	0.542	4.15
9 (DM-1)	MW-22	10/3/2017	0.173 J	4.91	303	1.93	8.58	63.5 J-	1080	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1	MW-23	11/7/2016	0.196 J	209	4190	0.71	6.88	0.031 U	18400	0.0003 J	0.0479	4.23365	0.00285 J	0.00027 J	0.05267	0.05011 J	0.06279	0.07398 J	0.00004 U	0.01899	0.01161	0.00031 J	7.18	5.59
2	MW-23	1/11/2017	0.214	298	5700	0.025 U	6.9	3.17	18900	0.00055 J	0.04366	4.01205	0.00022 U	0.000175 U	0.01383	0.00182 J	0.0006 J	0.01191 J	0.00004 U	0.04611	0.00238 J	0.000175 U	5.44	9.52
3	MW-23	3/8/2017	0.668 J	470	9640	0.025 U	6.83	0.33	24400	0.00049 J	0.04935	6.49077	0.00049 J	0.000035 UJ	0.00234 J	0.00162 J	0.00759	0.02597	0.00004 U	0.07489	0.00359 J	0.000175 U	11.8	23
4	MW-23	4/13/2017	0.49 J	576	8550	0.025 U	6.79	0.031 U	16940	0.0018 U	0.04495 J+	8.18547	0.00044 U	0.00035 U	0.005 U	0.00205 J	0.0006 J	0.04514	0.00004 U	0.04588	0.00232 J	0.0009 U	14.4	37
5	MW-23	5/18/2017	0.147 J	163	3280	0.067 J	7.24	26.2	10800	0.0013	0.02725	1.80338	0.00022 U	0.00017 U	0.005 U	0.00096 J	0.00052 U	0.02026 J	0.00006 J	0.07691	0.00139 J	0.00017 U	3.39	9.36
6	MW-23	6/22/2017	0.176 J	399	6850	0.025 U	6.97	2.83	38400	0.00057 J	0.03159	4.0236	0.00022 U	0.00017 U	0.005 U	0.0013 J	0.00052 U	0.05348	0.00004 U	0.01294	0.0022 U	0.00017 U	7.99	20.5
7	MW-23	7/20/2017	0.197 J	541	7900	0.025 U	6.68	1.8	28200	0.00064 J	0.02792	4.67341	0.00022 U	0.00017 U	0.00165 J	0.00181 J	0.00053 J	0.05581	0.00004 U	0.00702	0.0011 UJ	0.00017 U	10.7	22.1
8	MW-23	8/22/2017	0.183 J	487	7870	0.025 U	6.76	0.778	29800	0.00078 J	0.03474	4.22522	0.00022 U	0.00017 U	0.00153 J	0.00343 J	0.00052 U	0.0321	0.00004 U	0.01048	0.0011 UJ	0.00017 UJ	14.2 J	34.5 J
9 (DM-1)	MW-23	10/2/2017	0.178 J	620	11600	0.025 U	6.84	0.079 J	46100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1	MW-24	11/3/2016	0.239	127	3730	0.167	7.05	26.3	6876	0.00096	0.02203	1.84204	0.00022 U	0.00024 J	0.01213	0.00247 J	0.00174 J	0.01035 J	0.00004 U	0.12692	0.00266 J	0.000175 U	3.55	4.02
2	MW-24	1/12/2017	0.276	221	5350	4.47	6.99	2.96	18900	0.00033 J	0.02513	4.24308	0.00088 U	0.000175 U	0.01132 J	0.00953 J	0.01226	0.02816 J	0.00004 U	0.05288	0.00483 J	0.000175 U	7.4	14.3
5	MW-24	5/24/2017	0.255	119	1930	0.365	7.13	86.9	4320	0.00141 U	0.00833	1.11262	0.00022 UJ	0.00017 U	0.00255 J	0.00195 J	0.00139 J	0.01144 J	0.00004 U	0.13815	0.00209 J	0.00017 U	1.67	5.53
6	MW-24	6/27/2017	0.254	131	3150	0.066 J	7.12	95.4	17200	0.00098 U	0.02036	1.47904	0.00022 U	0.00017 U	0.00256 J	0.00143 J	0.00124 J	0.01518 J	0.00004 U	0.1046	0.0011 U	0.00017 U	2.36	4.31
7	MW-24	7/20/2017	0.27	161	3820	0.03 J	6.84	78.7	13000	0.00143	0.01874	1.81523	0.00022 U	0.00017 U	0.00171 J	0.00139 J	0.00052 U	0.0183 J	0.00004 U	0.07314	0.0011 UJ	0.00017 U	2.94	7.83
8	MW-24	8/22/2017	0.28	182	4670	0.025 U	6.79	28	16300	0.0009 U	0.01524	2.46586	0.00022 U	0.00017 U	0.00103 J	0.00097 J	0.00052 U	0.02754	0.00004 U	0.02503	0.0011 UJ	0.00017 UJ	3.28	7.52
9 (DM-1)	MW-24	10/2/2017	0.292	270	5520	0.025 U	6.95	7.24 J-	19400	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2	MW-25	1/12/2017	0.185 J	139	3500	0.051 J	7.19	0.429	6780	0.000175 U	0.03542	3.68888	0.00024 J	0.000175 U	0.00414 J	0.00291 J	0.00424	0.00899 J	0.00004 U	0.04373	0.00392 J	0.000175 U	4.57	4.52
3	MW-25	3/9/2017	0.464 J	193	4380	0.025 U	7.06	0.447	7500	0.0009 U	0.04394	4.84205	0.00022 U	0.000175 U	0.005 U	0.00155 J	0.00129 J	0.00823 J	0.00004 U	0.03903	0.0014 J	0.000175 U	4.11	4.2
4	MW-25	4/12/2017	0.2 J	229	4800	0.025 U	7.21	0.305	18500	0.0002 J	0.04645	6.01031	0.00022 U	0.000175 U	0.00692	0.00384 J	0.00389	0.01394 J	0.00004 U	0.02901	0.0011 U	0.000175 U	4.35	4.59
5	MW-25	5/18/2017	0.271 J	154	2040	0.412 J-	7.9	25.7	5800	0.00087 U	0.02014	1.98736	0.0011 U	0.00087 U	0.025 U	0.00441 J	0.00506 J	0.025 U	0.00005 J	0.01963 J	0.0055 U	0.00087 U	2.89	3.84
6	MW-25	6/21/2017	0.167 J	200	2940	0.122	7.43	0.483	17400	0.0009 U	0.03563	3.42806	0.0022 U	0.00017 U	0.0045 U	0.01462 J	0.01485	0.05 U	0.00004 U	0.01403	0.00272 J	0.00017 U	3.5	3.13

TETRA TECH

TABLE 3-1
CCR RULE GROUNDWATER MONITORING ANALYTICAL RESULTS SUMMARY
McELROY's RUN CCB DISPOSAL FACILITY - 2017 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

			APPENDIX III (all Chemical Constituents sampled as TOTAL RECOVERABLE)[1]							APPENDIX IV (all Chemical Constituents sampled 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
1	MW-26	11/1/2016	0.138 J	7.56	61.7	1.17	8.33	95.7 J-	968	0.00048 J	0.01198	0.13885 J+	0.00023 J	0.000175 U	0.00187 J	0.00071 J	0.00163 J	0.005 U	0.00004 U	0.06427	0.0011 U	0.000175 U	0.838	1.25
2	MW-26	1/11/2017	0.176 J	5.33	103	1.26	8.21	78.3	935	0.000175 U	0.0136	0.08979	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00068 J	0.005 U	0.00004 U	0.06759	0.0011 U	0.000175 U	0.63 U	1.82 U
3	MW-26 (D)	3/9/2017	0.162 J	4.88	103	1.41	8.23	80.2	868	0.00038 J	0.01318	0.08281	0.00022 UJ	0.000175 UJ	0.00322 J	0.00057 J	0.0006 J	0.005 U	0.00004 U	0.06452	0.0021 J	0.000175 U	0.227	0.598
3	MW-26	3/9/2017	0.194 J	4.81	108	1.5	7.85	77.1	880	0.00049 J	0.01372	0.08166	0.00022 UJ	0.000175 UJ	0.00111 J	0.00051 J	0.00088 J	0.005 U	0.00004 U	0.06391	0.00214 J	0.000175 U	0.161 U	0.183 U
4	MW-26	4/17/2017	0.168 J	3.61	135	1.48 J-	8.21	74.6	924	0.000175 U	0.01416	0.06079	0.00022 U	0.000175 U	0.005 U	0.000475 U	0.00052 U	0.005 U	0.00004 U	0.0594	0.0011 UJ	0.000175 U	0.0481 U	0.169 U
5	MW-26	5/17/2017	0.153 J	6.55	91.1	1.41	8.08	88.2	804	0.00031 J	0.01117	0.07164	0.00022 U	0.00017 U	0.005 U	0.00047 U	0.00052 U	0.005 U	0.00006 J	0.05368	0.0011 U	0.00017 U	0.0833 U	0.0608 U
6	MW-26	6/21/2017	0.172 J	6.21	132	1.48 J-	8.34	76.7	968	0.0009 U	0.01156	0.08412	0.00022 U	0.00017 U	0.0003 U	0.00047 U	0.00052 U	0.005 U	0.00004 U	0.04957	0.0011 U	0.00017 U	0.104	0.236 U
7	MW-26	7/25/2017	0.18 J	11.2	180	1.52 J	8.39	59.6	1384	0.00017 U	0.01481	0.18151	0.00028 J	0.00017 U	0.00368 J	0.00095 U	0.00259 J	0.005 U	0.00004 U	0.05345	0.0011 UJ	0.00017 U	0.537	1 U
1	MW-27 (D)	10/26/2016	0.0997 J	45.7	134	0.255 J-	7.43	10	560	0.000175 U	0.00069 J	0.79513 J+	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.01517 J	0.00004 U	0.01077	0.0011 U	0.000175 U	0.53 U	0.716
1	MW-27	10/26/2016	0.1 J	45.5	133	0.26 J-	7.47	10.6	560	0.000175 U	0.00068 J	0.77494 J+	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.01429 J	0.00004 U	0.01072	0.0011 U	0.000175 U	0.456 U	0.71 U
2	MW-27	1/10/2017	0.13 J	39	114	0.319	7.13	19.5	500	0.000175 U	0.00016 J	0.6402	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.01072 J	0.00007 J	0.0094	0.0011 U	0.000175 U	0.566	0.618
3	MW-27	2/28/2017	0.125 J	51.9	104	0.292	7.38	18.9	512	0.0009 U	0.00066 J	0.70772	0.00022 U	0.0009 U	0.0003 U	0.000475 U	0.00052 U	0.0121 J	0.00004 U	0.00713	0.0011 U	0.000175 U	0.377	0.0977 U
4	MW-27	4/6/2017	0.129 J	48.5	107	0.303	7.53	16.4 J-	500	0.000175 U	0.001 U	0.71642	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.01337 J	0.00004 U	0.00617	0.0011 U	0.000175 U	0.367	0.462
5	MW-27	5/17/2017	0.113 J	43.9	107	0.267	7.52	14.7	476	0.00017 U	0.00053 J	0.71261	0.00022 U	0.00017 U	0.005 U	0.00047 U	0.00052 U	0.01344 J	0.00006 J	0.00534	0.0011 U	0.00017 U	0.274	0.29 U
6	MW-27 (D)	6/22/2017	0.108 J	46.5	108	0.264	7.52	13.2	505	0.00017 U	0.00047 J	0.72611	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01232 J	0.00004 U	0.00491 J	0.0011 U	0.00017 U	0.268	0.112 UJ
6	MW-27	6/22/2017	0.107 J	46.3	105	0.265	7.53	13.3	504	0.00017 U	0.00055 J	0.72679	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01196 J	0.00004 U	0.00486 J	0.0011 U	0.00017 U	0.365	0.836 J
7	MW-27	7/20/2017	0.0963 J	49.6	112	0.274	7.43	11.8	588	0.00017 U	0.00038 J	0.8187	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01175 J	0.00004 U	0.00384 J	0.0011 UJ	0.00017 U	0.405	0.489
8	MW-27	8/21/2017	0.0977 J	46.1	111	0.256	7.48	10.7	512	0.00017 U	0.00058 J	0.82439	0.00044 U	0.00017 U	0.00045 U	0.00095 U	0.00052 U	0.01186 J	0.00004 U	0.00478 J	0.0011 UJ	0.00017 UJ	1 U	0.697
9 (DM-1)	MW-27 (D)	9/28/2017	0.0871 J	46.3	106	0.265	7.46	8.61	516	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9 (DM-1)	MW-27	9/28/2017	0.0932 J	45.5	108	0.266	7.24	8.68	528	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1	MW-28	10/25/2016	0.237	7.92	791	1.79 J-	7.43	4.97	2116	0.00037 J	0.00518	0.2324	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.01508 J	0.00004 U	0.03307	0.0011 U	0.000175 U	0.732	0.615
2	MW-28 (D)	1/10/2017	0.25	7.64	748	1.84	7.74	4.6	2076	0.00039 J	0.00572	0.2363	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.01176 J	0.00004 U	0.0343	0.0011 U	0.000175 U	0.423 U	0.896
2	MW-28	1/10/2017	0.244	7.61	776	1.79	7.8	4.87	2120	0.00027 J	0.00596	0.22263	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.0111 J	0.00007 J	0.03477	0.0011 U	0.000175 U	0.449	1.25
3	MW-28	3/2/2017	0.267	7.21	697	1.87	7.97	3.03	1967	0.009 U	0.00572	0.23093	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.01277 J	0.00004 U	0.02938	0.0011 U	0.000175 U	0.282	0.0553 U
4	MW-28	4/11/2017	0.271	7.09	697	1.7	7.92	1.42	2100	0.000175 U	0.00512	0.2377	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.01532 J	0.00004 U	0.03303	0.0011 U	0.000175 U	0.25	0.723
5	MW-28 (D)	5/16/2017	0.245	6.2	677	1.77	8.09	0.797	2020	0.00017 U	0.00403	0.23879	0.00022 U	0.00017 U	0.005 U	0.00047 U	0.00052 U	0.01743 J	0.00006 J	0.03146	0.0011 U	0.00017 U	0.299	0.101 U
5	MW-28	5/16/2017	0.248	5.97	690	2.02	8.06	0.972	2060	0.00017 U	0.00406	0.24462	0.00022 U	0.00017 U	0.005 U	0.00047 U	0.00052 U	0.01793 J	0.00006 J	0.03237	0.0011 U	0.00017 U	0.257	0.18 U
6	MW-28	6/20/2017	0.254	6.51	724	1.6	8.1	0.441	2187	0.00017 U	0.0032	0.21356	0.00022 U	0.00017 U	0.00045 UJ	0.00047 U	0.00052 U	0.01624 J	0.00004 U	0.0295	0.0011 U	0.00017 U	0.351	0.313 U
7	MW-28	7/24/2017	0.253	6.31	677	2.04 J	8.06	0.563	2200	0.00017 U	0.0031	0.23466	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01751 J	0.00004 U	0.03071	0.0011 UJ	0.00017 U	0.226	0.654 U
8	MW-28	8/21/2017	0.242	6.15	680	1.94	7.88	0.443	2067	0.00017 U	0.00377	0.2038	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.01669 J	0.00004 U	0.03071	0.0011 U	0.00017 U	1 U	0.0242 U
9 (DM-1)	MW-28	9/28/2017	0.215	5.91	631	1.95	7.66	0.263	2093	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1	MW-29	10/26/2016	0.339	12.2	715	1.09 J-	7.84	36.7	2364	0.00094	0.03028	0.5939 J+	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.02155 J	0.00004 U	0.03046	0.0011 U	0.000175 U	0.572	0.501 U
2	MW-29	1/4/2017	0.367	14.6	875	1.08	7.74	15.7 J+	2730	0.00027 J	0.02101	0.76854	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.02513	0.00012 J	0.01572	0.0011 U	0.000175 U	0.431 U	0.666 U
3	MW-29	2/28/2017	0.342	12.5	797	1.13	7.51	26	2587	0.0009 U	0.02743	0.75695	0.00022 U	0.000175 U	0.005 U	0.000475 U	0.00052 U	0.02235 J	0.00004 U	0.02284	0.0011 U	0.000175 U	0.336	0.281 U
4	MW-29	4/11/2017	0.372	13.2	967	1.08	7.76	3.36	2867	0.000175 U	0.01583	0.8608	0.00022 U	0.000175 U	0.0003 U	0.000475 U	0.00052 U	0.03438	0.00004 U	0.00645	0.0011 U	0.000175 U	0.588	0.821
5	MW-29	5/16/2017	0.336	11.6	952	1.14	7.82	3.85	2910	0.00017 U	0.01861	0.95472	0.00022 U	0.00017 U	0.005 U	0.00047 U	0.00052 U	0.03051	0.00006 J	0.00675	0.0011 U	0.00017 U	0.455	0.548 U
6	MW-29	6/20/2017	0.348	12.3	967	0.749	7.85	0.998	3120	0.00017 U	0.01186	0.83503	0.00022 U	0.00017 U	0.00045 UJ	0.00047 U	0.00052 U	0.03204	0.00004 U	0.00388 J	0.0011 U	0.00017 U	0.503	0.286 U
7	MW-29	7/24/2017	0.323	12.3	936	1.15 J	7.78	1.11	3160	0.00017 U	0.01357	0.95024	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.03061	0.00004 U	0.00352 J	0.0011 UJ	0.00017 U	0.429	0.885
8	MW-29	8/21/2017	0.355	11.9	959	1.11	7.76	0.926	2930	0.0009 U	0.01646	0.86084	0.00022 U	0.00017 U	0.00045 U	0.00047 U	0.00052 U	0.03182	0.00004 U	0.00432 J	0.0011 U	0.00026 J	1 U	0.421 U
9 (DM-1)	MW-29	9/27/2017	0.301	11.5	910	1.14	7.66	0.654	2980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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. 2490.01 (Exp. 11-30-18) and ISO/IEC 9001 Cert. No. 83761-IS7 (Exp. 01-16-21) and TestAmerica NELAP Identification Number: 02-00416, EPA Region: 3, Expiration Date: 04-30-18.
[2] Event Nos. 1 through 8 were background/baseline sampling events. Event No. 9 was the initial Detection Monitoring (DM-1) sampling event.
[3] Field duplicate samples that were taken for Quality Control purposes are noted with a (D).

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.

TETRA TECH

FIGURES

PGH P:\GIS\FIRST_ENERGY\MAPDOCS\PLEASANTSCO_EUREKA_PROPOSED_CCR_MAY2017_CCR.MXD 01/26/18 SP

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. Pre-Existing 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.

WELL NUMBER	NORTHING	EASTING
GW-7	316821.0	1466214.2
GW-9	321603.2	1465377.3
GW-19	322183.1	1466559.2
GW-20	319602.2	1471681.0
GW-21	316029.1	1469096.5
GW-22	316972.2	1471704.1
GW-23	320048.4	1471095.6
GW-24	320797.1	1469894.5
GW-25	321494.0	1468884.5
GW-26	322070.7	1467783.6
GW-27	320829.6	1465535.9
GW-28	320230.6	1465756.9
GW-29	319339.2	1465597.3

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

McElroy's Run Dry Disposal Landfill Area

McElroy's Run Disposal Impoundment

GW19 (713.90)
GW26 (737.45)
GW9 (688.47)
GW25
GW27 (666.76)
GW24
GW28 (678.00)
GW23
GW29 (788.73)
GW20 (821.69)
GW7 (888.73)
GW21
GW22 (801.89)

800 0 800 Feet

TETRA TECH

CCR RULE GROUNDWATER MONITORING SYSTEM
PLEASANTS POWER STATION
McELROY'S RUN CCB LANDFILL AND IMPOUNDMENT

FIRSTENERGY CORPORATION
GREENSBURG, PENNSYLVANIA

DRAWN BY: S. PAXTON 01/26/18
CHECKED BY: B.BAKER 01/26/18
APPROVED BY: B. BAKER 01/26/18

CONTRACT NUMBER: 212C-SW-00070

FIGURE NUMBER 2-1

REVISION 0

Legend

- Pre-Existing Monitoring Well
- New Monitoring Well
- **Geologic Unit Groupings**
  - Lower Connellsville SS/ Lower Clarksburg RB
  - Morgantown SS/Birmingham RB
  - Grafton SS/Pittsburgh RB
  - Saltsburg SS/Alluvium
- Approximate Waste Boundary
- Approximate Parcel Boundary
- Groundwater Elevation Contour
- (715.90) Groundwater Elevation May 2017
- Topographic Contour (10-foot)