2019

ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

COAL COMBUSTION RESIDUALS (CCR) RULE

D.B. WILSON GENERATING STATION PHASE II CCR LANDFILL OHIO COUNTY, KENTUCKY

Prepared for:



Big Rivers Electric Corporation D.B. Wilson Generating Station 5663 State Route 85 West Centertown, Kentucky 42328

Prepared by:

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January 2020

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1.0 INTRODUCTION

At the request of Big Rivers Electric Corporation (BREC), AECOM Technical Services, Inc. (AECOM) prepared this 2019 Annual Groundwater Monitoring and Corrective Action Report for the BREC D.B. Wilson Coal Combustion Residuals (CCR) Phase II Landfill (the Unit), located in Ohio County, Kentucky. This report was prepared in accordance with Part 257.90, Sub-Part (e) of the United States Environmental Protection Agency (USEPA) CCR Rule. The CCR Rule was established to regulate the disposal of CCR produced by electricity generating facilities (USEPA, 2015).

This report summarizes all activities related to the CCR Rule groundwater monitoring program at the Unit in 2019. The following sections present a site background summary, a discussion of field activities performed, a summary of laboratory results, statistical evaluation findings, and conclusions regarding groundwater conditions in the aquifer system subject to monitoring under the CCR Rule.

As stated in the previous 2016-2018 Annual Groundwater Monitoring and Corrective Action Report, statistical results of the baseline groundwater data indicate that the Unit requires Assessment Monitoring under the CCR Rule, as most of the Appendix III constituents, excluding fluoride and pH, have statistically significant increases (SSIs) over background. On February 5, 2018, BREC posted a formal notification that the Unit would enter into an Assessment Monitoring Program, fulfilling the requirement of 40 Code of Federal Regulations (CFR) § 257.107(h)(4).

1.1 Site Description

The Wilson Phase II Landfill is located in Ohio County approximately 5 miles northwest of the town of Centertown, Kentucky (**Figure 1**). The property is located northwest and adjacent to the D.B. Wilson Generating Station (Wilson Station). The current Wilson Phase II Landfill footprint is approximately 92 acres (**Figure 2**). Adjacent to the Phase II Landfill on the east is the Wilson Station Phase I Landfill, which is currently being regulated by Special Waste permit by the Kentucky Department of Environmental Protection, Division of Waste Management (KDMW) under of Title 401 of the Kentucky Administrative Regulations (KAR) Section 45.

The Wilson Phase II Landfill is raised above adjacent ground to a maximum elevation of approximately 520 feet above mean sea level (amsl). The original ground surface within the landfill footprint was an irregular post-mining reclaimed surface.

1.2 Program Monitoring Well Systems

1.2.1 Operating Permit Monitoring Wells

Prior to implementation of the CCR Rule, a groundwater monitoring well network was already present at the Unit in compliance with the requirements of the facility's operating permit. The existing wells are located along the perimeter of the permitted footprint for the Wilson Phase II Landfill and meet the CCR Rule requirements that downgradient monitoring wells must be located at the waste boundary of the (active) CCR unit, or as close as practical.

Under the requirements stated in the operating permit, five (5) monitoring wells (MW-5, MW-6, MW-7, MW-8 and MW-10) were installed adjacent to the Wilson Phase II CCR Landfill to determine the general direction of groundwater movement and to monitoring groundwater at the site. MW-8 is located north of the landfill and is considered upgradient. MW-5, MW-6 (both west of the landfill), MW-7 (southwest of the landfill) and MW-10 (south of the landfill) are considered as downgradient. As-built specifics of each well installation are summarized on **Table 1**. The locations of the groundwater monitoring wells are shown on **Figure 2**. Each well has a dedicated bladder pump and tubing system installed for sampling purposes.

As stated in the CCR monitoring well network certification, the stratigraphic interval considered as the most prominent water-transmitting zone within and adjacent to the Wilson Station is material identified as reclaimed surface mining spoil material comprised of disrupted consolidated sandstone and shale of the Carbondale Formation. The United States Geological Survey (USGS) Geologic Map of the Equality Quadrangle describes underlying bedrock as "Sandstone, siltstone, shale, coal and underclay: Sandstone, light- to medium-gray, fine-grained, massive, micaceous, locally grades into thin-bedded siltstone. Siltstone, light- to medium-gray and yellowish-brown." For purposes of compliance with the CCR Rule groundwater monitoring requirements, this disrupted sequence comprising the unconsolidated mine spoil is considered the uppermost aquifer underlying the Wilson Phase II Landfill.

Details about the monitoring network are presented in the *Monitoring Well Completion Report, D.B. Wilson Special Waste Landfill, Solid Waste Permit Number 092-00004, Ohio Count, Kentucky* (Associated Engineers, Inc., April 13, 2009), a copy of which was included as **Appendix A**. **No changes were made to the Program Monitoring Well System in 2019.** Monitoring wells MW-1, MW-2, MW-3, MW-4, P-9, and P-11 are included in the CCR program as "water level only" monitoring points

1.2.1 Characterization Monitoring Wells

To address the requirements of 40 CFR § 257.95(g)(1), five (5) Characterization monitoring wells (MW-102, MW-104, MW-105, MW-110, and MW-4D) were installed in October 2018 for the characterization of groundwater at locations indicated on **Figure 2**. As-built specifics of each well installation are summarized on **Table 1**. A Monitoring Well Construction Progress Report (AECOM, December 13, 2019), included herein as **Appendix B**, was prepared to summarize the well installation process and testing results.

The Characterization monitoring wells, located at projected downgradient positions east, southeast, south, and southwest of the Unit, were used to assist in the characterization of the existence, quality, quantity, areal extent, and depth of groundwater degradation, and the rate and direction of migration of CCR contaminants in the groundwater.

2.0 2019 ACTIVITIES SUMMARY

The following subsections describe the activities that were performed in 2019 for the Wilson Phase II Landfill related to the CCR Groundwater Monitoring Network.

2.1 Groundwater Sampling

Four groundwater sampling events were conducted at Wilson Phase II Landfill in 2019, including two Assessment Monitoring events and two Characterization sampling events. The following table summarizes the dates of the sampling event and the wells included in the event.

Event Type	Sampling Event	Dates	Wells Sampled
Assessment	13	June 27-30, 2019	Background (Upgradient) MW-8 Downgradient MW-5, MW-6, MW-7. MW-10
Characterization	2	June 27-28, 2019	Characterization Wells MW-4D, MW-102, MW-104, MW-105, MW110
Assessment	14	November 4-7, 2019	Background (Upgradient) MW-8 Downgradient MW-5, MW-6, MW-7. MW-10
Characterization	3	November 7-8,2019	Characterization Wells MW-4D, MW-102, MW-104, MW-105, MW110

Monitoring wells were sampled following low flow sampling techniques developed and incorporated into current operating permits, which are maintained within the operating record at Wilson Station.

Groundwater sampling activities were performed by BREC personnel in June and November 2019. Groundwater samples collected during the June 2019 event were submitted to Test America, Inc. (Test America) in Nashville, Tennessee and McCoy and McCoy Laboratories, Inc. in Madisonville, Kentucky for analyses. Groundwater samples collected during the November 2019 event were soley submitted to and McCoy and McCoy Laboratories, Inc. for analyses. Groundwater samples collected during the June and November Assessment Monitoring events were analyzed for Appendix III and Appendix IV parameters, in accordance with 40 CFR § 257.95(b). Groundwater samples collected during the June and November Characterization monitoring events were analyzed for Appendix III and Appendix IV parameters in accordance with 40 CFR § 257.95(g)(1).

No filtration of samples was conducted in either the field or laboratory procedures. Laboratory analyses were performed in accordance with approved USEPA methods.

2.2 Assessment of Corrective Measures

On December 6, 2018, BREC posted a formal notification that the Wilson Phase II Landfill would initiate an Assessment of Corrective Measures (ACM) per 40 CFR § 257.95(g)(5), fulfilling the requirement of 40 CFR

§ 257.107(h)(7). A notice of ACM initiation dated January 14, 2019 was posted to BREC's publicly-accessible CCR reporting website.

In June 2019 BREC finalized an ACM to identify applicable remedial technologies to address cobalt impacts in groundwater pursuant to Tile 40 CFR Section 257.96. A report summarizing the results of the ACM (AECOM, June 2019) was posted to BREC's publicly-accessible CCR reporting website on June 14, 2019.

3.0 DATA EVALUATION

3.1 Groundwater Flow

Groundwater level data collected during the 2019 monitoring events are summarized on **Table 2**. The data collected during November 2019 were used to construct a piezometric surface map to illustrate groundwater flow conditions for the uppermost aquifer (see **Figure 3**). These data are representative of general conditions at the site and support the following analysis.

Overall groundwater flow beneath the footprint of the Wilson Phase II Landfill is to the south and southeast. Groundwater flow beneath the Landfill is influenced by extensive strip-mining and the physical extent of mine spoil deposits. These mine spoil deposits are laterally limited by the remaining bedrock high-walls left undisturbed along the north side of State Route 85 and beyond the western edge of the Wilson Phase II Landfill.

3.2 Sampling Results

During 2019 a total of two (2) Assessment Monitoring events and two (2) Characterization sampling events were completed. Results from these sampling events are summarized on the tables included in **Appendix C**. Complete analytical laboratory reports are included in **Appendix D**.

3.3 Statistical Evaluation

As part of previous Assessment Monitoring performed at the Unit, background and downgradient wells for the Phase II Landfill were sampled for Appendix IV constituents in April, July, and October 2018. In accordance with 40 CFR § 257.95, groundwater protection standards (GWPS) were established for detected Appendix IV constituents. The 2018 Assessment Monitoring results indicate the presence of cobalt at a Statistically Significant Level (SSL) above the GWPS in one monitoring well (MW-10) at the Unit, as detailed in **Appendix C**

In accordance with 40 CFR § 257.93(f), 40 CFR § 257.93(h), and 40 CFR § 257.95(d)(2), AECOM conducted a statistical evaluation of the Assessment groundwater data as part of developing this summary report to determine any SSIs over baseline concentrations for the Appendix III and Appendix IV parameters and any SSLs over established GWPS for detected Appendix IV parameters. A summary of the 2019 statistical evaluation conducted on the Appendix III and assessment Appendix IV parameters is provided as **Appendix E**.

Statistical methods were chosen in accordance with 40 CFR § 257.93(f) and the rationale behind why each method was selected is outlined in Statistical Methods Certification Document dated June 28, 2016. The Appendix III groundwater quality data were evaluated using an interwell approach that statistically compared constituent concentrations at downgradient monitoring wells to those present at a background monitoring well. For the Unit, monitoring well MW-8 is designated as the background well because it is located upgradient, whereas monitoring wells MW-5, MW-6, MW-7, and MW-10 are designated as compliance wells because they are located downgradient.

The statistical analysis results indicate that the following Appendix III constituents have SSIs over background (see **Appendix E**; **Table E3**):

- MW-5: calcium, chloride, sulfate, and total dissolved solids (TDS);
- MW-6: calcium, chloride, and TDS;
- MW-7: boron, chloride, and TDS; and
- MW-10: calcium, chloride, and TDS.

Fluoride and pH do not have any verified SSIs over background. Based on these results, Assessment Monitoring is required to continue at the Unit on a semi-annual basis.

The statistical analysis results also indicate that the following Appendix IV constituents have SSIs over background (see **Appendix E**; **Table E4**):

- MW-5: cobalt and lithium;
- MW-6: cobalt and lithium;
- MW-7: cobalt and lithium; and
- MW-10: cobalt.

These constituents were further evaluated to determine whether they are present at SSLs over the GWPS by calculating the lower confidence limit (LCL) at 95% confidence for each well and constituent using all of the Baseline, Detection, and Assessment monitoring results collected to date. For a constituent to be present at a SSL over the GWPS, its LCL must be greater than the GWPS. **Attachment E, Table E5** provides a summary of the LCLs and GWPS for cobalt and lithium at monitoring wells MW-5, MW-6, MW-7, and MW-10. The results indicate that lithium at monitoring well MW-6 and cobalt at monitoring well MW-10 (yellow highlights) are present at SSLs above the GWPS. The LCLs for the remaining wells and constituents are equal to or less than the GWPS and thus are not considered SSLs.

On December 6, 2018, BREC posted a formal notification that one or more constituent in Appendix IV has been detected at SSLs above the established GWPS as required by 40 CFR Part 257.107(h)(6).

3.4 Conclusions

Based upon the statistical evaluation of Appendix III and Appendix IV parameters collected during Assessment Monitoring at the Wilson Phase II Landfill, BREC will continue Assessment Monitoring in 2020.

4.0 2020 Planned Activities

4.1 Groundwater Monitoring

Continued Semi-Annual Assessment Monitoring of all operating permit monitoring wells for the Unit are planned for 2020.

4.2 Remedy Selection

As required by 40 CFR Section 257.97, BREC is in the process of selecting a remedy for groundwater impacts at the Unit.

Currently BREC considers four (4) potential corrective action alternatives as viable options to address groundwater impacts at the Unit. To evaluate each alternative, additional data collection will likely be required. BREC is currently evaluating data collection needs in the following areas to assist with remedy selection:

- 1) Nature and Extent of impact groundwater trends, influence of non-groundwater remedies, etc.
- 2) Physical Characteristics available data on the physical characteristics of the landfill and the groundwater environment
- 3) Performance Modeling data needed to develop digital models demonstrating the effectiveness of potential alternatives
- 4) Engineering feasibility, cost estimates, etc.

BREC is working to establish a comprehensive list of data collection needs to proceed forward with remedy evaluation and anticipates providing additional data in future semi-annual remedy selection progress reports.

In 2019, BREC constructed a series of collection trenches around the perimeter of the Unit to address non-groundwater releases. The 2020 groundwater monitoring program will assist in evaluating the success of the non-groundwater release remedies and provide relevant and important information to be considered in the final groundwater remedy selection.

5.0 **REFERENCES**

- AECOM, June 2019. Assessment of Corrective Measures Under the CCR Rule, Phase II Landfill; D.B. Wilson Generating Station, Ohio County, Kentucky.
- United States Environmental Protection Agency, 2015. Part 257.90, Sub-Part (e) Coal Combustion Residuals Rule.

Tables

TABLE 1

MONITORING WELL SYSTEM SUMMARY OF MONITORING WELL CONSTRUCTION WILSON PHASE II LANDFILL

BIG RIVERS ELECTRIC CORPORATION - WILSON STATION OHIO COUNTY, KENTUCKY

				Reference	Elevation*	Casing		Filter	Pack	Scre	ened	Bottom of
		Loca	ation*	TOIC	GS	Length	Size / Type	Inte	erval	Inte	erval	Boring
Well No.	-	Lat	Long	(feet, NAD27)	(feet, NAD27)	(feet, TOIC)	(ID / Material)	(feet, l	NAD27)	(feet, l	NAD27)	(feet, GS)
Operating Permit Monit	oring Wells											
								Тор	Bottom	Тор	Bottom	
MW-5 (8005-3477)	D	37.4638	-87.0910	469.14	467.42	75.0	2 inch / PVC	404.92	391.42	402.92	392.92	76
MW-6 (8005-3476)	D	37.4614	-87.0910	433.06	431.12	53.5	2 inch / PVC	390.42	377.12	388.12	378.12	54
MW-7 (8005-3479)	D	37.4584	-87.0913	426.14	424.08	50.0	2 inch / PVC	386.58	373.18	384.58	374.58	50.9
MW-8 (8005-3475)	U/B	37.4682	-87.0883	471.60	470.01	63.5	2 inch / PVC	419.53	405.96	417.05	407.05	64.05
MW-10 (8005-3478)	D	37.4544	-87.0902	398.91	396.91	22.4	2 inch / PVC	387.16	373.83	384.99	374.99	23.08
Characterization Wells	_											
MW-4D (8007-4811)	D/C	37.4542	-87.0851	410.02	407.03	96.4	2 inch / PVC	326.03	313.03	324.03	314.03	111
MW-102 (8007-2995)	D/C	37.4613	-87.0757	399.71	396.46	39.3	2 inch / PVC	372.46	360.46	370.46	360.46	36
MW-104 (8007-2994)	D/C	37.4517	-87.0826	392.87	389.76	43.4	2 inch / PVC	361.76	349.26	359.76	349.76	40
MW-105 (8007-2992)	D/C	37.4516	-87.0973	396.74	393.56	63.3	2 inch / PVC	366.56	333.56	343.56	333.56	60
MW-110 (8007-2996)	D/C	37.4521	-87.0907	393.54	390.56	42.8	2 inch / PVC	362.56	350.56	360.56	350.56	76 / 40
Water Levels Only	_											
P-9 (8005-3480)	water level only	37.4622	-87.0867	432.37	429.19	38.7	2 inch / PVC	402.99	389.99	400.99	390.99	39.2
P-11 (8005-3472)	water level only	37.4593	-87.0872	446.55	444.03	68.6	2 inch / PVC	388.43	374.90	385.93	375.93	69.13
MW-1 (8002-9621)	water level only	37.4667	-87.0852	443.89	442.31	36.3	4 inch / PVC	419.6	407.6	417.6	407.6	36
MW-2 (8002-9622)	water level only	37.4618	-87.0820	417.11	414.60	36.0	4 inch / PVC	393.3	381.1	391.1	381.1	36
MW-3 (8002-9623)	water level only	37.4576	-87.0845	411.12	408.19	36.2	4 inch / PVC	387.2	374.9	384.9	374.9	36
MW-4 (8002-9624)	water level only	37.4546	-87.0850	408.82	406.55	31.3	4 inch / PVC	389.6	377.5	387.5	377.5	31

Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky June 2015 and November 2018

Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum

TOIC = Top of internal casing, or measured from (below) TOIC

GS = Ground Surface, or measured from (below) GS

U / B = Upgradient / Background

D = Downgradient

C = Characterization

PVC = Polyvinyl chloride

ID = Internal Diameter

TABLE 2

MONITORING WELL NETWORK GROUNDWATER ELEVATIONS WILSON PHASE II CCR LANDFILL

BIG RIVERS ELECTRIC CORPORATION - WILSON STATION OHIO COUNTY, KENTUCKY

WILSON PHASE II CCR LANDFILL

	OPERATING PERMIT GROUNDWATER MONITORING WELLS											
	MV	V-5	MV	V-6	MV	N-7	MV	V-8	MM	/-10		
Reference Elevation TOIC*(ft, NAD27)	Downgradient 469.14		Downgradient 433.06		Downgradient 426.14		Upgradient/Background 471.60		Downgradient 398.91			
Date Measured	Depth to Water (ft) (feet)	GW Elevation (feet)	Depth to Water (ft) (feet)	GW Elevation (feet)	Depth to Water (ft) (feet)	GW Elevation (feet)	Depth to Water (ft) (feet)	GW Elevation (feet)	Depth to Water (ft) (feet)	GW Elevation (feet)		
1/24/2019	58.15	410.99	42.59	390.47	39.87	386.27	45.75	425.85	13.36	385.55		
3/27/2019	54.60	414.54	40.78	392.28	39.38	386.76	43.16	428.44	13.34	385.57		
7/31/2019	55.64	413.50	41.69	391.37	40.03	386.11	43.80	427.80	13.64	385.27		
11/19/2019	58.86	410.28	43.23	389.83	40.01	386.13	46.18	425.42	13.08	385.83		

CHARACTERIZATION GROUNDWATER MONITORING WELLS

	MW	-4D	MW	-102	MW	-104	MW	-105	MW	-110
Reference Elevation	Characte	erization	Characte	erization	Charact	erization	Charact	erization	Characte	erization
	410		555		552	2.07	550		555	
Data Massured	Depth to Water (ft)	GW Elevation								
Date measured	(leet)	(leet)								
1/24/2019	23.98	386.04	10.50	389.21	6.04	386.83	5.99	390.75	8.68	384.86
3/27/2019	23.85	386.17	11.19	388.52	6.68	386.19	5.75	390.99	8.73	384.81
7/31/2019	24.32	385.70	12.00	387.71	6.85	386.02	5.20	391.54	9.15	384.39
11/19/2019	23.96	386.06	11.71	388.00	7.21	385.66	7.35	389.39	8.96	384.58

TABLE 2 (continued)

GROUNDWATER ELEVATIONS SUPPLEMENTAL WATER LEVEL ONLY MONITORING POINTS

BIG RIVERS ELECTRIC CORPORATION - WILSON STATION OHIO COUNTY, KENTUCKY

SUPPLEMENTAL WATER LEVEL ONLY MONITORING POINTS PEIZOMETERS												
	MV	N-1	M	N-2	M	N-3	M	N-4	North	n (P9)	South	(P11)
Reference Elevation TOIC*(ft, NAD27)	Water Le 443	evel Only 3.89	Water Le 417	evel Only 7.11	Water Le 411	evel Only 1.12	Water Le 408	evel Only 3.82	Water Le 432	evel Only 2.37	Water Le 446	evel Only 6.55
Date Measured	Depth to Water (ft) (feet)	GW Elevation (feet)										
1/24/2019	17.8	426.09	17.71	399.4	24.46	386.66	22.82	386	25.41	406.96	60.45	386.10
3/27/2019	18	425.89	17.11	400	24.53	386.59	22.67	386.15	24.48	407.89	60.27	386.28
7/31/2019	19.06	424.83	17.93	399.18	25.00	386.12	23.12	385.70	23.95	408.42	60.80	385.75
11/19/2019	19.73	424.16	19.13	397.98	24.79	386.33	22.79	386.03	25.06	407.31	60.53	386.02

Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky June 2015 Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum TOIC = Top of internal casing

GW = Groundwater; GS = Ground Surface; NM = Not measured

Figures





Legend

- Property Boundary
 - CCR Phase 2 Fill
 - Bond Increment
 - KAR Permit Area
- \oplus Downgradient CCR Monitoring Well Location
- \oplus Upgradient CCR Monitoring Well Location
- \oplus Characterization Monitoring Well Location
- Monitoring Well Location (Water Level Only) \oplus
- \overline{ullet} Piezometer Location (Water Level Only)

0	750	1,500
	Feet	

Wilson Station Landfill Ohio County, Kentucky

FIGURE 2 WELL LOCATION MAP

DATE: 12/9/2019	SCALE: 1IN = 750 FEET
CREATED BY: ALW	
JOB NO. 60579935	



Legend

Property Boundary

CCR Phase 2 Fill

Bond Increment

KAR Permit Area

- \oplus Downgradient CCR Monitoring Well Location
- \oplus Upgradient CCR Monitoring Well Location
- \oplus Characterization Monitoring Well Location
- \bullet Piezometer Location (Water Level Only)
- Monitoring Well Location (Water Level Only)
- Water Table Contour (Inferred from Available Monitoring Data)
- ----> Groundwater Flow Direction

Groundwater Elevation (Feet, NAD27) Measured November 4, 2018 409.69

* Data for P-9, P11, and MW-4D was collected on 10/28/19.

0	750	1,500
	Feet	

Wilson Landfill Ohio County, Kentucky

FIGURE 3 GROUNDWATER SURFACE MAP NOVEMBER 2019

DATE: 11/21/2019	SCALE: 1IN = 750 FEET
CREATED BY: TMJ	
JOB NO. 60590960	

Appendix A

2009 Monitoring Well Completion Report

MONITORING WELL COMPLETION REPORT

D.B. WILSON SPECIAL WASTE LANDFILL SOLID WASTE PERMIT NUMBER 092-00004 OHIO COUNTY, KENTUCKY

April 13, 2009

Prepared for:

Western Kentucky Energy 145 North Main Street P.O. Box 1518 Henderson, Kentucky 42419

Prepared By:



AEI Project #080542



April 13, 2009

Mr. Thomas L Shaw Western Kentucky Energy 145 North Main Street P.O. Box 1518 Henderson, Kentucky 42419

RE: Monitoring Well Completion Report D.B. Wilson Station Special Waste Landfill Solid Waste Permit Number 092-00004 Ohio County, Kentucky

Dear Mr. Shaw:

Enclosed please find three copies of the above referenced Monitoring Well Completion Report for the proposed landfill expansion area. We appreciate the opportunity to be of service to you. If you have any questions regarding this report, please contact our office.

Sincerely,

G. Douglas Dunbar, P.G. Senior Geologist

2740 North Main Street, Madisonville, Kentucky 42431 Phone: (270) 821-7732 • Fax: (270) 821-7789 1001 Frederica Street, Suite 200, Owensboro, Kentucky 42301 Phone: (270) 684-8450 • Fax: (270) 684-8449

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MONITORING WELL COMPLETION REPORT

D.B. WILSON SPECIAL WASTE LANDFILL SOLID WASTE PERMIT NUMBER 092-00004 OHIO COUNTY, KENTUCKY

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MONITORING WELL COMPLETION REPORT

D.B. WILSON SPECIAL WASTE LANDFILL SOLID WASTE PERMIT NUMBER 092-00004 OHIO COUNTY, KENTUCKY

1.0 GENERAL INFORMATION

This report summarizes the monitoring well and piezometer completion activities required to implement the Revised Groundwater Monitoring Plan for the proposed expansion area at the D.B.Wilson Special Waste Landfill.

Five monitoring wells and two piezometers were completed at locations shown on the attached Site Plan.

All of the wells/piezometers are located in an area of reclaimed surface mining. As previously ascertained, the uppermost aquifer is the reclaimed mine spoil. All wells were terminated in spoil.

2.0 DRILLING ACTIVITIES

The wells/piezometers were drilled, constructed, and developed between January 14, 2009 and February 16, 2009. Work was impacted by severe weather conditions. Extra time was taken as necessary to insure that all Solid Waste Branch (SWB) requirements were met.

The Drilling Contractor was American Drilling Services (ADS), Indianapolis, Indiana. In addition to ADS personnel, drilling, construction and development procedures were supervised by Douglas Dunbar and Scott Duckworth with Associated Engineers, Inc. Timothy Hall with Western Kentucky Energy assisted in supervision and facilitation of activities.

Boreholes were completed using a CME 750 ATV drill. Holes were advanced by 6 1/4" I.D. hollow stem auger (HSA) or 6 1/8" air hammer with a filtration system capable of removing 99.999% of 0.3 micron particles. It was originally intended to use the air hammer in all holes except for the most shallow; however use of the required air compressor was severely limited by very wet conditions restricting site access and by very cold temperature which inhibited reliable starting. As a result, the air hammer was used in only borehole – P-11.

The drill rig and all down hole equipment were thoroughly cleaned at the D.B. Wilson facilities prior to beginning drilling. The rig and downhole equipment were subsequently decontaminated prior to moving to each well/piezometer site by pressure washing with a steam cleaner using potable water. Decontamination activities took place in the equipment cleaning building identified on the attached Site Plan or on a pad set up on the north side of the building. The interior cleaning site has a concrete floor. Heavy-duty plastic sheeting was installed at the exterior site. All drill cuttings, and

spoil/soil material generated by decontamination were contained and covered for disposal in the existing Phase I waste area by Western Kentucky Energy.

Plastic sheeting was installed in the active work area during drilling to contain cuttings. Cuttings were covered in plastic prior to leaving each site and left in charge of Western Kentucky Energy for disposal.

Each borehole was logged during advancement by observation of cuttings and drilling characteristics. Particular attention was given to water content of cuttings

3.0 WELL CONSTRUCTION ACTIVITIES

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Well/piezometer construction details are provided in the Uniform Kentucky Well Construction Records and Well Construction Diagrams found in Appendix A.

The Revised Groundwater Monitoring Plan dated 5/2/08 included installation details and proposed locations for monitoring wells. It stipulated that the wells were to be screened in the upper 10 ft. of the encountered saturated zone. Subsequently, SWB approved the locations as shown on the Site Plan submitted with this report Locations P-9 and P-11 were approved for use as piezometers to obtain static water levels only. Water quality sampling and testing not required. Additionally SWB allowed installation of 2" I.D wells and piezometers with screens a maximum of 10 ft. in length.

During field operations SWB required that P-9 and P-11 be completed following the same procedures as monitoring wells to allow future sampling and testing if necessary. Since water removal was required during development, monitoring well records were submitted to the Division of Water although they are not presently being used for water quality testing.

Since identifying the saturated zone was critical to proper well installation, it was deemed advantageous to begin well installation at the site closest to the existing impoundments at the south end of the proposed expansion (MW-10) and then move toward the north. Based on water level measurements in existing wells and potentiometric surface mapping of this data, it was considered probable that the water surface elevations in the pit would closely match the top of the saturated zone in MW-10 and the saturated zone would generally rise toward the north.

All well completions were successful in penetrating the saturated zone identified based on visual observation. As approved by SWB during field operations, some well screens were set slightly deeper than the upper 10 ft. of the encountered saturated zone. The deepest, MW-7, was set 12.6 ft. below the top of the zone.

In P-11, a limestone boulder directly overlying a void was encountered from 47.0 ft. to 48.7 ft. This interval was above the saturated zone (57 ft.) and bentonite pellet seal (top at 51.5 ft.). Approximately 1238 gallons of bentonite grout were required to plug the void and bring the grout up to within 3 ft. of the surface.

During installation of MW-10, the use of bentonite chips was approved for placement in the annulus from the top of the sand filter pack up to within 3 ft. of the ground surface. This is considered

acceptable since depth to the filter pack is only 9.75 ft. A bentonite pellet seal followed by bentonite grout was used above the filterpack in the remaining wells/piezometers. Density of bentonite grout was checked using a mud scale prior to placement by the tremie method.

A 6 1/8" diameter air hammer was used only in piezometer P-11. Use was approved during field operations.

Remaining well construction activities were completed in accordance with the document <u>A Guide</u> for Monitoring Well Construction and Abandonment-Solid Waste Branch.

4. WELL DEVELOPMENT

After waiting a minimum of 24 hours after installation of the surface pad and outer protective surface casing, wells were developed by pumping while monitoring ph, temperature, and specific conductivity. Approval was granted to discharge water down-slope from the well. Stabilization was achieved in all wells with the exception of the turbidity in MW-10. This well exhibits very slow recovery which allows only one well volume of water to be purged at a given time. 24 hours is required for full recovery. Apparently the spoil contains a high percentage of relatively fine grained, impermeable clay at this location. The relatively shallow depth and location may also be a factor, possibly resulting in greater compaction by heavy equipment. Subsequent pumping events have been conducted with elevated turbidity still exhibited to date.

5. WELL SURVEY

After installation of the surface pad and outer protective surface casing was completed for all wells, elevation of the top of the PVC casing and concrete pad were surveyed by Associated Engineers, Inc. The top of the pad is essentially the same as the ground elevation around the wells. Elevations are included in the Uniform Kentucky Well Construction Records and are also tabulated in Table 1. While obtaining this data, casing and pad elevations were surveyed for existing wells MW-1 through MW-4 (Phase I Waste Area). Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum.

APPENDIX A

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Uniform Kentucky Well Construction Records

TABLE 1.	MONITORING WEL	L/PIEZOMETER DATA
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WKE Site No.	DOW Site No.	Well/Piezometer	Top Casing Elev. (ft.)	Top Pad Elev. (ft.)	Location
MW-5	8005-3477	Well	469.27	467.38	Proposed Expansion Area
MW-6	8005-3476	Well	433.06	431.16	
MW-7	8005-3479	Well	426.20	424.15	
MW-8	8005-3475	Well	471.77	469.94	
P-9	8005-3480	Piezometer	423.28	421.24	
MW-10	8005-3478	Well	398.84	396.96	
P-11	8005-3472	Piezometer	446.65	444.02	
MW-1		Well	444.08	442.33	Phase I Waste Area
MW-2		Well	417.20	414.65	
MW-3		Well	411.08	408.25	
MW-4		Well	408.89	406.65	

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APPENDIX A

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Uniform Kentucky Well Construction Records

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD Use this form to report installation of monitoring or water wells. Original copy must be submitted to Division of Water within 30 days of completion. See instructions on reverse of form. Do not write in shaded areas. Record must be typed or neatly printed or it will be returned to the driller as unacceptable. One copy to Division of Water, one copy to owner, one copy to driller's files.								mber) 3	
4. Owner name Big Rivers Electric Corporation						1. Kentucky		- 34	nber
S. Owner address P. O. Box 24						2. Owner Well ID:	ACC	-MW-5	
^{6. City} Henderson		7. SI	^{ste} KY	8, Zip 424	419-0024	3. Attachme Required	nts		
If elle name and address differ fo	bbe bre emen serve mor	ress:				1. Site p 2. Welt 1	lan or sketc ocation tonouraphk	hmap man OR	0 M
9. Site D.B. Wilson Sta	ation					Conditiona	tained by Gi	PS unit	ö
address Highway 85						3. Well (4. Colifo 5. Signe	diagram (mo im analysis d variance (nitoring wel (if applicable if applicable	
11. City Centertown		12. S	tate KY	13. Zip	42328	Octional 6. Other	laboratory a	analysis rep	wi[]
14. Agency Interest	15, Facility type			Drinking V	Waler Armoni	31. Work start date	Feb	03 Day	2009 Year
(Al) 3319 Number	ID Number Sp	ecial	Waste Landi	500 AS 20 11	5941K9111	32, Work end date	Feb Month	13 Day	2009 Year
16. Owner (270) 844-6031	17.5	Site	(270) 821-73	43		Please r	eport depths not as relativ	in feet below to elevations	surface,
18. USGS topo map Equality			22. Physiographic Re			33, Total de	pth (N)		0
19. County Ohio			Biuegrass	D Ohlo Riv	er Alluvium	34. Depth to	bedrock (A)		_
20. Surface 21, E	Devation determined by OPS I Map I Prior rep	ort	 E. Coal Field Miss. Plateau 	Jackson	Field Purchese	35. Static w	nter tevel (fl)	63.7	5 22.68
23. Well Use	24. Drilling metho	1 10G d		25. Well status		So. Casiog o	ATER WI	ELLS ON	
Agriculture Ge	othermal II Auger - HS	C	Jet wash	Active		37. Estimate	d weil yield		
Commercial He	atpump DAuger-SS	et []	Push/probe Rotary - air	Inactive	a for	El gpr	n 🗋 gp	h Dg	pd
Dindustrial Dirie	Cable toot	L L L	Rotary - mud Rotary - reverse	intended u	15 0	38, Well ser	vice	of peop	le served
Monitoring / Water Level Moni	ning Core	ğ	Send point	26, Wellbead	Lastian	39. Disinfee	ant provet		Type Bleach
Deublic DVa	used Driven casing Excavation	HS aug	Sonic Unknown ger & air rotary	Walk cap	eal .	[] 02 [[] 10s [ups 🗍	Hypo- chiorite
27. Well completion; Casing and scre	*#\$		28. Annulus fill and scal			11. Pitless adapter installed [] Yee No			
From To Borehole Casing depth, fL depth, fl. diameter diameter	Casing type	Screen Joi Aize	depth, ft. depth, A	From To depth, ft. depth, ft. Material			(12, Pump lastalled:		
64.50 74 50 10 1/4" 2"ID	PVC screen (0.010	0.00 3.00 Concrete			. Bailer or bucket D Hand D No pump			
74.50 75.00 10 1/4 2"ID	PVC		56.30 62.50 Benionite pellets			44. Apparent quality and odor:			
75.00 76.00 10 1/4 2"ID	Open hole		62.50 76.00 Sand			u mok		• F	_
			30 Shush maa				an xudy ⊈		LQ.
From To Description (ind	fude any show of water and ind	icete	30, Startet: map [7] Ste plankhetch map attached on asparate page			1 d 0 m	uddy Ö] [] Iron] [] Sulfur
depth, fl. depth, fl. 0.00 0.50 Mine spoil - 1	apparent quality) OD SOI					12010	rdid		Selt
0.50 7.00 Mine spoil - g	gray clay and gray sha	le				COLIFORM TEST			
7.00 8.00 Mine spoit - y	ellowish brown clay					+S. Coliforn	1 Difecal	and total	
8.00 9.00 Mine spoil - g	pray clay and gray sha lark gray clay and da	ile) rk				46. Collferen test results			
gray shale	<u>, , , , , , , , , , , , , , , , , , , </u>					or	# co	lonias per 1	im 00
10.00 76.00 Mine spoil - p	gray shale with gray cl	ay,				47. Date Sampled		Oay	Year
wet at 04.4 m	· .					48. Date Analyzed	Month	Dey	Year
	Shoe well location and datar feite, major reads (reduce n WDrCATE)	Show well beation and delances from permanent shuctures, septor drain felds, major reads (include name or number) and intersections overcate workth with AV ARMOW		Latituđe	DMIS or	a ,			
47. Comments 6 1/4" HSA advanced to 76. Sand placed 62.50' - 75.0'. 58.30'. Protactive casing inst	9. Comments 6 1/4" HSA advanced to 76.0'. Sand placed 75.0' - 76.0'. 2" PVC screen and riser installed. Sand placed 62.50' - 75.0'. Bentonite pellets 58.30 - 62.50'. Bentonite tremie grouted 3.0' - 58.30'. Protactive casing installed in concrete ped.						Decimal DAVS Of Decimal	• ;	
50. Affirmation: The work described abo	nos bra sus si froças skil	rect to the best of a	my knowledge.	Lat/Long m	ethed DGPS	SUR []	REP		
Signature of Signa	2000		Date	4 /9/0	9	Dale Receiv	ed		
Certification	Driffing company	1				Laidab of			
0212.0424		twee e	inen Unliv	<u>y</u> Je	0.00	testeser			(#/ 04/11/2008

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UNIFORM KENTUCKY WELL CONS Use this form to report installation of monit Original copy must be submitted to Division of Water See instructions on reverse of form. Do not Record must be typed or neally printed or it will be retu One copy to Division of Water, one copy to own	n Well Identification Number abel Here (if applicable) Water wells: yellow labels onitoring wells: blue labels					
4. Owner name Big Rivers Electric Corporation				1. Kentucky Well ID (AKGWA) Number		
5. Owner address P. O. Box 24				2. Owner Well ID # ACC-MW6		
6. City Henderson	^{7. State} KY	8. Zip	2419-0024	3. Attachments Required		
If eite name and address differ from owner name and address	rese:			1. Site plan or sketch map 2. Well location Concernmenting map OR 10		
9. Site D.B. Wilson Station				Obtained by GPS unit Clamber Conditionally Required		
10. Site address Highway 85	-			3. Well diagram (monitoring well) 4. Coliform analysis (if applicable)		
^{II. City} Centertown	^{12. State} KY	13. Zip	42328	5. Signed variance (ir applicable) Dottonal 6. Other taboratory analysis report []		
14. Agency IS. Facility type		Waste [] Drinki	ng Water	31. Work Feb 05 2009 start date Worth Day Year		
(AI) 3319 & Urv (AI) DNumber SD	ecial Waste	Landfill	290231611	32. Work Feb 12 2009 end date Month Day Year		
16. Owner (270) 844-6031	lite (270) 8	21-7343		Please report depths in feet below surface,		
18. USGS topo map Equality	22. Physiog	aphle Regios		33. Total depth (ft) 54.00		
19. County Ohio	C Blueg	rass 🗋 Ohio	River Allunium	34. Depth to hedrock (ft)		
20. Surface 21. Elevation determined by	ort 🗋 Miss.	al Field 🛄 W. C Plateau 📑 Jack	oal Field son Purchase	35. Static water level (A) 43.18		
23. Well Use 24. Driblios metho	4	25. Well at	lus	VATER WELLS ONLY		
Agriculture Geothermal	🗋 Jet wash	Active		37. Estimated well yield		
Commercial Heat pump Auger - SS	el 🔲 Rotary - al	e 🔲 Inacth	të Induk for	🗋 gpm 🗋 gph 🗋 gpd		
Dindustriat	Rotery - m	ud Intend	ed use	38. Well service # of people served		
Monitoring / Water Level Moni DMining Core	Send point	26. Wellber	d CD 1 setting	39. Disinfectant amount 40. Type		
Public [] Unused Excavation	Sonic D Unknown HS auger & eir rot	ary C Senita	ep ny seal	Oricouri Oricouri		
27. Well completion: Casing and screens	28, Annol	us Jill and scal		41. Pilless adapter installed Yes No		
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53.50 54.00 10 1/4 2"ID Open hole	40.70	54.00 Sand				
20 1 libeteste las diferences energia sected continue on constate par	a) 30 Shareh	(S □ Cloudy S		
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1.00 4.00 Mine spoil - yellowish brown clay				COLIFORM TEST		
4.00 5.00 Mine spoil - Ilmestone boulder				45. Coliform test type		
5.00 54.00 Mine spoll - yellowish Drown clay, v at 41.4'	Net			16. Coliform test results		
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	court is			Sampled Day Year		
	P 101 - 101 - 101			48. Date Analyzed Morth Day Year		
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ex. comments 6 1/4" HSA advanced to 54.00". Sand placed 53.1	50' - 54.00'. 2"	PVC screen an	d riser			
Installed. Sand placed 40.70' - 53.50'. Bentonite p grouted 3.00' - 36.70'. Protective casing installad	ellets 38.70' - In concrete pa	40.70'. Benton d.	le tremie	Longitude a Decimal a		
50. Affir mation: The work described above was done under my supervision Note: the differ is not responsible for natural groundwater quality or quarties.	on, and this report is to stily encountered while	ue and correct to the be a drilling or completing th	t of my knowledge. Is well	Lai/Long retelhod		
Signature of Date Star Date Received						
ertification amber 0373-0259-01 Company American Drilling Services Interior						

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UNIFORM KENTUCKY WELL CONSTRUCTION RECORD Use this form to report installation of monitoring or water wells. Original copy must be submitted to Division of Water within 30 days of completion. See instructions on reverse of form. Do not write in shaded areas. Record must be typed or neatty printed or it will be returned to the driller as unacceptable. One copy to Division of Water, one copy to owner, one copy to driller's files.								Vell identification Number rei Here (if applicable) ster wells: yellow labels sitoring wells: blue labels		
4. Owner Big Rivers Ele		I. Keetucky Well ID (AKGWA) Number								
S. Owner address P. O. Box 24	· · ·					2. Owner Well ID#	ACC-M	W-7		
6. City Henderson		7. Sta	^{te} KY	^{8, Zip} 424	19-0024	3. Attachments				
if site name and address diffe	r from owner name and	addresa:		•		1. Site pla 2. Well loc	n or sketch ma ation	p	0	
^{9. Sile} D.B. Wilson S	Station					On topographic map, <u>OR</u> Obtained by GPS unit				
10. Site Highway 85						Conditionally 3. Well dia	<u>Regulred</u> Igram (monitori	ing well)	g	
11. City Centertown		12. SI	ale KY	i3. Zip	42328	6. Signed	variance (il app variance (il app	viicable)	8	
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Interest 22.50	15. Facility type E] CERCLA] RCRA	Solid Waste	Drinking \	Nater sament	siari dale	FGD Mosth	US . Day	Year Year	
(AI) 3319 Number	1D Number	Special	Waste Landfi			32. Work end date	Feb Month	12 2 Dey	2009 Year	
16. Owner (270) 844-603	31	17. Site	(270) 821-734	13		Please tep	ort depths in feet	t below sur	face,	
18. USGS topo map Fallality		phone	2) Physicareabic Re	nton		33. Total deat	of as relative cie	50,90		
19. County Ohlo		· · · · · ·	Bluegrass	D Ohlo Riv	er Alluvium	34. Depth to be	rdrock (A)			
20. Surface	. Elevation determined by		E, Coal Field	🗊 W. Coai	Field	35. Static wate	r tevel (ft) 🔄	39.24		
elevation (R) 424.15	Survey DPno	r well log	LI MISS, PIECEOU	L Jackson	r di Ci là 58	36. Casing belg	spi apone surla	ce (ín) 🔒	24.60	
23. Well Use	24. Drilling m	ethod (7		25. Well status		WA:	FER WELL	S ONLV	'	
Commercial	Heat pump 🖸 Auger - 1	HS 🛛 SS 🖸	Jet wash Push/probe	Inactive		37, Estimated	well yield			
Domestic	HVAC D Auger - I	bucket	Rotery - air Rotery - mud	Unsuitable	a for	38. Well servic	х #0	of people :	served	
industrial	injection Cable to		Rotary - raverse	antended u 26. Wellhead	120	39, Disinfectan	i amount	40, Tyj	pe	
Remed Working / Water Lavel Mon Life	Maning ⊡ Core ⊡ Driven c	esing []	Send point Sonic	🖸 Flush 💽	Locking			🗂 Bie	Mach	
DPublic	Unused 🗍 Excavati	ion []} ad.–HSaug	Unknown per & air rotary	 Well cap Sanitary s 	eat	[]@ [] []Ibs []	qis 门 cups gal	D Hy chi	rpo- orite	
27. Well completion: Casing and se	treens		28, Annulus fill and scal			fl. Filless adapter installed Yes No			⊡ No	
From To Bonchola Casia depth, R. depth, R. diameter diame	ng Casing type	Screen aloi size	From To Material depth, R. Material			42. Pump inste [**] Submersit	ited: de l‴ljei	i''' Turt	oine	
0.00 39.50 10 1/4" 2"		0.010	0.00 3.00 Concrete			Baller or bucket D Hand No pump				
49.50 50.00 10 1/4 2"	D PVC	0.010	33,50 37.50 Bentonita pellets			43. Depth to intake (D)				
50.00 50.90 10 1/4 2"	D Open hole		37.50 50.90 Sand			44. A pparent q	nanta ana onoi	r:		
			· · · · · · · · · · · · · · · · · · ·						101	
29. Lithologie log (11 more space is	needed, continue on separat	e page)	30, Sketch map Ø Site plantsketch map attached on separate page			ja ⊡ Kuda	w §⊡		[] fron	
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wet et 36.9	, Aigh cigh sur Aigh. A	onale,				45. Coliform to	st type III fecal and	tolal		
						16. Coliform to	st results	: [7] Con	fuent	
:						or	# colonies	s per 100	ml	
						47. Dale				
						Sampled 48. Date		Ony	Year	
-			Chou and heat or out of the		chana ande date	Analyzed	Month	Day	Year	
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49, Comments 6 1/4" HSA advanced to 5	0.00' Send placed	50 <u>00' -</u> 5	0.00° 2" P\/C.s/	reen and d	eer	D	icinel		•	
Installed. Send placed 37. grouted 3.00' - 33.50'. Pro	Installed. Send placed 37.50' - 50.00'. Bentonita pelleta 3 grouted 3.00' - 33.50'. Protective casing installed in conc				lremie	Loogitude of Di	ecimal •		л 0	
50, AffIrmation: The work described Note: the datter is not responsible for	50. Affirmation: The work described above was done under my supervision, and this n Note: the defar is not reasonable for natural anomalismes much a supervision and this network.				my knowledge. N.	Lat/Long meth	od GPS □ SU		EP	
Signature of Steen Date 4/4/04 Date Received										
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		74721	in the second	y acto				194	64/11/2018	



UNIFORM KENTUCKY WELL CONSTRUCTION RECORD Use this form to report installation of monitoring or water wells. Original copy must be submitted to Division of Water within 30 days of completion. See instructions on reverse of form. Do not write in shaded areas. Record must be typed or neatly printed or it will be returned to the driller as unacceptable. One copy to Division of Water, one copy to dwner, one copy to driller's files.								
4. Owner name Big Rivers Electric Cor		1. Kentucky Well ID (AK	GWA) Number					
S. Owner P. O. Box 24					2. Owner Welling ACC-	MW-8		
6. City Henderson	7	7. State KY	^{8, Zip} 424	19-0024	3. Attachments Required			
If site name and address differ from owned	r neme and eddree	86;			1. Site plan or sketch 2. Well location	map 🗈		
9. Site D.B. Wilson Station					On topographic Obtained by GP	map, <u>OR</u> 10 Sunki 10		
10. Site address Highway 85					3. Well diagram (mor 4. Coliform analysis (itoring well) 🗈		
11, City Centertown	1	12. Stole KY	13, Zip	42328	5. Signed variance (il Optional 6. Other laboratory as	applicable)		
14. Agency 15. Facility	y type 🚺 CER	ICLA 🔲 Solid Waste	Drinking V	Water	31. Work Jan start date Mooth	26 2009		
(AI) 3319	k ⊡RCR.	KA 🗍 UST	🚺 Site Asse	ssmenl	32. Work Feb	13 2009		
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18. USGS topo map Equality		22. Physiographic Re	gion D Ohio Riv	er Alkolum	33. Total depth (R) 34. Depth in belcork (fi)			
20. Sectors 21. Efevation de	termined by	E. Coal Field	W. Cost	Field	35. Static water level (ft)	52.41		
etevation (ft) 469.94	Aap Prior report	t 🛄 Miss. Plateau og	🖸 Jeckson	Purchase	36. Casing height above s	urface (in) 24.00		
23. Weti Use	4. Drilling method		25. Well status		WATER WE	LLS ONLY		
Agriculture Geothermal	Auger - HS	🗋 Jetwash 🗋 Push/probe	Active		37. Estimated well yield			
Domestic Dreat pump	Auger - bucket	Rotary - eir	Unsuitable	e for	gpm Cigph	t of occorie served		
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27. Well completion: Casing and sereens	80	28, Annulus fill and	28, Annulus fill and seal From To stated			41, Pitless adapter installed [] Yee [] No		
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20. Lithelaste ter filmere energie seaded contin		30 Statch man	30. Sketch map					
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depth, fL depth, fL apparent of	nd olive brown	· e j				C C C C Selt		
shate					COLIFORM TEST			
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28.00 35.00 Mine spoil - dark gray	clay and shale				or # cold	mies per 100 mi		
35.00 64.05 Mine spoil - dark gray	/ shale, wet at 5	52.5			47. Date Sampled	Dəy Year		
					48. Date Analyzed Month	Qay Year		
		Show well beedlan and distan Selds, major roads (Include m WEI/CATE	ces from permanent st end or number) and its NORTH WITH AN ARR	ruchures, septic drain Iersections IOW	Duo Latitude or	o , u		
49. Comments				in or	Oecimal	0		
installed. Send placed 50.48' - 63.46 grouted 3.0' - 46.53'. Protective casi	ellets 46.53' - 60.48'. Concrete pad.	Bentonite	tremle	DMS Longitude or Decimal	o , , , , , , , , , , , , , , , , , , ,			
50. Affirmation: The work described above was done Note: the dollar is not responsible for natural around	under my supervision, fwater pusity of quarbs	, and this report is true and con ly encountared while drift no or	rect to the best of compligting this w	my knowledge e3	Lal/Long wethod	SUR 🗍 REP		
Signature of Stoppe 56	0	Date signed M	1/9/04	7 Year	Date Received			
Certification number 272 - 255 - 21	Drilling company	and a Arit	<u>,</u>		faitials of			
03/3-0037-01	A	METICAN UTIL		101173	(E)NAGL	rev 04/11/2008		

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UNIFORM KENTU Use this form t Original copy must be au See instructions Record must be typed or nead One copy to Division o	CKY WELL CONS o report installation of monitor braited to Division of Water on reverse of form. Do not ty printed or it will be return f Water, one copy to owne	STRUCTION REC oring or water walls. within 30 days of completi write in shaded areas. med to the driller as unac r, one copy to driller's file	CORD on. ceptable.	Attach La M	h Well Identification Number abel Here (if applicable) Water wells: yellow labels fonitoring wells: blus labels					
4. Owner Big Rivers Elec	Iric Corporation				1. Kentucky Well ID	(AKGWA) Numb	" 8 0			
S. Owner address P. O. Box 24					2. Owner Well ID # AC	C-P-9				
6. City Henderson		7. State KY	^{a. Zip} 424	19-0024	3. Attachments Required					
If site name and address differ f	rom owner name end addr	D\$\$:			1. Site plan or sk 2. Well location	etch map				
9. Site D.B. Wilson Sta	ation				On topograp Obtained by Conditionally Recu	hic map, <u>OR</u> GPS unit Ired				
10. Site address Highway 85					3. Well diagram (4. Coliform analy	monitoring well) sis (if applicable)				
II. City Centertown		^{12. State} KY	13. Zip	42328	5. Signed variant Optional 6. Other laborato	xe (if applicable) ny an <u>alysis report</u>				
I4. Agency Interest	15. Facility type 🔲 CE	RCLA C Solid Weste	C Drinking 1	Nater	31. Work Jan start date Nort	1 21 h D <u>ey</u>	2009 Year			
(A) 3319	ID Number Spe	cial Waste Landfi		\$ SING IL	32. Work Fell ead date Mont	D 13	2009 Year			
16. Owner (270) 844-6031		ile (270) 821-734	13		Please report dept	hs in feet below su	ríace,			
18. USGS topo map Equality	P	22. Physiographic Re	glon		33. Total depth (ft)					
19. County Ohlo		Bluegress	Ohto Riv	er Alluvium	34. Depth to bedrock	(R)				
20. Surface 21. E elevation (ft) 421.24	Clevation determined by GPS I Map I Prior repo	At Di Miss. Plateeu	Jackson	Purchase	35. Static water level	(n) <u>18.00</u>	24 4A			
23, Well Use	24. Drilling method		25. Well status			36. Casing height above surface (in) 24.48 WATER WELLS ONLY				
Agriculture Ca	othermal 🖪 Augur - HS	🗖 Jel wesh	Active		37, Estimated well yie	4d	-			
Commercial He	at pump 🖾 Augar - SS /AC 🔲 Augar - bucke	Di Push/probe ∋i Di Rotery-air	 Innetive Unsuitable 	for	El gem 🖸	gph 🖸 gpd	l 			
Dindustrial Dinte	ection Cable tool	Rotary - mud Rotary - reverse	intended u	ISO	38. Well service	# of people	Derved			
Monitoring / Water Lavel More	ning 🖸 Core	Send point	16. Wellbead	Locking	J9, Distriectant amou	ан налу С В	ieach			
[]Public []Un	used D Excevation	Unknown	Wali cap	eal]cups []H ch	ypo- iorits			
27. Well completion: Casing and sere		28. Annulus fill and	seal		43. Pitless adapter in:	talled 🚺 Yas	No No			
From To Borshols Casing depth, R. depth, R. diameter clemeter	Casing type S	iornen From To depth, ft. depth, h	Mate	riad 🕴	12. Pump Installed:					
0.00 28.20 10 1/4" 2"ID	PVC	0.00 3.00	Concrete	· - · · - · · - · · - ·	Beiler or bucket B Hand D No pump					
28.20 38.20 10 1/4 2"ID 38.20 38.70 10 1/4 2"ID		22.20 26.20	Bentonite pelle	eta	43. Depth to Intake (ft)					
38.70 39.20 10 1/4 2"ID	Open hole	26.20 39.20	Sand	;	. 44. Apparent quality and odor:					
	·	-	·····		₩ 🗋 Clear		Ě			
29. Lithologic log. (if more space is ne From To Description (inc	eded, continue on separate page	c) 30. Sketch map (2) 8te penisketch m	ap attached on sec	wate page	Muddy	8000				
depth, ft. depth, ft.	apparent quality)				Setur C S		🗋 Sultur 🗋 Sell			
8.00 21.00 Mine spoil - (pray clay with gray sha	le			COLIFORM TEST					
21.00 28.00 Mine spoll - 6	olive brown clay				45. Coliform test type	cal and total				
28.00 39.20 Mine spoil - (olive brown clay, wet				46. Coliform test resu		nfluent			
					or #	colonies per 100) mi			
					47. Date Sampled	Day	Year			
					48. Date Analyzed Most	h Day	Year			
		Show well location and distant fetide, chajor roads (molude na INDRCATE A	the from permanent st me or number) and its SORTH WITH AN ARR	uctures, septe drain mections GW	ows Latitude #	• •	-			
49, Comments				_	Decimal		•			
Installed. Sand placed 28.20 grouted 3.0' - 22.20'. Protect	 Sand placed 38.70 to 38.70'. Bentonite p ctive casing installed in 	r= 39.20°, 2° PVC 867 pellets 22.20' - 26.20' i concrete pad.	een and ris . Bentonite	tremie	DMS Longitude or Docimal	• ,	•			
50. A ffirmation: The work described ab Note, the driller is not responsible for a	ove was done under my supervisio atural groundwater quality or quan	n, and this report is true and com bty encountered while division of	his report is true and correct to the best of my knowledge. ounlared while dnilling or completing this well				(EP			
Signature of Classe	360	Date signed M	1/9/0 mth Day)ų 	Date Received					
Certification number 0373-025	9-01 Drilling company A	menican Drill	ini <u>s S</u> e	wikes	Initials of sestence					
						(6	V 04/11/2008			



UNIFORM KENTI Use this form Original copy must be a See instruction Record must be typed or ner One conv to Division	UCKY WEL to report installed submitted to Divisi s on reverse of for atly printed or II v of Water, one co	L CONSTRU Ion of monitoring of Ion of Water within m. Do not write in will be returned to will be returned to	UCTION REC a water wells, 30 days of completing sheded areas, the driller as unac- conv to driller a file	JCTION RECORD r water wells. 30 days of completion. shaded areas. b the driller as unacceptable. conv to rivillar of files. Mc				I Well identification Number abel Here (if appliceble) Water wells: yellow labels onitoring wells: blue labels			
4. Owner Big Rivers Ele	ctric Corpor	ation	<u>eepj <u>e</u> anner e ne</u>			1. Kentucky Well ID (AKGWA) Number					
S. Owner P. O. Box 24			14 / - / / (A) (- / / - / / - / / - / / - / / - / / - / / - / / - / / - / / - / / - / / - / / - / / - / / - /		2. Owner Well ID	ACC-	MW-1	0			
6. City Henderson		7, S(4	^{ite} KY	3. Attachme	ats						
If site name and address differ	from owner nam	e and address:				1. Site p 2. Weil	lan or skelch location	mép			
^{9, Site} D.B. Wilson S	tation			On Ob	topographic r tained by GPS	nap, <u>QR</u> Sunit	8				
10. site address Highway 85						3. Well	diagram (mon	itoring well			
II. City Centertown		12, Se	^{ule} KY	13. Zip	42328	5. Signe Optional	id variance (if	applicable) B		
14. Agency	15 Facility type		Solid Waste	Drinking \	Water	6. Olha 31. Work	Jan	alysis repo 14	2009		
Interest 3319	&			Sile Asse	ssment	start date	Feb	0ay 16	2009		
(A1) Number	ED Namber	Special	Waste Landfill			end date	Month	Day	Year		
16. Owner (270) 844-603	1	17. Site phone	(270) 821-734	13		Please	eport depths in not as relative	feet below elevations	surface,		
18. USCS topo map Equality			22. Physiagraphic Re	33. Toial de	pih (N)	23.08	3				
19. County Ohio			Bluegrass	Ohio Riv	rer Alluvium Field	34. Depih ia	bedrock (N)		-		
20. Surface elevation (1) 396.96	Elevation determini	Prior report	Miss. Plateau	Jackson	Purchase	35. Static w	nter ferel (A)	<u>12.61</u>	22.56		
23. Well live	Survey 24. Dei	I Prior well log		S. Well status		So, Casing B	ATED WEI		<u>v</u>		
Agriculture	ieothermal 🔲 A	uger-HS 🖸	Jet wash	Active		37, Estimate	d well yield _				
	leat pump DA	uger-SS	Push/probe Roteou - elr	Inacilive			n Digph	[]] gg	wi ku		
DomesticDH		uger-hand	Rolary - mud	intended	e for USB	38. Well ser	vice	a of beob	bevrea el		
Monitoring / Water Level Moni	lining DC	ore locietole D	Rolary - reverse Send point	tő, Weilhead		39. Disinfect	lant amount	40. 7	Cype		
Remed	inused D D	rtven casing []. kcavation []	Sonic Unknown	Flush Kell cap Control	Locking] qts [] cuj	9 C) 1 C) eq	Bleach Hypo- thiorite		
27. Well completion: Casing and set			28. Annulus fd) and seal			41. Pitless a	_} 081 dapter installe	- 1 🖸 Yes	No No		
From To Borehole Casin depth & depth & diameter diameter	Casing by	pe Screen	From To depth ft. depth. ft.	42. Pamp Installed:							
0.00 11.92 10 1/4" 2"10	PVC		0.00 3.00 Concrete			│ []] Submensible]] Jet]] Turbine]] Beller or bucket]] Hend]] No pump					
11.92 21.92 10 1/4 2 IL	PVC screen	0.010	3.00 9.75	Bentonite chip	98	43. Depth to Inlake (ft)					
21.92 22.42 10 1/4 2"	PVC		9.75 23.08	Sand	1	44. Apparent quality and odor:					
22,42 23.06 10 1/4 2 12	Opennola					8 🗆 0	er	2 5 8	6		
29. Lithologic log (if more space is r	eeded, continue on	separate page)	30, Sketch map			1 I I I I I I I I I I I I I I I I I I I	oudy g	278 000	≓ ∏iron		
From To Description (a depth, ft. depth, ft.	nclude any show of v apperent gvality)	water and indicate	Ste planiskelch m	ap ettached on eep	parate page	а D м. \$ Ю то	nddy Z nold		Suttur		
0.00 , 23.08 Mine spoil -	gray clay with	gray shale	:				🚺 Salt				
and gray se	ndstone fragm	nents. Wet al				COLIFORA	I TEST				
12 ft.						feca 46. Coliforn	fecal e	ind total			
						or _	<1.0 ∐ 1N #conko	nĭesperi0	onfluent X0ml		
						47. Date					
						Sampled 18. Date		Ony	Year		
			Shoe well bestim and water	en fort permanent et	acherna seate dan	Analyzed	Month	Day	Year		
49. Comments			Selds, major roads (ncluds N INDICATE)	TA OF FUTCH } 2-6 PA	ersections OV	Latitude	ov Oecamai	- ,	¢		
6 1/4" HSA advanced to 26 Installad. Sand placed 9.75 in concrete pad.	9.08'. Sand pla 5' - 22.42'. Bel	aced 22.42 - 2 nionile chips 3	3.08'. 2" PVC so .0' - 9.75'. Prole	reen and ri clive casing	ser g Instelled	Longitude	DM3 or Decime1	ь I	n 6		
50. Affirmation: The work described a Note: the driller is not responsible for	bove was done under	my supervision, and t quality or quantity enc	his report is true and com cuntered while drilling or	ed to the best of completing this wa	my knowledge. ell.	Lat/Long m	ethod CIGPS D	SUR 🖸	REP		
Signature of cectified driller	36	2	Date signed by	1/9/	09	Date Receiv	ed				
Certification number 0378-025	5-01	ompany Aun a	cica Din	1. Je	-	fuitials of					
		NAM 6	and Dun		01013	CONCRET.			rev 04/1 1/200A		



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A Density A Construction 7. State: KY h. 20p 42419-0024 Attembersts Baseling Baseling Baseling Baseling Baseling Density Query Density	4. Owner name Big Rivers Ele	ectric Cor	poration							1. Keatucky Well ID (AKGWA) Number			
6 Giv Handerson 7.544 KY h.20 4.219-0024 Authements Hate zeros and address differ from owner owne and address. 5.544 KY h.20 4.219-0024 Authements Saire D.B. Wilson Station Consequencies may Difference with mage Difference wi	S. Owner address P. O. Box 24							2. Owner Well ID	ACC	-P-11			
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A size	If site name and address diffe	r from owne	r name and addre	964:				1. Site 2. Well	plan or sketcl location	qem c			
10. Sile	9. Site D.B. Wilson S	Station						iO IO	topographic plained by GE	map, <u>OR</u> Sunit	0		
11. City Centertown 12. Start: KY 13. Zep 4 2328 5. Signed without of projection) 14. Aprime S. Chart Monostricy analysis report Centertown 10. Start: KY 13. Zep 4 2328 14. Aprime S. Chart Monostricy analysis report Centertown Dirichly grintering 10. Start: April 10. Start: Special Wassis Control (Start) Dirichly grintering 10. Start: April 10. Start: Special Wassis Control (Start) Dirichly grintering 10. Start: Special Wassis Control (Start) Dirichly grintering 10. Start: Special Wassis Control (Start) 10. Start: Special Wassis Control (Start	10. Site address Highway 85							3. Well	diagrem (mo	l nitoring wel lif ennticebl			
14. Agency tother 13319 15. Pacifity type a □ CERCLA □ Bold Weste □ Diriting Wester Diriting Wester 16. Obsert (270) 844-6031 17. Site 	11. City Centertown			12. S	ate KY	13. Zíp	42328	5. Sign Optional 6. Othe	ed variance (i r iaboratory a	t applicable nalysis rep			
Intervent 3319 A ПCRA UST Sie Assessment Wate B Number A Pression Special Waste Land(H) Wate Feb D Number Sie Assessment D Number Sie Assessment D Number Sie Assessment D Number Sie Assessment D Number <	14. Agency	15, Facility	y type 🚺 CE	RCLA	Solid Waste	Drinking 1	Waler	31. Work	Jan	16	2009		
Number ID Number Special Waste Landfill ed date User Org Yesr 16 Onarr (270) 824-6331 [7: Bits protect [7: Bits prote	AD 3319		RC 🖸 RC	RA	DI UST	D Site Asse	esmeni	32. Work	Feb	12	2009		
16. Owner (270) 821-7343 Plaster (270) 844-6031 Plaster (270) 821-7343 18. USGS inpo mp Equality 12. Phytographic Region 3. Teal adjust of the bolto surface, not an initiation of the bol	Number	ID N1	Imper Sbe	cial	Waste Landf	41		end date	Month	Day	Year		
III. USGS inpo map. Equality 12. Physiographic Regin 33. Tesh depth (n) 69.13 III. Comp. Charles of the second of	16. Owner (270) 844-603	31	17. Si p	ite hone	(270) 821-734	13		Please	report depths i not as relativ	n feet below e elevations	surface,		
19. County Ohio □ □ Bulagrass □ Ohio New Alkulan Depth is bedrock (fi)	18. USGS topo map Equality				22. Physiographic Re	gion		33, Total de	rpth (ft)	69.1	3		
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and the second secon	20. Surface 444 02	l, Elevation de 🖞 GPS 🔲 N	termined by Aap 🔲 Prior repo	a	Miss. Plateau	U W. Coal	Field Purchase	35, Statie w	ster level (A)	57.1	<u>o</u>		
13. Well Ster Date Control of C	elevation (n)	Survey	Prior well	log 🛛				36. Casing l	height above i	urf ace (la)	31.56		
Dight match December of the part	23. Well Use	Ceothermail (4. Drifting method	-	25. Well status			WATER WELLS ONLY					
Donnestic		Heat pump	Auger - SS		Push/probe			J7. ESTIMAL	ea wen siela m 🗖 aas		~		
Industrial Injection Duty = name Intended use Monitoling / ware two two Monitoling / ware two	Domestic O	HVAC	Auger - bucke		Rotary - eir Unsuitebla for			LI 9P 38. Well ser	m Ligpi Mice	₩ LJ¥ # o{peop	pu la sarved		
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Dividen Casing Dividen Casing Softed Dividen Casing Dividen Casin	Monitoring / Water Level Moni	Minlog	Core	D	Send point	16, Wellhead		39. 81151m(ec	TRUT AMOUOI	-10. 173	i ype Bleach		
T. Well completion: Casing and screes: B. Acaulus Gill and scal B. Acaulus Gill and scal J. Yuell completion: Casing and screes: B. Acaulus Gill and scal Hints adaptic installed Ves No J. Out (J. 47, 2°L) PVC Some of the screen	CPublic	Unused	Driven casing		Sonic Unknown	Well cap	1 Locking		ri ets [1] o	ups []	Hypo-		
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Profin 10 Celebration openin 10 Celebration	29. Lithologic log (if more space is	needed, contin	ive on separate page	;) 	30. Sketch map 30. Ste panaketch m	ep attached on se	perate page	а Д П м	wady 8	000	nori 🗋		
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Appendix B

2019 Monitoring Well Construction Progress Report

MONITORING WELL CONSTRUCTION PROGRESS REPORT - ADDENDUM CCR MONITORING PROGRAM

PHASE II LANDFILL D.B. WILSON GENERATING STATION OHIO COUNTY, KENTUCKY

December 13, 2019

Prepared For:



Big Rivers Electric Corporation D.B. Wilson Generating Station 5663 State Route 85 West Centertown, KY 42328

Prepared by:



AECOM Technical Services

525 Vine Street Suite 1800 Cincinnati, Ohio 45202 Phone: (513) 651-3440 Fax: (877) 660-7727

Job Number: 60619848

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1.0 INTRODUCTION

The United States Environmental Protection Agency (USEPA) released rules for the regulation, management, and disposal of coal combustion residuals (CCR) generated at electric utilities and independent power producers under the Resource Conservation and Recovery Act (RCRA) in the Federal Register on April 17, 2015 (CCR Rule). The federal CCR Rule (40 Code of Federal Regulations (CFR) Part 257(g) Subparts 1-5 requires that the owner or operator of a CCR unit install additional characterization of nature and extent is required after a Statistically Significant Increase (SSI) of App IV parameters is detected above Groundwater Protection Standards (GWPS). This Monitoring Well Construction Progress Report describes the procedures implemented on behalf of Big Rivers Electric Cooperation (BREC) to establish a network of monitoring wells to perform the requisite characterization groundwater monitoring well network for the D.B. Wilson Coal Combustion Residuals (CCR) Phase II Landfill (the Site).

A total of five wells (designated as MW-4D, MW-102, MW-104, MW-105, and MW-110) were originally planned to be installed at locations downgradient or cross gradient (MW-102) from the Wilson Phase II Landfill. The borings for the wells were drilled within mine spoils and bedrock (sandstone, shale), and finished as 2-inch monitoring wells.

This report documents field activity associated with monitoring well installation, construction, development, and surveying at the Site between October 4 and November 15, 2018. This report was initially submitted to the Kentucky Division of Waste Management (DWM) on June 25, 2019 but has been revised in this addendum to incorporate DWM comments on the original document.

2.0 FIELD ACTIVITIES

This section documents the field activities performed in completing the characterization groundwater monitoring network for the Phase II Landfill at the D.B. Wilson Station. A site map detailing the monitoring well locations is provided as **Figure 1**.

2.1 Staking and Utility Clearances

AECOM worked with BREC to establish a network of monitoring wells to conduct the requisite characterization groundwater sampling. Prior to the start of drilling, proposed locations were reviewed with BREC personnel during a field visit on October 4, 2018. Proposed locations were staked on October 4, 2018. BREC personnel provided final approval to relocate MW-104 north to avoid a fire suppression water line within the vicinity. Utility clearance surveys were performed at the original proposed locations and the approved alternate location of MW-104 on October 8, 2018 by Blood Hound, Inc. of Brownsburg, Indiana under subcontract to AECOM.

All monitoring well locations were cleared using a hand auger to a minimum of 5 feet below ground surface (bgs) prior to the advancement of powered drill tooling to help avoid potential damage of underground utilities.

2.2 Monitoring Well Installation Schedule

Drilling and well construction services were performed by Cascade Drilling, LP (Cascade) of Marietta, Ohio, under subcontract to AECOM. The Kentucky Certified Well Driller for the project was Todd Mills of Chase Environmental Group (Chase) of Kevil, KY under subcontract to Cascade.

The following is a general timeline of drilling and well construction activities:

October 9	Set-up staging area and decontamination pad
October 9 - October 13	Drill borings and set monitoring wells
October 15 - October 17	Complete surface completions and perform well development activities
October 17	Complete well installations
October 17	Monitoring well coordinate/elevation survey

2.3 Drilling and Logging Methods

The installation and development of new monitoring wells was completed to meet the groundwater monitoring requirements of EPA's CCR Rule (40 CFR Part 257) and Title 401 of Kentucky Administrative Regulations (KAR) Chapter 45:160. Drilling and installation of the CCR Rule monitoring wells at the Site was performed under the supervision of a Kentucky Certified Well Driller, (Mr. Todd Mills of Chase, License #0344045400).

Boreholes were advanced by rotosonic drilling methods with an annular diameter of 6-inches to provide a nominal 4-inch annular space required between the borehole and the well casing. Samples of unconsolidated materials were collected at a minimum 5-foot interval via rotosonic sampler in order to classify the physical characteristics of the unsaturated and saturated zones. The lithologic characteristics observed by the field geologist are presented in the boring logs (**Appendix A**).

Boreholes were advanced to sufficient depth to allow installation of monitoring wells within the uppermost groundwater zone, either within bedrock or unconsolidated deposits (MW-102). MW-4D was advanced

through the mine spoils below the uppermost groundwater zone and set at the mines spoil/bedrock interface to assess the groundwater impacts to the bedrock underlying the spoil materials.

2.4 Borehole Water Level Gauging

During drilling, the geologist kept observations of when water would appear in the lithologic samples. Periodically, drilling operations would be paused to allow recharge (inflow of groundwater) to be evaluated. The depths of the wells were selected based on the following factors: observable water, rocks with primary porosity, water bearing zones within rock core (weathered zones, fracture seams, etc.), and the target elevation in reference to the baseline monitoring well network total depth and water level elevation.

2.5 Borehole Abandonment

During well installation efforts at proposed location MW-110, the initial borehole was advanced beyond the targeted completion depth to identify the reference elevation of the No. 9 coal seam to assist in determining the total depth. This information was used to inform the conceptual site model and to identify a target depth for MW-4D. The initial borehole was abandoned in accordance with KAR 401 6:350 by a licensed driller. An offset boring was drilled for installation of monitoring well MW-110.

2.6 Monitoring Well Construction

The installation and development of the characterization monitoring wells is intended to meet the groundwater monitoring requirements of EPA's CCR Rule (40 CFR Part 257). Five 2-inch inner diameter (ID) polyvinyl chloride (PVC) monitoring wells with 10-foot screen intervals (0.010 slot) were installed during October of 2018. Well construction details are provided in the table below and are included on the boring logs provided in **Appendix A**.

Well ID	Location	Installation Date	Well Depth feet (btoc)	Well Casing Diameter (inch)	Borehole Diameter (inch)
MW-102	Wilson Phase II Landfill (East)	10/13/2018	39.25	2	6
MW-104	Wilson Phase II Landfill (Southeast)	10/9/2018	63.31	2	6
MW-105	Wilson Phase II Landfill (Southwest)	10/12/2018	96.36	2	6
MW-110	Wilson Phase II Landfill (South)	10/11/2018	42.76	2	6
MW-4D	Wilson Phase II Landfill (Southeast)	10/13/2018	43.43	2	6
btoc = below to	p of casing			· · · · · · · · · · · · · · · · · · ·	

Well construction was initiated after the borehole was advanced to the desired total depth. A 2-inch ID schedule 40 PVC well pipe and riser was positioned at the appropriate depth within the open borehole. A deviation from the standard 4-inch ID riser and screen required under 401 KAR 45:160 was outlined in a letter from BREC to KDEP dated August 21, 2018 and approved by KDEP in a letter dated October 5, 2018. Once in position, #5 sand filter pack material consisting of clean, rounded to well-rounded, insoluble particles of quartz silica composition was placed around the well screen to within a minimum of 2 feet above the top of the 10-foot screened interval. MW-105 is an exception to this standard in that it was constructed with a sand filter pack that extends 23 feet above the top of the screened interval. This deviation from the standard well construction procedure was used because there was no clear indication of the likely groundwater production zone at the time of drilling. Evaluation of the post-construction groundwater levels reveals that the static groundwater elevation measured in MW-105 (390.08 feet amsl in December 2018) is 46.58 feet above the top of the screened interval (343.5 feet amsl) and very near to the ground surface.

It appears that the monitoring well may be getting recharge from a minor fracture horizon noted at 27.5 feet bgs in the boring log (see **Appendix A**) and that a more appropriate screened interval would be at 333.5 to 343.5 feet amsl. There is no evidence that there are deeper water-bearing horizons intercepted by the screen/sand pack, so there does not appear to be a potential for cross-contamination. Regardless, abandonment and replacement of this well will be addressed in the data gap stage of the Selection of Remedy CCR activities.

Following placement of the sand filter pack at each monitoring well locations, a minimum 2-foot-thick interval of bentonite pellets was placed above the sand filter pack and hydrated to manufacturer recommendations to form the bentonite well seal. The borehole annulus above the bentonite seal was filled with bentonite grout slurry, to a height approximately 2 feet bgs. Deionized water, obtained locally from the D.B. Wilson Station, was utilized as the hydration fluid for the bentonite seal and grout slurry.

Well ID	Location	Installation Date	Top of Casing Elevation	Ground Surface Elevation	Stick-up Height (feet)	
MW-102	Wilson Phase II Landfill (East)	10/13/2018	399.71	396.46	3.25	
MW-104	Wilson Phase II Landfill (Southeast)	10/9/2018	392.87	389.76	3.11	
MW-105	Wilson Phase II Landfill (Southwest)	10/12/2018	396.74	393.56	3.18	
MW-110	Wilson Phase II Landfill (South)	10/11/2018	393.54	390.56	2.98	
MW-4D	Wilson Phase II Landfill (Southeast)	10/13/2018	410.02	407.03	2.99	

The new monitoring wells were completed above ground surface as detailed below.

Each monitoring well was equipped with a locking steel casing, 4 by 4 foot concrete pad at a sufficient depth to protect against frost heave, and four surrounding bollard posts to protect against vehicle strikes in accordance with 401 Kentucky Administrative Regulations (KAR) 45:160 Section 3(4). The protective steel casings and bollard posts were painted with a high visibility paint designed to inhibit corrosion.

Upon completion of well installation, the drilling subcontractor gauged each new monitoring well and submitted Kentucky Monitoring Well Records (DEP 8043) to the Kentucky Environmental and Public Protection Cabinet, Division of Water (KEPPC/DOW), Groundwater Branch. Copies of the Kentucky well records are provided as **Appendix B**.

2.7 Monitoring Well Development

Sufficient well development was critical to consistently achieving the low turbidity required for samples analyzed for total metals. Water within the well column was agitated (surged) by the raising and lowering of a Proactive Hurricane[®] submersible pump to help develop the well.

Well development was completed between October 15, 2018 and October 17, 2018. Development activities were continued until one of the following conditions was met:

- 1) a minimum of five times the volume of water lost to the formation during drilling was removed;
- 2) a minimum of five well volumes of groundwater was removed, calculated on the measured depthto-water and total depth of the well at the time of development, or
- 3) until the water, being pumped from the well, was observed to be free of visible sediment.

Purge water resulting from development was containerized in a 200-gallon polyethylene container and later discharged to the ground surface.

2.8 Monitoring Well Survey

After all new wells were completed; the locations and elevations of all wells in the groundwater-monitoring network for the CCR Unit were surveyed on November 15, 2018 by James D. Cansler, a Kentucky-licensed Professional Surveyor with Associated Engineers, Inc. The elevation of the top of the inside (PVC) casing (north side) and ground surface were surveyed. Horizontal coordinates were established using the Kentucky State Plane Coordinate System, NAD 83, North Zone. Vertical elevation was measured to within +/- 0.01 ft. above mean sea level (amsl).

Well ID	AKGWA Number	Well Diameter (inch)	Northing	Easting	Top Of Casing (feet)	Total Depth (feet)	Screen Interval (feet)
MW-102	8007-2995	2	413379.918	1615236.077	399.71	36	26-36
MW-104	8007-2994	2	409906.937	1613180.209	392.87	40	30-40
MW-105	8007-2992	2	409924.745	1608904.522	396.74	50	50-60
MW-110	8007-2996	2	410067.232	1610839.037	393.54	40	30-40
MW-4D	8007-4811	2	410815.652	1612469.027	410.02	93	83-93

2.9 Equipment Decontamination

All downhole drilling equipment was decontaminated by the subcontractor prior to arrival at the station and on site at a designated decontamination pad before initiation of each boring. Between boreholes the downhole tooling was decontaminated with pressurized potable water to remove residual soil cuttings prior to use at the next borehole. All other equipment (pumps, water level indicators, etc.) was decontaminated using potable water and a mild laboratory-grade detergent (Alconox[®]) solution between holes.

3.0 SUMMARY AND FINDINGS

A total of five borings were advanced at the Site during October 9, 2018 and October 17, 2018 in order to install the characterization groundwater-monitoring network. The new monitoring wells, located at projected downgradient positions east, southeast, south, and southwest of the Wilson Phase II Landfill, will assist in the characterization of the existence, quality, quantity, areal extent and depth of groundwater degradation, and the rate and direction of migration of CCR contaminants in the groundwater.

Groundwater level data collected during the 2018 monitoring events are summarized on **Table 1**. These data were used to construct a piezometric surface map to illustrate groundwater flow conditions for the uppermost aquifer (see **Figure 2**, December 2018). Overall groundwater flow beneath the footprint of the Wilson Phase II Landfill is to the south and southeast. Groundwater flow beneath the Landfill is influenced by extensive strip-mining and the physical extent of mine spoil deposits. These mine spoil deposits are laterally limited by the remaining bedrock high-walls left undisturbed along the north side of State Route 85 and beyond the western edge of the Wilson Phase II Landfill.

The Site lies in the Western Kentucky Coalfields section, characterized by rolling uplands underlain by coalbearing bedrock of the Pennsylvanian Period. In the vicinity of the site, maximum topographic relief is on the order of 80 feet. The geologic quadrangle (Geologic map of the Equality quadrangle, Ohio County, Kentucky, 1973) for the Site vicinity published by the Kentucky Geological Survey (KGS) shows the surficial material to be unconsolidated loess representing the Pleistocene and Holocene geologic epoch. The loess consists of sandy and clayey silt. The unconsolidated surficial materials, which include silty and sandy clay units, are up to approximately 25 feet in thickness.

The unconsolidated materials are shown to be underlain by bedrock of the Middle Pennsylvanian Carbondale Formation. The Carbondale Formation consists of cyclic sequences of sandstones, shales, siltstones and coals. The Carbondale sediments were deposited in a fluvial-deltaic system. As a result of this depositional environment, the lithologic units of the Carbondale tend to be lenticular bodies rather than continuous sheet-like strata. Gradational and abrupt horizontal changes in lithology are often encountered.

Cross sections have been prepared as part of development of the Assessment of Corrective Measures for the Site. The individual cross sections are presented on **Figures 3, 4 and 5**. These sections illustrate the sequence of geologic materials present under the Phase II Landfill as evidenced by the currently available data.

For purposes of compliance with the CCR Rule groundwater monitoring requirements the unconsolidated mine spoil is considered to be the uppermost aquifer underlying the Phase II Landfill. The uppermost usable aquifer is unconfined and first encountered at an elevation of approximately 400 ft. above mean seal level (amsl) at the north end of the Phase II Landfill and 395 ft. amsl at the south end.

Due to the nature of the Wilson Phase II Landfill site setting (former mining area with large minespoils deposit), many CCR parameters are expected to be naturally occurring in the uppermost aquifer. BREC will evaluate whether Alternative Source Demonstrations for SSIs and SSLs at Wilson Phase II Landfill is warranted.

Figures







100		
	Legend	
	Property Boundar	y
15725	CCR Phase 2 Land	Ifill Permitted Area
the -	CCR Phase 2 Land	fill (Active)
1. 19	KAR Permit Area	
	CCR Phase 1 Land	lfill
	Downgradient CCR	Monitoring Well Location
	Upgradient CCR Mc	nitoring Well Location
111	Characterization Mo	onitoring Well Location
196.5	Piezometer Location	n (Water Level Only)
	Monitoring Well Loca	ation (Water Level Only)
	 Seep 	
	Water Table Contour (Inferred from Availa Groundwater Flow [, ble Monitoring Data) Direction
	409.69 Groundwater Elevat Measured December	ion (Feet, NAD27) r 11, 2018
and the second sec	Register attor	du anatomar (and and and and and and and and and and
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	0 750) 1.500
	Fee	et
14		
		Wilson Station Landfill
and the	5 1011	
and a	FIGU CCR GROU MONITORIN	RE 2 INDWATER IG SYSTEM
-	DATE: 5/16/2019	SCALE: 1IN = 750 FEET
K	CREATED BY: ALW	STREET INT TOUTEET
and and and a	100.110.00570005	



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Table

TABLE 1

MONITORING WELL NETWORK GROUNDWATER ELEVATIONS WILSON PHASE II CCR LANDFILL

BIG RIVERS ELECTRIC CORPORATION - WILSON STATION OHIO COUNTY, KENTUCKY

WILSON PHASE II CCR LANDFILL

		PROGRAM GROUNDWATER MONITORING WELL											
	MW-5 Downgradient 469.14		MV	V-6	MV	N-7	MV	V-8	MW	/-10			
Reference Elevation TOIC*(ft, NAD27)			Downgradient 433.06		Downgradient 426.14		Upgradient/Background 471.60		Downgradient 398.91				
Date Measured	Depth to Water (ft) (feet)	GW Elevation (feet)	Depth to Water (ft) (feet)	GW Elevation (feet)	Depth to Water (ft) (feet)	GW Elevation (feet)	Depth to Water (ft) (feet)	GW Elevation (feet)	Depth to Water (ft) (feet)	GW Elevation (feet)			
4/13/2018	56.30	412.84	41.32	391,74	39.38	386.76	44. 54	427.06	13.21	385.70			
7/12/2018	57.56	411.58	42.60	390.46	39.93	386.21	44.45	427.15	13.39	385.52			
10/3/2018	59.89	409.25	43.54	389.52	40.28	385.86	46.94	424.66	13.66	385.25			
1 2/ 11/2018	59.45	409.69	43.29	389.77	40.18	385.96	46.73	424.87	13.60	385.31			

Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky June 2015 Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum

CHARACTERIZATION GROUNDWATER MONITORING WELL

Reference Elevation TOIC*(ft, NAD27)	MW-4D Characterization 410.02		MW-102 Characterization 399.71		MW-104 Characterization 392.87		MW-105 Characterization 396.74		MW-110 Characterization 393.54	
Date Measured	Depth to Water (ft) (feet)	GW Elevation (feet)	Depth to Water (ft) (feet)	GW Elevation (feet)	Depth to Water (ft) (feet)	GW Elevation (feet)	Depth to Water (ft) (feet)	GW Elevation (feet)	Depth to Water (ft) (feet)	GW Elevation (feet)
11/2/2018	23.62	386.40	11.15	388.56	6.70	386.17	6.57	390.17	9.48	384.06
12/11/2018	24.38	385.64	11.25	388.46	6.78	386.09	6.66	390.08	9.02	384.52

Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky November 2018

Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum

TOIC = Top of internal casing

GW = Groundwater; GS = Ground Surface; NM = Not measured

TABLE 1 (continued)

GROUNDWATER ELEVATIONS SUPPLEMENTAL WATER LEVEL ONLY MONITORING POINTS

BIG RIVERS ELECTRIC CORPORATION - WILSON STATION OHIO COUNTY, KENTUCKY

SUPPLEMENTAL WATER LEVEL ONLY MONITORING POINTS PEIZOMETERS												
	MV	V-1	MV	V-2	M\	V-3	M\	N-4	North	(P9)	South (P11)	
Reference Elevation TOIC*(ft, NAD27)	Water Level Only 443.89		Water Level Only 417.11		Water Level Only 411.12		Water Level Only 408.82		Water Level Only 432.37		Water Level Only 446.55	
Date Measured	Depth to Water (ft) (feet)	GW Elevation (feet)										
4/13/2018	18.02	425,87	17.05	400.06	24.39	386.73	23.58	385.24	25.81	406.56	60.15	386.40
7/12/2018	19.03	424.86	18.76	398.35	25.02	3 8 6.10	23.36	3 8 5.46	NM	NM	NM	NM
10/3/2018	18.86	425.03	19.34	397.77	25.03	386.09	23.40	385.42	25.95	406.42	60.89	385.66
12/11/2018	18.43	425.46	18.64	3 9 8.47	25.50	385.62	23.18	385.64	25.91	406.46	60.89	385.66

Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky June 2015

Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum

TOIC = Top of internal casing

GW = Groundwater; GS = Ground Surface; NM = Not measured

Appendix A Boring and Well Construction Logs

Client: Big River Electric Co. Project: DB Wilson Station Site: Centertown, KY Project Number: 60589938

MW-102

Date(s) Drilled and Installed	10/13/18	Logged By	S. Lillard	Reviewed By	M. Wagner
Drilling Method	Rotosonic	Drilling Contractor	Cascade	Total Depth of Borehole	36.0 feet
Sampling Method	4" Sonic Sampler	Water Level	7.65 b.g.s. (measured 10/15/18)	Top of Casing Elevation	399.71 feet msl
Size and Type of Well Casing	2" PVC Schedule 40	Screen Perforation	0.010 inch slotted	Ground Surface Elevation	396.46 feet msl
Seal or Backfill	Bentonite/Cement Grout	Coordinates	N 413,379.92 E 1,615,236.08	AKGWA #	8007-2995

	SAMPLES				LES	;			- N	/FLI	CONSTRUCTION
vation, t msl	oth, t bgs	le Type	lumber	(%)	overy	ping pm	s Graphic	MATERIAL DESCRIPTION			DETAILS Riser with
Ele	Dep	amp	⊿ un	B	Rec	D, pl	SCR				protective casing
	0	S	Я	œ	%	ਲ ਦ	⊃ ∽ T T T	Loose, moist, brown to light brown with reddish brown mottled, fine-grained,			77
	-							sandy SILT with dark grey shale gravel fragments [FILL]			
-395											O" ID Sobodulo 40
									B		PVC Riser
	-		1		51			+	-		-Cement Grout
	-							-	-83		
	5-							_	-83		
	_								_		
390		65						Soft, moist, greenish grey with some reddish brown mottled, silty CLAY			
	-									V	
	-	1000							-88		
	-	anio di manga						-	-88		
	10-	- CARGE									
		orientalies originations									
-385	1	haddeletter Alteration	2		111						
	-	anti-tatik							-83		
	-	8							-		
	-	1. : 						Grades with some dark grev/black mottles (13.75-16)	-		
	15	nijezanjen									
2	15										
-380	1							Soft, wet, reddish brown fine-grained, sandy, silty CLAY			
5	-								-)	
	-							Loose, wet, greenish grey with reddish brown mottled clayey SILT	-##		
		는 생 평									
		NAME.									
3	20-						┼┼┼	Loose, wet, dark grey, clayey SILT with trace fine-grained sand	-83		
375	-		3		93				-		
5 375	-	, ¹²¹⁸						-	-		Bentonite Seal
2107	ľ	æ :						-			(Pellets)
		8						Grades with increasing sand content to a sandy, clavey silt			
	-	Electric 172 d									Filter Pack Sand #5
	25–		1			1				 ^	
L								AECOM		-4	¥

Client: Big Riv	ver Electric Co.
Project: DB Wilso	n Station
Site: Centertown,	KY
Project Number:	60589938

MW-102

Sheet 2 of 2

1			S	AMF	LES	;			
Elevation, feet msl	Lepth, ↓ feet bgs	Sample Type	Run Number	RQD (%)	% Recovery	Screening PID, ppm	 USCS Graphic Symbol 	MATERIAL DESCRIPTION	DETAILS
	-							Loose wet light brown with light grey mottled glavey fine-grained SAND	
-370	-						14	Loose, wet, light blown with light grey motiled clayey, line-grained SAND	2" ID Schedule 40
							11	Loose, wet, light grey, clayey, fine-grained SAND	PVC 0.010" Slotted Screen
	30-	11						 Sand content grades less to a sand with some clay (29.8) 	
-365	-		4		103			- Grades light brown (30.7)	
	-							Grades brown (31.6)	
	1.6	11							
	-							Grades raddich brown (possible iran staining) (34.0)	
	35							States readish brown (possible inclusion indig) (34.0) Soft, wet, reddish brown fine-grained, sandy CLAY	
								Loose, wet, reddish brown with light grey and light brown mottled, clayey,	
-360								End of boring at 36' bgs.	
	7								
	-							*1	-
	40-								
0.55	-							- · · · · · · · · · · · · · · · · · · ·	1
-355		ē.,					1.5		-C.
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BR								AECOM	m

Client: Big River Electric Co. Project: DB Wilson Station Site: Centertown, KY Project Number: 60589938

MW-104

Date(s) Drilled and Installed	10/9/18	Logged By	S. Lillard	Reviewed By	M. Wagner
Drilling Method	Rotosonic	Drilling Contractor	Cascade	Total Depth of Borehole	40.0 feet
Sampling Method	4" Sonic Sampler	Water Level	7.3 b.g.s. (measured 10/10/18)	Top of Casing Elevation	392.87 feet msl
Size and Type of Well Casing	2" PVC Schedule 40	Screen Perforation	0.010 inch slotted	Ground Surface Elevation	389.76 feet msl
Seal or Backfill	Bentonite/Cement Grout	Coordinates	N 409,906.94 E 1,613,180.21	AKGWA #	8007-2994

ſ				S	AMP	LES	_	0		V	NE	LL	CONSTRUCTION
5	<u> </u>		/pe	Ъ		~		ihq					DETAILS
atic	ms	th, bg≲	e T)	Тщ.	(%	lave	gε	ů_	MATERIAL DESCRIPTION	-			Riser with
	eet	eet	hpl	Ž L) Q	Sec	een , pp	South			Г	٦Г	protective casing
1			Sa	Ru	RC	% F	PDS	Sy	R	Ц			and locking cap
									Loose, moist, light brown with grey/tan mottled clayey SILT	B	22		
		-									Š		
		_								₿		×	2" ID Schedule 40
									Grades with increasing clay content Seam of dark brown clayey silt (2.3-2.4)	B	Ś	B	PVC Riser
		-		1		100				B	g		Cement Grout
		_								Ë	Ś	B	
	385	_							Seam of dark brown clavey silt (4.6-4.7)	B	â		
		5-								諁	Ş	諁	
		-	§ 16						- Bedrock inferred at 6' bgs		Š	B	
		_	and References						Light grey, medium hard, fine-grained SANDSTONE; heavily mechanically fractured	B	<u>8</u> _	諁	
										B	₹		
		-							· ·	ŝ	Ś	B	
		_								B	ź	æ	
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ò										Ħ	3	B	
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		-					ŀ	****	Brown, medium hard, fine-grained SANDSTONE with fine-crystalline guartz	B	1	B	
N N		-2	副の							×	Ż		
≊3	70		£ .							æ			
3		20-					ŀ		Grey, medium hard, fine-grained SANDSTONE	贷	1	贷	
		-		3		80		:::: -	· -	æ		æ	
			Ŕ					:::::	Grades light brown/reddish brown (iron-staining)	ß	1	×	
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MW-105

Date(s) Drilled and Installed	10/11/18-10/12/18	Logged By	S. Lillard	Reviewed By	M. Wagner
Driiling Method	Rotosonic	Drilling Contractor	Cascade	Total Depth of Borehole	60.0 feet
Sampling Method	4" Sonic Sampler	Water Level	3.4 b.g.s. (measured 10/13/18)	Top of Casing Elevation	396.74 feet msl
Size and Type of Well Casing	2" PVC Schedule 40	Screen Perforation	0.010 inch slotted	Ground Surface Elevation	393.56 feet msl
Seal or Backfill	Bentonite/Cement Grout	Coordinates	N 409,924.75 E 1,608,904.52	AKGWA #	8007-2992

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	б <u>-</u>	Ś	ype	ber		2		aphi			DETAILS
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	eet eet	eet	d m	N N	ğ	Ş	een , pp	nbe mbe			protective casing
			Sa	Ru	RC	4 %	E c	Sy	K		and locking cap
		v							Loose, dry, light brown with grey-brown mottled, clayey SILT		
		-									
		_									
											PVC Riser
		-		1		83				₩▼₿	Cement Grout
	-390	-								▓⋷₿	
									Loose dry light brown with grey-brown mottled micaceous SILT		
		5									
		_	6 6					Щ			
			المدالية. والمحالية						Loose, ary, light brown, slity, micaceous, fine-grained SAND		
		-						44			
		_							- Loose, dry, brown, silty, micaceous, fine-grained SAND -		
┠	-385										
		٦	¥ ·						Grades to a light brown with reddish brown mottles	# #	
		10	*						_ Slit content grades out		
		_	10562	2		122		אַלא	Loose, dry, light brown with reddish brown, micaceous, sandy GRAVEL of	# #	
			łs:						weathered sandstone tragments	# #	
		-					c	°õ d			
		_						°°°{		# #	
	-380						c	jо,			
		-						;0°}			
		15-						00	¬_ Top of bedrock at 15' bgs		
/19			ioi Si sei						Hard, light brown to reddish brown, micaceous, fine-grained SANDSTONE;		
6/19			e					: : : : :		# #	
GP		-	Abasista					::::			
ALL			ŝ.							# #	
INST I	375		- 1					:::::	Natural fracture (18.1)		
₹		-					ŀ		Medium hard, light grey, micaceous, fine-grained SANDSTONE with quartz	# #	
118		20-							crystalline; 60 degree contact between sandstone bed above		
0 2				3		92					
NBC DB				l							
Ж		-							•		
2018			100				1	::::	Washed out section of loose fine-grained sand; likely mechanical influence (22,2-22,6)		
FL	370	1	• []					::::	- \/		
INST	5,5	-						:::::			-Bentonite Seal
Ŵ		25	1000								(Pellets)
REC		20									AP-
ш С											





MW-110

Date(s) Drilled and Installed	10/10/18-10/11/18	Logged By	S. Lillard	Reviewed By	M. Wagner
Drilling Method	Rotosonic	Drilling Contractor	Cascade	Total Depth of Borehole	76.0 feet
Sampling Method	4" Sonic Sampler	Water Level	6.7 b.g.s. (measured 10/11/18)	Top of Casing Elevation	393.54 feet msi
Size and Type of Well Casing	2" PVC Schedule 40	Screen Perforation	0.010 inch slotted	Ground Surface Elevation	390.56 feet msl
Seal or Backfill	Bentonite/Cement Grout	Coordinates	N 410,067.23 E 1,610,839.04	AKGWA #	8007-2996




Clier Projec Site: Projec	n t: Bi ct: DB Center	ig I 8 Wi rtov ber:	Riv Isor vn, ł	er E Stat	Elec tion 9938	tric	Co.		MW-1 Sheet 3 c	10 f 3
Elevation, feet msl	Depth, feet bgs	ample Type	un Number	AMF (%) CC	Recovery	reening 0, ppm	SCS Graphic /mbol	MATERIAL D	ESCRIPTION	WELL CONSTRUCTION DETAILS
-335	55-	Se	Ř	R	%	Sci	л ś	Soft, dark grey, massive SHALE	-	
220	60-		7		108			Soft, dark grey, SHALE; heavily mechanically - Medium hard, grey, massive SHALE	fractured	
-330			8		114			Mechanical fractured (61-61.9)		
-325	65 - -							Heavily mechanically fractured (65-69)		
-320	70-		9		98			Moderately weatherd fractures on shale beddin Heavily mechanically fractured (72-73)	ng planes (69-72)	
-315	75-							Soft, wet, dull, dark grey CLAY with some shall Heavily mechanically fractured (75-76) End of boring at 76' bgs; offset and redrill to 40	e fragments	
-310	80-							-	of the pred that	P. Contraint attor for Planestona 6 0197 00 00 00 00 00 00 00 00 00 00 00 00 00
								AECOM	And	guin-

MW-4D

Sheet 1 of 4

Date(s) Drilled and Installed	10/12/18-10/13/18	Logged By	S. Lillard	Reviewed By	M. Wagner
Drilling Method	Rotosonic	Drilling Contractor	Cascade	Total Depth of Borehole	111.0 feet
Sampling Method	4" Sonic Sampler	Water Level	22.4 b.g.s. (measured 10/13/18)	Top of Casing Elevation	410.02 feet msl
Size and Type of Well Casing	2" PVC Schedule 40	Screen Perforation	0.010 inch slotted	Ground Surface Elevation	407.03 feet msl
Seal or Backfill	Bentonite/Cement Grout	Coordinates	N 410,815.65 E 1,612,469.03	AKGWA #	8007-4811

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tion,	- S	Type	nber		ery	-	raphi				DETAILS
evat et m	et b	ple	Nun	(%)	COV	ppm ppm	ອ ເງິຊ	MATERIAL DESCRIPTION		-	Riser with
щã	۵ŧ	Sam	Run	Ra	6 Re	Scree	Sym		ШГ		and locking cap
	0—				<u>°`</u>	<u>0 a</u>	200	Loose, moist, grey-brown to grey silty, sandy, fine to coarse GRAVEL with shale			~~
	-							and coal tragments [Mine Spoils]			
-405	_						00 00	<u>-</u> .	B .		-2" ID Schedule 40
											PVC Riser
	-		1		65				B		Cement Grout
	-							- Brown to reddish brown mottles			
	5-						00°				
	_										
		(RURIN						Loose, moist, brown/reddish brown with localized grey sections, fine-grained sandy, gravelly (shale) SILT [Mine Spoils]			
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2 0	20	10.00									
5	20−										
	4	æ 83	3		73			Light grey sandstone clasts (21-26)			
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	-	10.20						· · · · · · · · · · · · · · · · · · ·			
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	nt:Bi	ig F Wil	Riv Ison	r er l n Sta	Elec tion	ctric	Co.		_	MW-4D
Site: Proje	Center ct Num	rtow ber:	/n, k e	(Y 6058	9938					Sheet 3 of 4
Elevation, feet msl	Depth, feet bgs	Sample Type	Run Number	RQD (%)	% Recovery	Screening PID, ppm	USCS Graphic Symbol	MATERIAL D	ESCRIPTION	WELL CONSTRUCTION DETAILS
-350	55 - -							-		
-345	- 60 -		7		78			- - -		
-340	65— -	Located description of the second					0	-		
-335	- 70 - -	· · · · · · · · · · · · · · · · · · ·	8		78					
	75-							-		
-330	- - 80- -		9		37		$\frac{1}{2}$	-		-Bentonite Seal (Pellets)
-325	-							A=COM		Filter Pack Sand #5



BREC MW INSTALL 2018 BR DBW OCT18 MW INSTALL GPJ 6/19/19

Appendix B Kentucky Well Records

Definition of maintime and maintime and maintime. Designed and all and the Difference and all and the Difference and th					U	NIFORM	KENTU	CKY WEL	L CONS	STRUG	CTION RECORI	D					
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Dame: 1/1 Devel: 1/1 <td< td=""><td>Owne Name</td><td>r First (*)</td><td>NA</td><td></td><td>Owne</td><td>r Last N</td><td>lame(*)</td><td>NA</td><td></td><td></td><td></td><td></td><td></td><td></td><td>Owne</td><td>r Well</td><td>MW-102</td></td<>	Owne Name	r First (*)	NA		Owne	r Last N	lame(*)	NA							Owne	r Well	MW-102
Bener City(*) Verderigen State(*) memory Owner 2 (p(*) 42459-0024 More 8 (rd 10/17/2018 Bite France(*) 0.8. Witch Status	Owne	r 255(*)	PO Box 2	4				1							Work	Start	10/13/2018
Denset 270-644-6031 Denset e Hall Site Sum(?) 20.8 Works Statum Site Sum(?) 20.8 Works Statum Site Site Chi(?) 20.8 Works Statum Site France 270-621-224 Site Phone 270-621-224 Site Site Site Site Site Site Site Site	Owne	r City(*)	Henderso	m	State(*) Ken	tucky		• 0	wner Z	2ip(*)	42419-0024				Work	End *)	10/17/2018
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Site	Site N	lame(*)	D.B. Wils	on Static	n			~							Depth	to ck (ft)	
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Agency Instrement (A1) Number j Facility Type A1D Agency Instrement (A1) Number j Facility Type A1D Agency Instrement (A1) Number j Facility Type A1D Stor Top Nage joint (P) County (*) Stor Top Nage joint (P) County (*) Chaing / Open Borchole Instrement (In) (*) Define (action Case) Well Visit (*) Chaing / Open Borchole Instrement (In) (*) Defen Borchole Instrement (In) (*) Chaing / Open Borchole Instrement (In) (*) Defen Borchole Instrement (In) (*)	Well L	.atitude(*	37.46	51724	Well Longi	tude(*)	-87.07	6285	Method	i(*)	Paper or Internet	Map Int	terpt •		surfac	cabove ce (in)	
Agency Interest (AI) Number 2313 Facility Type & ID Sole Wate: • Special Wate Landfill UBGS Topo Wap(*) County(*) County(*) County(*) County(*) UBGS Topo Wap(*) County(*) County(*) County(*) County(*) Physiographic Region(*) W Coll Tack Well Use(*) Physiographic Region(*) Well Use(*) Physiographic Region(*) K Coll Tack Well Candition(*) Physiographic Region(*) Well Use(*) Physiographic Region(*) K Coll Tack Well Candition(*) Physiographic Region(*) Well Vise(*) Street From depth (ft)(*)*Dodepth (ft)(*)*Barchole diameter (in) Screen Type(*)(*) Intack (*) Street Screen Screen Type(*)(*) Intack (*) Defeto 26.0 6.0 2.0 Proc 0.010 New Screen Type(*)(*) Intack (*) Physiographic Region(*) Physiographic Region(*) Defeto 26.0 36.0 6.0 2.0 Proc 0.010 New Screen Type(*)(*) Physiographic Region(*) Physiographic Region(*) Physiographic Region(*) Defeto 26.0 36.0 6.0 2.0 Pr	DMS I	o DD Conve	rter												WAIE	C WEL	
USBS Topo Map(*) Figuratury * (County(*) (Dim * Surface elevation (f1) 387.0 Elevation determined by Togopathy moleconduct* Well Vield	Agenc	y Interest	(AI) Nun	nber 33	19 Fac	cility Ty	pe & ID	Solid Wast	e		 Special V 	Naste L	andfill		well	yield	
Surface elevation (h) 39:0 Elevation determined bit Byographic may interplate and interplate an	USGS	Горо Мар(*)	EQUALIT	Υ	• C	ounty(*	()		Ohio			·]		Well	Yield	•
Bhysiographic Region (1) W Coal rets • Well Use(-) Itemicore yell: compane. • Welling Method (2) usdrug Gp • Well Status(-) Caling / Open Borehole isource (n) (+) (2asing diameter (in)(+) (2asing diameter (in)(+) (2asing type(+)) Delet 0.0 26.0 From depth (ft)(+) To depth (ft)(+) (s) Borehole diameter (in) (s) Casing diameter (in) (s) Casing type(+) Sector	Surfac	e elevatio	n (ft)	387.0		E	levation	determin	ned by	Тород	graphic map interp	polation '	-]		Well	<u>, , , , , , , , , , , , , , , , , , , </u>	
Drilling setting(1)	Physio	graphic R	egion(*)	W. Coal F	ield	• W	/ell Use	(*)		Monit	toring well - compl	liance	-		servi	ce (# ople	
Control of applicable Provide of applicable Provide of applicable Description Collform Screen Screen Screen Screen Prom depth (ft)(*) To depth (ft)(*) Borehole diameter (in) (*) (Casing type (*) Screen Screen Add New Screen (*) Screen Type (*) (*) Screen Type (*) (*) Screen Type (*) (*) Add New Screen Type (*) (*) Screen Type (*) (*) Screen Type (*) (*) Screen Type (*) (*) Add New Screen Type (*) (*) To depth (ft)(*) Screen Type (*) (*) Screen Type (*) (*) Add New Screen Type (*) (*) To depth (ft)(*) To depth (ft)(*) Screen Type (*) (*) Add New Screen Type (*) (*) Screen Type (*) (*) Screen Type (*) (*) Add New Screen Type (*) (*) Screen Type (*) (*) Screen Type (*) (*) Detex (as 0 36.0 Screen Type (*) (*) Screen Type (*) (*) Screen Type (*) Screen Type (*) (*) Screen Type (*) (*) Screen Type (*) Screen Type (*) (*) Screen Type (*) (*) Screen Type (*) Screen Type (*) (*) Screen Typ	Drilling	g Method(*)	Sonic		• W	ell Stat	us(*)		active	e				serve	:d)	ļ
From depth (ft)(*) To depth (ft)(*) Bosehole diameter (in)(*) Casing type(*) Disinectant Delete 0.0 26.0 6.0 2.0 PC * Screen	Casine	Open Borel	nole	Locking						Tunci	tioning property				Disin	fectant	
Delete 0.0 26.0 6.0 2.0 Prc Material Serven Screen Screen Screen Screen From depth (ft)(*)(*) To depth (ft)(*)(*) Borehole diameter (in) Screen diameter (in) Screen Type(*)(*) Delete 26.0 36.0 6.0 2.0 Prc 0.010 Add Add 0 0.010 Apparent guality and dor: Add Add 0 0.010 Apparent guality and dor: Add 2.0 22.0 Prc 0.010 Add 2.0 22.0 Prc 0.010 Add New 2.0 22.0 Material(*) Apparent guality and dor: Add New 2.0 22.0 Material(*) Note: Delete Section(*) From depth (ft)(*) To depth (ft)(*) Material(*) Delete Seal 2.2.0 24.0 Bernanke * Delete Seal 2.2.0 24.0 Bernanke * Delete Seal 2.2.0 24.0 Bernanke * Milbolgic log: * * * * From depth (ft)(*) To depth (ft)(*) Description(*) * * Add New Site Map/Sitech Map(*) Conser fin fin fin desen * Other laboratory analysis (if applicable) Conser fin fin fin desen * Other laboratory analysis (if applicable) Conser fin fin fin desen * Other laboratory analysis (if applicable) Conser fin fin fin desen * <td></td> <td>From de</td> <td>pth (ft)(</td> <td>*) To de</td> <td>epth (ft)(*)B</td> <td>orehole</td> <td>diamet</td> <td>ter (in)(*</td> <td>)Casin</td> <td>g dia</td> <td>meter (in)(*)</td> <td>Casin</td> <td>g type(*)</td> <td></td> <td>Disin</td> <td>fectant</td> <td></td>		From de	pth (ft)(*) To de	epth (ft)(*)B	orehole	diamet	ter (in)(*)Casin	g dia	meter (in)(*)	Casin	g type(*)		Disin	fectant	
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Soreen Installed Installed From depth (ft)(*)(*) To depth (ft)(*)(*) Soreen diameter (in) Screen Type(*)(*) Sice Add Soreen diameter (in) Screen Type(*)(*) Sice Apparance Installed Add Section(*) From depth (ft)(*) To depth (ft)(*) To depth (ft)(*) Material(*) Delete Soc 2.0 PvC 0.010 Apparance Odor Level > Coliform Tet Coliform Soc Sand > Coliform Delete Section(*) From depth (ft)(*) To depth (ft)(*) Benconte Coliform Coliform Delete Section(*) From depth (ft)(*) Descerption(*) Signed variance (if applicable) Odor-Level v Coliform Coliform metry Colores file No te closen Coliform * Coliform * Coliform mains (if applicable) Cooser file No te closen Coliform Signed variance (if applicable) Cooser file No Signed variance (if applicable) Cooser file No Coliform mains (if applicab	Add Ne	w										<u> </u>			Pitles	:s ter	
from depth (ft)(*)(*) To depth (ft)(*)(*) To depth (ft)(*)(*) Screen Type(*)(*)	Screen	_			_	1				1				Easaan (insta	led	
Delete 26.0 36.0 6.0 2.0 PVC 0.010 Intake (ft) Add New 0 0 0.010 Appendix of the construction of the	F	From dept	h (ft)(*)((*) To	depth (ft)(*)	(*)	Borehoi (*)(*)	le diamet	er (in)	Scre (*)(en diameter (*)	(in)	Screen Type(*)(*)	slot size(*)	insta	led h to	
And Point of the descent of the des	Delete	26.0		36.	0		6.0			2.0	_		PVC	• 0.010	intak	e (ft)	lity and adam
New Annulus fill and seal Annulus fill and seal Section(*) From depth (ft)(*) To depth (ft)(*) Mature - bentonite & cement * Delete Giver 22.0 Mature - bentonite & cement * Coliform Test Delete Seat 22.0 24.0 Bentonite * Add New 24.0 36.5 Sand * Coliform Test Lithologic log From depth (ft)(*) To depth (ft)(*) Description(*) * * Add New Site Map/Sketch Map(*) Choose File No file chosen * * * Golform manisys (if applicable) Choose File No file chosen * * * * Signed variance (if applicable) Choose File No file chosen * * * * Casing/Screen Supplemental Info Choose File No file chosen * * * * Signed variance (if applicable) Choose File No file chosen * * * * Casing/Screen Supplemental Info Choose File No file chosen * * * * Signature of certified driller & sponshof for again-ting is informat	Add														Арра	arance	T
Annubus min and seal Qdor-Level v Section(*) From depth (ft)(*) To depth (ft)(*) Material(*) Delete Geau 22.0 24.0 Bentonite Coliform Test Delete Steel * 22.0 36.5 Sand * Delete Filter Pack 24.0 36.5 Sand * * Lithologic log *	New	C 11	-												Odor	Туре	•
Delete Grout 22.0 24.0 Bentonite Intervention the scenant Delete Firer Pack 22.0 24.0 Bentonite Intervention Interventin Intervention	Annulus	Section	*)		From depth	(ft)(*)	To	depth (ft)(*)		Material(*)				Odor	Level	•
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Delete Fitter Pack 24.0 36.5 Sand Image: Construction of the construct	Delete	Seal		٠	22.0		24.	.0			8entonite		·		test t	уре	•
Add New Lithologic log From depth (ft)(*) To depth (ft)(*) Description(*) Add New Site Map/Sketch Map(*) Description(*) Site Map/Sketch Map(*) Description(*) Add New Site Map/Sketch Map(*) Choose File No file chosen Date Signed variance (if applicable) Choose File No file chosen Date Collform analysis (if applicable) Choose File No file chosen For Internal Staff Use Only Casing/Screen Supplemental Info Choose File No file chosen For Internal Staff Use Only Date map (if applicable) Choose File No file chosen Tode Mapped By: v Sasure ful qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those ersons directly responsible for gathering the information, including the possibility of fine and imprisonment for knowing violations. By submitting data, this ransmission constitutes my signature and I am responsible for any and all content submitted either by me or by the people I represent. Submit to DEP Signature of certified driller & Todd Driller Last Name(*) Millis	Delete	Filter Pack		•	24.0		36.	5		_	Sand		•				or
From depth (ft)(*) To depth (ft)(*) Description(*) Add New Site Map/Sketch Map(*) Choose File No file chosen Well Diagram (monitoring well) Choose File No file chosen Coliform analysis (if applicable) Choose File No file chosen Signed variance (if applicable) Choose File No file chosen Casing/Screen Supplemental Info Choose File No file chosen Comments 3'X3' concrete pad w/ 4 bollards. Affirmation: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those resons directly responsible for submitting false information, including the possibility of fine and imprisonment for knowing violations. By submitting data, this ransmission constitutes my signature and ra mesponsible for any and all content submitted either by me or by the people I represent. Signature of certified driller & PIN(*) Todd Millis Date Signed(*) 11/14/2018 Driller First Name(*) Todd Driller Last Name(*) Millis Certification Certification Number(*) 0344-0454-00 Certification Chase Environmental Group, Inc.	Litholog	*ic log					1					_			Colife	orm esults	# colonies per
Site Map/Sketch Map(*) Dives File No file chosen Well Diagram (monitoring well) Choose File No file chosen Colliform analysis (if applicable) Choose File No file chosen Signed variance (if applicable) Choose File No file chosen Other laboratory analysis report (if applicable) Choose File No file chosen Casing/Screen Supplemental Info Choose File No file chosen Comments 3'X3' concrete pad w/ 4 bollards. Affirmation: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed is assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or presons who manage the system, or those resons directly responsible for gathering the information, submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware hat there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. By submitting data, this ranamission constitutes my signature and I am responsible for any and all content submitted either by me or by the people I represent. Signature of certified driller & PIN(*) Todd W Mills Date Signed(*) 11/14/2018 Driller First Name(*) Todd V Mills Date Signed(*) 11/14/2018 Certification Child the file of 0.	Add No	From de	pth (ft)(*)To de	epth (ft)(*)D	escripti	on(*)										
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Casing/Screen Supplemental Info Choose F& No file chosen Casing/Screen Supplemental Info Choose F& No file chosen Comments 3:X3' concrete pad w/4 bollards. Affirmation: 1 certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to support the person or persons who manage the system, or those bersons directly responsible for gathering the information submitted. Based on my inquiry of the person or persons who manage the system, or those bersons directly responsible for gathering the information, including the possibility of fine and imprisonment for knowing violations. By submitting data, this ransmission constitutes my signature and 1 am responsible for any and all content submitted either by me or by the persent. Signature of certified driller & PIN(*) Todd Date Signed(*) 11/14/2018 Driller First Name(*) Todd Driller Last Name(*) Mills Certification Number(*) 0344-0454-00 Certification Chase Environmental Group, Inc.	Signed	variance	(if applic	able)	life and the second	Choose	File No fil	e chosen						-	For Inte	rnal Sta	off Use Only
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ransmission constitutes my signature and I am responsible for any and all content submitted either by me or by the people I represent. Signature of certified driller & Todd W Mills Date Signed(*) 11/14/2018 Driller First Name(*) Todd Driller Last Name(*) Mills Certification Number(*) 0344-0454-00 Certification Chase Environmental Group, Inc.	assure that persons d that there	at qualified p lirectly respo are significa	personnel p posible for g ant penaltie	roperly ga gathering as for subr	ather and evalua the information nitting false info	te the info , the infor ormation,	ormation mation su including	submitted. ubmitted is, g the possib	Based or to the b ility of f	n my i lest of fine an	inquiry of the per my knowledge a id imprisonment	rson or and beli for kno	persons who manage the s ef, true, accurate, and con wing violations. By subm	system, or those uplete. I am aware itting data, this	Save Fo	r Future	Retrieval Submit to DEP
PIN(*) Date signed(*) 11/14/2018 Driller First Name(*) Todd Driller Last Name(*) Mills Certification Number(*) 0344-0454-00 Certification Chase Environmental Group, Inc.	transmiss Signate	ion constitut	tes my sign ified drill	ature and	I am responsibl Todd W Mills	e for any	and all co	ontent subm	itted eit	her by	me or by the pe	ople I n	epresent.				
Certification Number(*) 0344-0454-00 Certification Chase Environmental Group, Inc.	PIN(*)	First Nam	a(*)		Todd			-		Delle	ar Lact Name/	•	A 1/ 14/ 2018		Į		
	Certific	ation Num			0344-0454-0	0				Certil	fication		Chase Environmental G	roup, Inc.			

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		ហ	IFORM KE	NTUCKY WELL CO	NSTRU	JCTION RECORD				
			Use this form	n to report installation of r	nonitorir	ng or water wells.				
		Form must be co	ompleted and s	ubmitted to the Division of	of Water	within 60 days of well com	pletion.			
				See insuperions h	alow					
			0	See instructions of						
			One	copy to owner and one co	by to dri	er s mes.			Kentucky	
Owner Name(*)	Big Rivers Electr	ic Corporation							Well ID (AKGWA) Number(*)	8007-2994
Owner First Name(*)	NA	Owner	· Last Nam	e(*) NA					Owner Weil ID	MW-104
Owner Address(*)	PO Box 24								Work Start Date(*)	10/09/2018
Owner City(*)	Henderson	State(*) Kent	ucky	• Owne	r Zip('	*) 42419-0024	_		Work End Date(*)	10/17/2018
Owner Phone(*)	270-844-6031	Owner eM	lail						Total depth (ft)(*)	40.0
Site Name(*)	D.B. Wilson Stat	ion							Depth to bedrock (ft)	93.0
Site Address(*)	5633 State Rout	e 85 W							Static water level (ft)	38.0
Site City(*)	Centertown	State(*) Kent	ucky	• Site Zi	ip(*)	42328			SWL method(#)	Reported V
Site Phone	270-821-7343	Site eMail							Casing	
Well Latitude(*)								height above	30
DMS to DD Conv	37.451828		WATER WELL	S ONLY						
									Estimated	
Agency Interest			The second	Solid Waste	(and	Special Waste			Well Yield	
Surface elevatio	n (ft) 385.0		Eleva	ity(*) ation determined t		o ooraphic map interpolatio			Method	•
Physiographic R	egion(*) W. Coal	Field	• Well	Use(*)	Mor	nitoring well - compliance	•		Well service (#	
Drilling Method	*) Sonic		• Well	Status(*)	acti	ve	•		of people (served)	
Wellhead(*)	Locking	Cap	• Well	Condition(*)	Fun	ctioning properly	•		Disinfectant	
Casing / Open Bore	hole	lanth (ft)(#)[0	anahala dir	an aton (in)(*)(Co	ing di				amount	•
Delete 0.0	30.0	6.	0	2.0	ang u	PVC	r		type	•
Add New							Ĩ		Pitless	T
Screen									installed	
From dent	h (#\/#)/#\ To	denth (ft)(*)	*) Bos	rehole diam eter (i	n) Scr	een diameter (in)		Screen slot	Pump installed	T
			(*)	(*)	(*)	(*)	Screen Type()()	size(*) (*)	Depth to	
Delete 30.0	40	1.0	6.0		2.0		PVC	• 0.010	Apparent quali	ty and odor:
Add New									Appearance	•
Annulus fill and sea	1					· · · · · · · · · · · · · · · · · · ·		a	Odor Type	•
Section	(*)	From depth	(ft)(*)	To depth (ft)(*)		Material(*)			Coliform Test	•
Delete Grout		• 2.0		25.0	_	Moiture - bentonite &	cement *		Coliform	*
Delete Seal		25.0		28.0	-	Bentonite			test type	•
Add N=w		20.0		40.5		Janu				or
Lithologic log									Coliform test results	# colonies per
From de	epth (ft)(*)To d	epth (ft)(*) De	scription(*)						
Add New	Man(#)						···· · ···	-	Date	
Well Diagram (n	map(*) ionitoring well\		Choose File	No file chosen				-	Sampled	
Coliform analysi	s (if applicable)		Choose File	No file chosen				1	Analyzed	
Signed variance	(if applicable)		Choose File	No file chosen					For Internal Stat	ff Use Only
Other laboratory	analysis report	(if applicable)	Choose File	No file chosen	_			-	Date Receive	d:
Casing/Screen S	upplemental Inf		Choose File	NO FILE CHOSEN				-	Date Mapped	
Affirmation: L certify	under penalty of la	w that this docum	ent and all a	ttachments were prepa	red up?	ler my direction or supe	Tvision in accordance with a	system designed to	Mapped By:	•
assure that qualified	personnel properly	gather and evaluat	e the inform	ation submitted. Based	l on my	inquiry of the person of	r persons who manage the sy	stem, or those	Save For Future	Retneval Submit to DEP
that there are signific	ant penalties for sul	b mitting false info	mation, incl	luding the possibility of all content submitted	e vest o of fine a either b	and imprisonment for k	nowing violations. By submi	tting data, this		
Signature of cert PIN(*)	ified driller &	Todd W Mills			Date	e Signed(*)	11/14/2018			
Driller First Nam	e(*)	 Todd			Dril	ler Last Name(*)	Mills			
Certification Nun	nber(*)	0344-0454-00			Cert	tification npany(*)	Chase Environmental Gr	oup, Inc.		



		UN	IFORM KENT	UCKY WELL	CONSTRU	UCTION RECORD					
			Use this form to	report installation	ofmonitoria	ig or water wells.					
		Form must be co	mpleted and subn	nitted to the Divisi	on of Water	within 60 days of well co	impletion.				
				See instruction	ns below.						
			Оле сор	y to owner and one	copy to dril	ler's files.				Kentucky	1
Owner Name(*)	Big Rivers Elec	tric Corporation								Well ID (AKGWA) Number(*)	8007-2992
Owner First Name(*)	NA	Owner	Last Name(*) NA						Owner Well ID	MW-105
Owner Address(*)	PO Box 24									Work Start Date(*)	10/11/2018
Owner City(*)	Henderson	State(*) Kent	ucky	• Ow	ner Zip('	*) 42419-0024				Work End Date(*)	10/17/2018
Phone(*)	270-844-6031	Owner eM	ail							Total depth (ft)(*)	60.0
Site Name(*)	D.B. Wilson St	ation		-						Depth to bedrock (ft)	15.0
Address(*)	5633 State Ro	ute 85 W		<u> </u>						Static water level (ft)	53.0
Site City(*)	Centertown	State(*) Kenti	Jcky	• Site	Zip(*)	42328	-			SWL method(*)	Reported
Well Latitude(4	*)									Casing height above	30
DMS to DD Conv	erter 37.451726	Well Longit	ude(*) -87.0	97313 Me	ethod(*)	Paper or Internet Ma	p Interpc 🔻			WATER WELL	S ONLY
Agency Interest	t (AI) Number	3319 Faci	lity Type & I	D Solid Waste		 Special Wa 	ste Landfill			Estimated well yield	
USGS Topo Map	e(*) EQU4		• County	(*)	Ohi	0	<u> </u>			Well Yield Method	
Surface elevatio	on (ft) 395. Region (*) W. Co	0 pal Field	Elevatio	on determine	d by Top	ographic map interpola	tior T			Well service (#	
Drilling Method	(*) Sonic		• Well St	atus(*)	acti	ve				of people served)	
Wellhead(*)	ehole	ng Cap	• Well Co	indition(*)	Fun	ictioning properly	<u></u>			Disinfectant	
From d	epth (ft)(*)To	depth (ft)(*)Bo	rehole diam	eter (in)(*)	Casing di	iameter (in)(*)C	asing type(*)			Disinfectant	•
Delete 0.0 Add New	50	0.0 6.0	0	:	2.0	P	VC			Pitless	
Screen								Q		adapter	•
From dep	th (ft)(*)(*) 1	Fo depth (ft)(*)(*) Boreh (*)(*	ole diameter)	(in) Scr (*)	reen diameter (in)(*)) Screen Type	(*)(*) Screen slot size(*)		Pump installed	T
Delete 50.0		50.0	6.0	• 	2.0		PVC	(*)	-	intake (ft)	
Add						,				Apparent quan	ty and odor:
Annulus fill and sea	ai						ļ			Odor Type	
Section	(*)	From depth (ft)(*) T	o depth (ft)(*)	Material(*)			_	Coliform Test	
Delete Grout		* 2.0	2	4.0		Mixture - bentonite	& cement 🔻			Coliform	•
Delete Seal	•b	• 24.0	2	7.0		Bentonite	*			test type	•
Add New		27.0		0.5						Collform	or
Lithologic log	enth $(ft)(*)$ To	denth (ft)(*) De	ecription(*)							test results	# colonies per 100 ml
Add New				1						Date	
Site Map/Sketch Well Diagram (r	n Map(*) monitoring wel	1)	Choose Fie No Choose Fie No	file chosen						Sampled	
Coliform analys	is (if applicable	; ;)	Choose File No	file chosen						Analyzed	
Signed variance	(if applicable)		Choose File No	file chosen						For Internal Staff	Use Only
Other laborator	y analysis repo Supplemental I	rt (if applicable) nfo	Choose File No Choose File No	file chosen						Date Receive	d:
Comments 3'X3'	' concrete pad w	4 bollards.								Date Mapped	
Affirmation: I certify assure that qualified persons directly reso	y under penalty of personnel properly consible for eather	law that this docume y gather and evaluate ing the information	ent and all attace the information	hments were pro on submitted, Ba submitted is, to	epared und ased on my	fer my direction or su inquiry of the perso of my knowledge and	pervision in accord n or persons who m belief, true, accurat	ance with a system design anage the system, or those e, and complete. I am awa	ed to	Mapped By: Save For Future F	Retrieval Submit to DEP
that there are signific transmission constitu	cant penalties for s utes my signature	submitting false infor and I am responsible	mation, includ for any and all	ing the possibili content submitt	ty of fine a ted either b	and imprisonment for	knowing violations e I represent.	s. By submitting data, this			
Signature of cer PIN(*)	tified driller &	Todd W Mills			Date	e Signed(*)	11/14/2018				
Driller First Nam	ne(*)	Todd			Dril	ier Last Name(*)	Mills				
Certification Nu	mber(*)	0344-0454-00			Cert	tification npany(*)	Chase Environ	mental Group, Inc.			



			UNI	IFORM H	KENTUCKY WEL	L CON	STRUCTION F	ECORD				
				Use this f	form to report installat	on of mo	nitoring or water v	ells.				
			Form must be con	mpleted an	d submitted to the Div	ision of \	Water within 60 da	ys of well comp	pletion.			
					See instruc	lions belo	IW;					
				0	ne copy to owner and	one copy	to driller's files.				Kentucky	
Owner Name(*)	Big Rivers I	Electric Co	orporation				1				Well ID (AKGWA) Number(*)	8007-2996
Owner First Name(*)	NA		Owner	Last Na	nme(*) NA						Owner Well ID	MW-110
Owner Address(*)	PO Box 24										Work Start Date(*)	10/11/2018
Owner City(*)	Henderson	St	ate(*) Kentu	icky	•	wner 2	Zip(*) 42419	-0024			Work End Date(*)	10/17/2018
Owner Phone(*)	270-844-60	031	Owner eM	ail							Total depth (ft)(*)	40.0
Site Name(*)	D.B. Wilson	Station									Depth to bedrock (ft)	25.0
Site Address(*)	5633 State	Route 85	5 W								Static water	7.0
Site City(*)	Centertown	Sta	ate(*) Kentu	cky	• 5	ite Zip	(*) 42328				SWL	Reported
Site Phone	270-821-73	843	Site eMail								Casing	
Well Latitude(*)										height above surface (in)	30
DMS to DD Conv	/ent_i	J75	Well Longiti	ide(*)	-87.090307	Method	d(*) Paper or	Internet Map I	nterpx V		WATER WELL	SONLY
Agency Interes	t (AI) Numb	er 3319	Facil	lity Typ	e & ID Solid Was	te	• S	pecial Waste	Landfill		Estimated well yield	
USGS Topo Map	p(*) E	QUALITY		• Co	unty(*)		Ohio		T		Well Yield	
Surface elevation	on (ft) 3	90.0	1	Ele	vation determi	ned by	Topographic m	ap interpolatio			Well	
Physiographic I	Region(*)	V. Coal Field	d	• We	ell Use(*)		Monitoring wel	- compliance	<u> </u>		service (#	
Drilling Method	(*) s	ionic oching Can		T We	Ell Status(*)	-	active	apartu	-		served)	
Casing / Open Bor	ehote	ocking cap		1000			[Ponctioning pr				Disinfectant	
From d	lepth (ft)(*)	To dept	h (ft)(*) Bo	rehole	diameter (in)(*) Casin	ng diameter (in)(*)Cas	ing type(*)		Disinfectant	
Defete 0.0 Add New	-	30.0	6.0)		2.0		PVC	•		Pitless	
Screen											adapter	•
										Screen	Pump	
From dep	th (ft)(*)(*)) To dep	pth (ft)(*)(*) ((*)	er (in)	(*)(*)	neter (in)	Screen Type(*)(*)	slot size(*)	Depth to	1
Delete 30.0		40.0		6	5.C		2.0		PVC	• 0.010	intake (ft)	
Add				Í							Appearance	ty and odor:
Annulus fill and set	al										Odor Type	T
Section	u(*)	Fr	rom depth (ft)(*)	To depth (fi)(*)	Materia	il(*)			Odor-Level	•
Delete Grout		* 2	.0		26.0		Mixture	- bentonite &	cement 🔻		Coliform	-
Delete Seal		• 2	6.0		28.0		Bentonit	e	T		test type	
Add New	±,	* 2	8.0		40.5		Sand		· · ·			or
Lithologic log	<u></u>						<u></u>				Coliform test results	# colonies per
From d	epth (ft)(*)	To depti	h (ft)(*) De:	scriptio	n(*)							
Site Map/Sketch	1 Map(*)		<u>`</u>	Choose F	e No file chosen						Date	
Well Diagram (1	monitoring v	well)		Choose Fr	le No file chosen					-	Date	
Coliform analys	is (if applica	ble)		Choose F	e No file chosen					_	Analyzed	
Signed variance	(if applicab	le)	annliashlad	Choose F	le No file chosen					=	For Internal Staf	f Use Only
Casing/Screen S	Supplementa	al Info	applicable)	Choose Fi	e No file chosen				`		Date Receive	d:
Comments 3'X 3	concrete pad	l w/ 4 bol	ilards.							5	Date Mapped	
Affirmation: I certify	y under penalty	of law the	at this docume	nt and all	attachments were	prepare	d under my dire	ction or supe	rvision in accordance with a	system designed to	Mapped By:	•
ssure that qualified ersons directly resp hat there are signifi	personnel prop oonsible for gat cant penalties f	perly gathe thering the for submitt	er and evaluate information, t ting false infor	the infor he inform mation, in	mation submitted. nation submitted is ncluding the possib	Based o , to the b vility of 1	on my inquiry or best of my know fine and imprise	the person of ledge and be onment for k	r persons who manage the s lief, true, accurate, and com nowing violations. By submi	stem, or those plete. I am aware tting data, this	Save For Future	Retrieval Submit to DEP
ransmission constitution of cer	utes my signatu tified driller	are and I	m responsible odd W Mills	for any a	nd all content subn	nitted eit	ther by me or b	(*)	represent.			
Driller First Nan	ne(*)	To	odd				Driller Last	Name(*)	Mills			
Certification Nu	mber(*)	03	344-0454-00				Certification		Chase Environmental Gr	oup, Inc.		
							Y		4		-9	



				UNI	IFORM K	ENTUCKY WELL CON	STRU	CTION RECORD				
					Use this fo	rm to report installation of mo	nitoring	g or water wells.				
				Form must be con	mpleted and	submitted to the Division of V	Nater w	vithin 60 days of well comp	letion.			
						See instructions belo	w.					
					On	e copy to owner and one copy :	to drill	er's lites.				
Owne	er i i i					1					Kentucky	1
Name	BI	ig Rivers	Electric	Corporation	_	ļ					Well ID (AKGWA)	8007-4811
Owne Name	er First	A	-	Owner	Last Nai	me(*) NA					Number(*)	
Owne	P(2 8ox 24									ID	MW-4D
Owne	er City(*) H	endersor	1	State(*) Kentu	icky	• Owner 2	Zip(*	·) 42419-0024			Work Start Date(*)	10/12/2018
Owne	2 (*) 2	70-844-6	5031	Owner eM	ail						Work End Date(*)	10/17/2018
Site N	lame(*)	.8. Wilso	n Statio	n]					Total depth (ft)(*)	93.0
Site	50	533 Stat	e Route	85 W	•	<u> </u>					Depth to bedrock (ft)	93.0
Site C	ity(*)	entertow	0	State(*) Kentu	cky		(*)	42328			Static water level (ft)	38.0
Site P	hone 2	70-821-7	/343	Site eMail							SWL method(*)	Reported •
Weli L	Latitude(*)										Casing	30
DMS to	o DD Converte	37.454	145	Well Longitu	ude(*) -	87.085061 Method	d(*)	Paper or Internet Map I	nterp: •		surface (in)	
Agenci	v Interest (A	.I) Num	ber 33:	19 Facil	iity Type	& ID Solid Waste		Special Waste	Landfill		Ectimated	SUNLY
USGS 1	Topo Map(*))	EQUALIT	Y	- Cou	inty(*)	Ohio	,	•		well yield	
Surfac	e elevation (ft)	405.0		Elev	vation determined by	Торо	graphic map interpolation	•		Well Yield Method	7
Physio	graphic Reg	ion(*)	W. Coal F	ie'd	* We	ll Use(*)	Mon	itoring well - compliance	<u>·</u>		Well	
Drilling	g Method(*)		Sonic Locking (• We	Il Status(*)	activ	rtioning organity	•		service (# of people	
Casing	Open Borehol	l	LOCKING		. Inve	in condition(*)	I FUNC	tioning propeny			served)	
Cusing /	From dept	- h (ft)(*) To de	epth (ft)(*)Bo	rehole d	iameter (in)(*)Casir	ng dia	ameter (in)(*)Casi	ng type(*)		Disinfectant amount	
Delate	0.0		83.0	6.0)	2.0		PVC	•		Disinfectant	7
Delete	93.0		111.0	6.0)	2.0	_	Oper	n hole •		Ditless	
Screen											adapter	•
Screen							Τ-			Screen	Pump	
F	From depth ((ft)(*)(*) To a	depth (ft)(*)(*) <mark>B</mark> (orehole diameter (in) ')(*)	Scre (*)	een diameter (in) (*)	Screen Type(*)(*)	slot size(*)	Installed	
Delete	83.0		93.0	0	6	0	2.0		PVC	(*) • 0.010	intake (ft)	
Add	0510		1.00	•	0.		1			10.010	Apparent quali	y and odor:
New											Odor Type	•
Annulus	Section(*)			From denth ((t)(*)	To depth (ft)(*)		Material/#)			Odor-Level	•
Delete	Grout			2.0		79.0		Milture - bentoni = 8 c	ement •		Coliform Test	
Delete	Seal		•	79.0		81-0		Bentonite			test type	*
Delete	Filter Pack	_	۲	81.0		95.0		Sand	•			• .
Delete	Grout		•	95.0		111.0		Bentonite	•		Coliform	# colonies per
Litholog	vic log										test results	100 ml
	From dept	h (ft)(*) To de	pth (ft)(*)De	scriptior	n(*)				1		
Add Ne	W (Skotsh M	20(2)								1	Sampled	
Well Di	iagram (mor	av(*) nitorina	weli)		Choose File	No file chosen					Date Analyzed	
Colifor	m analysis (if applic	able)		Choose File	No file chosen					For Internal Staf	f Use Only
Signed	variance (if	applica	ble)		Choose F#	No file chosen					Date Receive	d:
Other I	aboratory an	nalysis r	eport (if applicable)	Choose File	No file chosen					Date Mapped	
Comm	ents 3'X3' co		an 11170	bollards.	Unoose Fie		_				Mapped By:	· ·
Affirmati	ion: I certify un	der penal	ty of law	that this docume	nt and all	attachments were prepare	d und	er my direction or supe	J rvision in accordance with a	system designed to	Save For Future A	tetrieval Submit to DEP
assure the	at qualified per-	sonnel pri ible for m	operly ga	ather and evaluate	the inform	nation submitted. Based o ation submitted is, to the l	n my	inquiry of the person of my knowledge and be	r persons who manage the sy lief, true, accurate, and comm	stem, or those lete. I am aware		
that there	are significant	penalties	for subn	nitting false infor	mation, in	cluding the possibility of	fine a	nd imprisonment for kr	owing violations. By submit	ing data, this		
Signatu	ure of certific	ed drille	er &	Todd W Mills	ior any an	is an coment submitted er	Date	signed(*)	11/14/2018			
PIN(*)	Einet bla f	*)		Todd			D-111		Mille			
Certific	ation Numb	-j er(*)		0344-0454-00			Cert	ification	Chase Environmental Gro	up. Inc		
							Com	ipany(*)				

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Appendix C

Analytical Summary Tables

										DATE						
APPENDIX III CONSTITUENTS	Detection Limit	GWPS	4/4/2016	5/20/2016	8/25/2016	10/4/2016	2/15/2017	5/17/2017	8/16/2017	9/28/2017	10/12/2017	4/13/2018	7/12/2018	10/3/2018	6/30/2019	11/6/2019
							Baseline Events	6				Assessment	Re-sample		Assessment	
Boron	0.08		0.387 JB	0.282 JB	0.386 J	0.367 JB	0.839 J	0.981 JB	1.17	0.81 J	1.27		0.667 J	0.755 JB	ND D2 U	ND D2 U
Calcium	0.5		673	472	509	464	471 B	514 B	480	493	480 B		504	471	670 D1	541 D1
Chloride	3		49.3 B	60.2 JB	73.5	89.8	160 B	169 B	180	158 B	261		69.3 B	94.0 B	159 D	98.2 D
Fluoride	1		ND J	ND J	ND	0.838	ND J	ND J	ND JB	ND J	2.88		ND J	ND J	ND U	ND U
Sulfate	5		1630	1950	1670 B	1570 B	1620	1530	2040 B	1860 B	1730 B		1520	1640 B	2060 D	1490 D
pH (Field Measurement)	0.10		6.59	6.34	7.17	6.93	5.94	6.92	6.77	6.46	7.18	6.67	6.13	6.25	7.3 H3	6.44
Total Dissolved Solids	10		2840	2960	2940	2930	3000	3100	3220	3090	3040		3210	3200	3440	3290
APPENDIX IV CONSTITUENTS																
Antimony	0.002	0.006 mg/L	ND	ND	ND J	ND JB	ND	ND JB	ND JB	ND J		ND JB	ND J	NA	ND U	ND U
Arsenic	0.005	0.01 mg/L	0.00524 J	0.00523	0.00577 B	ND J	ND J	ND JB	ND J	ND J		ND J	ND J	ND J	0.0025	0.0023
Barium	0.2	2 mg/L	ND J	ND J	ND J	ND J		ND J	ND J	NA	0.010	0.010				
Beryllium	0.002	0.004 mg/L	ND	ND J	ND J	ND J	ND	ND J	ND J	ND		ND	NA	NA	ND U	ND U
Cadmium	0.001	0.005 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	NA	NA	ND U	ND U
Chromium	0.003	0.1 mg/L	ND	ND J	0.00309 B	ND J	ND	ND J	ND J	ND		ND J	ND	NA	ND U	ND U
Cobalt	0.005	0.006 mg/L	0.00909 J	0.00829	0.00659	0.00664	0.00518	0.0057	ND J	0.0051		0.00873	0.00672	0.00660	0.009	0.008
Fluoride	1	4 mg/L	ND J	ND J	ND	0.838	ND J	ND J	ND JB	ND J		ND J	ND J	ND J	ND U	ND U
Lead	0.005	0.015 mg/L	ND	ND	ND J	ND JB	ND J	ND J	ND J	ND J		ND J	ND J	NA	ND U	ND U
Lithium	0.05	0.040 mg/L	0.0243 J	0.0283 J	0.0374 J	0.0338 J	0.0432	0.042 J	0.0489 J	0.0398		0.0370 J	0.0375 J	0.0382 J	0.03	0.03
Mercury	0.0002	0.002 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	NA	NA	ND U	ND U
Molybdenum	0.01	0.1 mg/L	ND J	ND J	ND J	ND J		ND J	ND J	ND J	0.004 J	0.004 J				
Radium 226 Radium 228	1	5 pCi/L	0.645	0.915	0.714	1.19	1.01	0.967	1.22	1.01		0.783	0.711	1.23	1.8	0.434
Selenium	0.01	0.05 mg/L	ND	ND J	ND J	ND J	ND J	ND JB	ND J	ND		ND J	ND J	NA	ND U	ND U
Thallium	0.001	0.002 mg/L	ND	ND J	ND	ND J	ND	ND J	ND J	ND		ND	ND	NA	ND U	ND U

*All results listed in milligrams per liter (mg/L) unless otherwise noted by the Maximum Contaminant Level (MCL) GWPS = Groundwater Protection Standard

NA = Not Analyzed

NC = Not Collected

ND = Not Detected at or above Method Detection Limit

pCi/L = picoCuries per Liter J = Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value. B = Compound was found in the blank and sample.

D1 = Sample required dilution due to high concentration of target analyte

D2 = Sample required dilution due to matrix interference H3 = Sample received and analyzed past holding time

U = Target analyte was analyzed for, but was below detection limit

										DATE							
APPENDIX III CONSTITUENTS	Detection Limit	GWPS	4/5/2016	5/19/2016	8/25/2016	10/4/2016	2/15/2017	5/18/2017	8/16/2017	9/29/201	7 10/12/2017	4/13/2018	7/12/2018	10/4/2018	6/30/2019	11/6/2019	
							Baseline Even	ts				Assessment	Re-sample		Assessme	nt	
Boron	0.08		0.255 JB	0.243 JB	0.27 J	0.228 JB	0.293	0.265 JB	0.298 J	0.328	J 0.286 J		0.250 J	0.272 JB	ND D2 U	ND D2 U	
Calcium	0.5		534	466	470	445	414 B	490 B	477	459	438 B		478 J	426	433 D1	482 D1	
Chloride	3		3.65 B	5.09 B	4.1 B	4.63	4.93	4.37 B	5.49 B	5.36 E	3 5.6		4.79 B	6.16 B	8.2	16.3	
Fluoride	1		ND J	ND JB	ND	ND	ND J	ND J	ND JB	ND J	J 2.96		ND J	ND J	ND U	ND U	
Sulfate	5		1560	1710	1660 B	1790 B	1610	1570	1840 B	1630 E	3 1670 B		1730	1590 B	2040 D	1280 D	
pH (Field Measurement)	0.10		6.40	6.26	6.56	6.64	6.09	6.35	6.36	6.29	6.4	6.15	6.07	6.08	7.01 H3	6.29	
Total Dissolved Solids	10		2740	2780	2790	2800	2620	2820	2950	2900	2920		2920	3050	2700	3170	
APPENDIX IV CONSTIUENTS																	
Antimony	0.002	0.006 mg/L	ND	ND J	ND J	ND JB	ND J	ND JB	ND JB	ND .	JB	ND JB	ND J	NA	ND U	ND U	
Arsenic	0.005	0.01 mg/L	ND J	0.00736	ND JB	0.00534	0.0123	ND B	0.00598	0.00632		ND J	0.00683	0.00592	0.0046	0.0060	
Barium	0.2	2 mg/L	ND J	ND J	ND J	ND .	J	ND J	ND J	NA	0.010	0.012					
Beryllium	0.002	0.004 mg/L	ND	ND	ND	ND J	ND	ND	ND	ND		ND	NA	NA	ND U	ND U	
Cadmium	0.001	0.005 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	NA	NA	ND U	ND U	
Chromimum	0.003	0.1 mg/L	ND	ND J	ND B	ND	ND	ND	ND	ND .	J	ND J	ND	NA	ND U	ND U	
Cobalt	0.005	0.006 mg/L	0.00728 J	0.00713	0.0074	0.00688	0.0054	0.0059	0.00578	0.00686		0.00742	0.00672	0.00666	0.008	0.008	
Fluoride	1	4 mg/L	ND J	ND J	ND	ND	ND J	ND J	ND JB	ND .	J	ND J	ND J	ND J	ND U	ND U	
Lead	0.005	0.015 mg/L	ND	ND J	ND J	ND JB	ND J	ND J	ND J	ND J	J	ND J	ND J	NA	ND U	0.0005 J	
Lithium	0.05	0.040 mg/L	0.0326 J	0.0419 J	0.0494 J	0.0459 J	0.0508	0.0455 J	0.0495 J	0.0472	J	0.0470 J	0.0496 J	0.0463 J	0.04	0.04	
Mercury	0.0002	0.002 mg/L	ND	ND	ND	ND	ND	ND	ND	0.000161	JF1	ND	NA	NA	ND U	ND U	
Molybdenum	0.01	0.1 mg/L	ND J	ND J	ND J	ND J	J	ND J	ND J	ND J	0.006 J	0.007 J					
Radium 226 Radium 228	1	5 pCi/L	0.596	0.581	0.519	0.847	0.919	0.892	0.82	0.639		0.900	0.795	1.44	0.8	1.42	
Selenium	0.01	0.05 mg/L	ND	ND	ND	ND J	ND	ND	ND	ND		ND	ND	NA	ND U	ND U	
Thallium	0.001	0.002 mg/L	ND	ND J	ND J	ND J	ND	ND	ND	ND J	J	ND J	ND	NA	ND U	ND U	

*All results listed in milligrams per liter (mg/L) unless otherwise noted by the Maximum Contaminant Level (MCL) GWPS = Groundwater Protection Standard

NA = Not Analyzed

NC = Not Collected

ND = Not Detected at or above Method Detection Limit

pCi/L = picoCuries per Liter

J = Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value. B = Compound was found in the blank and sample.

F1 = MS and/or MSD Recovery is outside acceptance limits.

D1 = Sample required dilution due to high concentration of target analyte D2 = Sample required dilution due to matrix interference

H3 = Sample received and analyzed past holding time

U = Target analyte was analyzed for, but was below detection limit

MW-7

									DAT	E						
APPENDIX III CONSTITUENTS	Detection Limit	GWPS	4/4/2016	5/19/2016	8/25/2016	10/6/2016	2/15/2017	5/18/2017	8/16/2017	9/29/2017	10/12/2017	4/13/2018	7/12/2018	10/4/2018	6/27/2019	11/7/2019
							Baseline Events					Assessment	Re-sample		Assessment	
Boron	0.08		0.241 JB	0.165 JB	0.277 J	0.203 JB	0.293 J	0.232 JB	0.263 J	0.28 J	0.245 J		0.324 J	0.395 JB	1.75 B	1.41 D2
Calcium	0.5		364	241	287	251	262 B	273 B	268	269	259 B		297	271	329	331 D1
Chloride	3		3.47 B	5.31 B	5.67 B	5.65 B	6.15	6.91 B	7.91 B	7.54 B	7.77		17.1 B	21.9 B	32.0	30.1
Fluoride	1		ND J	ND J	ND J	ND J	ND J	ND J	ND JB	ND J	1.43		ND J	ND J	0.222	0.21
Sulfate	5		759	784	813 B	822	850	877	940 B	1780 B	910 B		837	888 B	1030	809 D
pH (Field Measurement)	0.10		6.53	6.29	6.60	7.33	5.60	6.55	6.49	6.32	6.50	6.26	6.18	6.23	7.05 HF	6.59
Total Dissolved Solids	10		1450	1450	1520	1560	1540	1550	1600	1590	1610		1720	1750	1820	1890
APPENDIX IV CONSTIUENTS																
Antimony	0.002	0.006 mg/L	ND	ND	ND J	ND JB	ND	ND JB	ND JB	ND JB		ND JB	ND J	NA	0.000242 JB	ND U
Arsenic	0.005	0.01 mg/L	ND	ND J	ND JB	ND J	ND J	ND JB	ND J	ND J		ND J	ND J	ND J	0.00423 J	0.0034
Barium	0.2	2 mg/L	ND J	ND J	ND J	ND J	ND J	ND J	ND J	ND J		ND J	ND J	NA	0.0164 JB	0.013
Beryllium	0.002	0.004 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	NA	NA	ND	ND U
Cadmium	0.001	0.005 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	NA	NA	ND	ND U
Chromimum	0.003	0.1 mg/L	ND	ND J	0.00304 B	ND	ND	ND	ND	ND		ND J	ND	NA	0.0247 B	ND U
Cobalt	0.005	0.006 mg/L	0.0084 J	0.0058	0.0062	0.00483 J	0.00531	0.00358 J	0.00395 J	0.00454 J		0.00468 J	0.00365 J	0.00346 J	0.00236 JB	ND U
Fluoride	1	4 mg/L	ND J	ND J	ND J	ND J	ND J	ND J	ND JB	ND J		ND J	ND J	ND J	0.222	0.21
Lead	0.005	0.015 mg/L	ND	ND	ND	ND J	ND	ND	ND	ND		ND	ND J	NA	0.000348 J	ND U
Lithium	0.05	0.040 mg/L	0.0241 J	0.0241 J	0.0305 J	0.0263 J	0.0318 J	0.0277 J	0.0291 J	0.0278		0.0261 J	0.0271 J	0.0273 J	0.0323 J	0.02
Mercury	0.0002	0.002 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	NA	NA	ND	ND U
Molybdenum	0.01	0.1 mg/L	ND J	ND J	ND J	ND J	ND J	ND J	ND J	ND J		ND J	ND J	ND J	0.0142	0.006 J
Radium 226	1	5 pCi/l	0 727	0.558	0.613	0.66	ND	0.817	0.852	0 779		0.572	0.697	0 935	0 597	0 864
Radium 228		0 0002	5 21	0.000	0.010	5.00		0.011	5.502	0.110		0.072	0.001	0.000	0.001	0.001
Selenium	0.01	0.05 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	NA	0.000427 J	ND U
Thallium	0.001	0.002 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	NA	ND	NDU

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pCi/L = picoCuries per Liter J = Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value. B = Compound was found in the blank and sample.

			DATE													
APPENDIX III CONSTITUENTS	Detection Limit	GWPS	4/4/2016	5/19/2016	8/25/2016	10/3/2016	2/15/2017	5/17/2017	8/15/2017	9/28/2017	10/12/201	7 4/13/2018	7/12/2018	10/3/2018	6/30/2019	11/5/2019
						I	Baseline Ever	nts				Assessment	Re-sample		Assessment	
Boron	0.08		ND JB	ND JB	ND J	ND JB	ND J	ND JB	ND J	ND J	ND 、	J	ND J	0.0388 JB	ND D2 U	ND D2 M2 U
Calcium	0.5		329	242	237	226	213 B	225 B	230	214	216 8	3	245	207	248 D1	240 D1 M3
Chloride	3		4.12 B	5.48 B	4.38 B	4.69	4.7	4.19 B	4.68 B	4.82 B	4.44		3.83 B	4.80 B	4.1	4.7
Fluoride	1		ND J	ND J	ND J	ND JB	ND J	ND J	ND JB	ND J	1.210		ND J	ND J	0.2	0.27
Sulfate	5		876	910	872 B	854 B	779 B	877	964 B	900 B	894 E	3	887	799 B	920 D	1480 D
pH (Field Measurement)	0.10		6.47	6.34	6.64	6.63	4.91	6.47	6.44	6.35	6.50	6.28	6.08	6.25	6.85 H3	
Total Dissolved Solids	10		1530	1590	1550	1520	1450	1560	1590	1520	1560		1690	1560	1640	1570
APPENDIX IV CONSTIUENTS																
Antimony	0.002	0.006 mg/L	ND	ND	ND J	ND JB	ND	ND JB	ND JB	ND J		ND JB	ND J	NA	ND U	ND U
Arsenic	0.005	0.01 mg/L	0.00931 J	0.00698	0.00709 B	0.00581	0.00799	0.0072 B	0.00548	0.00515		0.00525	0.00558	0.00757	0.0054	0.0056
Barium	0.2	2 mg/L	ND J	ND J	ND J	ND J		ND J	ND J	NA	0.024	0.022				
Beryllium	0.002	0.004 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	NA	NA	ND U	ND M2 U
Cadmium	0.001	0.005 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	NA	NA	ND U	ND U
Chromimum	0.003	0.1 mg/L	ND	ND J	ND JB	ND	ND	ND	ND	ND		ND J	ND J	NA	ND U	0.0009 J
Cobalt	0.005	0.006 mg/L	ND	0.00156 J	0.00118 J	0.0015 J	0.0011 J	0.000739 J	0.000943 J	0.00102 J		0.000800 J	0.00113 J	0.000849 J	ND U	ND U
Fluoride	1	4 mg/L	ND J	ND J	ND J	ND JB	ND J	ND J	ND JB	ND J		ND J	ND J	ND J	0.2	0.27
Lead	0.005	0.015 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND J	NA	ND U	0.0005 J
Lithium	0.05	0.040 mg/L	ND	ND	0.0116 J	0.012 J	0.0142 J	0.0103 J	0.0137 J	ND		ND	0.0125 J	0.0129 J	0.009 J	0.009 J
Mercury	0.0002	0.002 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	NA	NA	ND U	ND U
Molybdenum	0.01	0.1 mg/L	0.0187 J	0.0142	0.0145	0.0151	0.0185	0.0137	0.0166	0.0153		0.0123	0.0129	0.0137	0.01	0.01
Radium 226	1	5 pCi/L	1.12	1.31	0.741	1.12	0.854	1.07	1.04	0.901		0.802	1.29	1.69	2.8	0.946
Radium 228	0.01	0.05 mg/l	ND	ND	ND	ND		ND		ND		ND		NA		
Thallium	0.01	0.05 mg/L		ND	ND					ND				NA		

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D1 = Sample required dilution due to high concentration of target analyte

D2 = Sample required dilution due to matrix interference

H3 = Sample received and analyzed past holding time

M2 = Matrix spike recovery was low; the method control sample recovery was acceptable.

M3 = The accuracy of the spike recovery value is reduced since the analyte concentration in the sample is disproportionate to spike level. The method control sample recovery was acceptable.

U = Target analyte was analyzed for, but was below detection limit

			DATE														
APPENDIX III CONSTITUENTS	Detection Limit	GWPS	4/5/2016	5/18/2016	8/25/2016	10/6/2016	2/17/2017	5/18/2017	8/18/2017	10/2/2017	10/13/2017	4/14/2018	7/13/2018	10/5/2018	6/30/2019	11/4/2	2019
						E	Baseline Events					Assessment	Re-sample		Assessment		
Boron	0.08		0.291 JB	0.217 JB	0.205 J	0.166 JB	0.229 J	0.163 JB	0.196 J	0.181 J	0.251 J		0.144 J	0.286 JB	ND D2 U	ND	J D2
Calcium	0.5		497	390	404	369	440 B	390 B	368	379 B	347 B		378 J	334	369 D1	409 F	D1
Chloride	3		53.7 B	85.7 JB	53	44 B	44 B	47.4 B	43.5 B	63.3	83		48.2 B	59.2 B	80.1 D	143 C	C
Fluoride	1		ND JB	ND J	ND	ND J	ND J	ND J	ND JB	ND J	2.8		ND J	ND J	ND U	ND I	J
Sulfate	5		2090	2210	2000 B	2030	1980 B	2070	2320 B	2250 B	2080 B		2010	1850 B	2440 D	553 F	C
pH (Field Measurement)	0.10		6.03	5.82	6.05	6.91	4.62	5.88	5.83	5.84	6.00	5.90	5.68		6.74 H3		
Total Dissolved Solids	10		2980	3300	3240	3230	3050	3240	3200	3300	3120		3270	3120	2980	2960	
APPENDIX IV CONSTIUENTS																	
Antimony	0.002	0.006 mg/L	ND	ND	ND J	ND JB	ND	ND JB	0.00396 B	ND JB		ND JB	ND J	NA	ND U	NDI	J
Arsenic	0.005	0.01 mg/L	ND J	ND J	ND JB	ND J	ND J	ND JB	ND J	ND JB		ND J	ND J	ND J	0.0009 J	0.0025	
Barium	0.2	2 mg/L	ND J	ND J	ND J	ND J	ND J	ND J	ND J	ND J		ND J	ND J	NA	0.009	0.01	
Beryllium	0.002	0.004 mg/L	ND	ND J	ND	ND	ND	ND	ND	ND		ND	NA	NA	ND U	NDI	J
Cadmium	0.001	0.005 mg/L	ND	ND	ND	ND	ND J	ND J	ND	ND		ND	NA	NA	0.0001 J	ND I	J
Chromimum	0.003	0.1 mg/L	ND	ND J	ND JB	ND	ND	ND	ND	ND J		ND J	ND	NA	ND U	ND I	J
Cobalt	0.005	0.006 mg/L	0.158	0.113	0.126	0.108	0.0836	0.0602	0.121	0.139		0.0412	0.0704	0.114	0.110	0.108	
Fluoride	1	4 mg/L	ND J	ND J	ND	ND J	ND J	ND J	ND JB	ND J		ND J	ND J	ND J	ND U	ND I	J
Lead	0.005	0.015 mg/L	ND	ND J	ND J	ND J	ND J	ND	ND	ND J		ND J	ND J	NA	ND U	ND I	J
Lithium	0.05	0.040 mg/L	ND	ND	0.0141 J	0.0149 J	0.0133 J	0.0109 J	0.0129 J	0.0124 J		ND	0.0102 J	0.0147 J	0.009 J	NDI	J
Mercury	0.0002	0.002 mg/L	ND	ND	ND	ND	ND	ND	ND	ND		ND	NA	NA	ND U	ND I	J
Molybdenum	0.01	0.1 mg/L	ND	ND	ND	ND	ND	ND	ND J	ND		ND	ND	ND	ND U	0.003 J	J
Radium 226	1	5 pCi/l	ND	ND	ND	ND	ND	0.384	0.372	0.506		0 721	0 472	0.625	12	0 11	
Radium 228	'	0 2011						0.004	0.072	0.000		0.721	0.472	0.020		0.11	
Selenium	0.01	0.05 mg/L	ND	ND	ND	ND	ND	ND	ND J	ND JB		ND	ND	NA	ND U	ND L	J
Thallium	0.001	0.002 mg/L	ND	ND J	ND J	ND	ND	ND	ND J	ND		ND	ND	NA	ND U	0.0001 J	J

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H3 = Sample received and analyzed past holding time U = Target analyte was analyzed for, but was below detection limit

			DATE						
APPENDIX III CONSTITUENTS	Detection Limit	GWPS	11/2/20	18	6/28/201	9	11/8/	2019	
					Characteri	zation	1		
Boron	0.08		6.60		8.09	D2	9.11	D2	
Calcium	0.5		607		635	D1	628	D1	
Chloride	3		676	В	826	D	537	D	
Fluoride	1		ND	J	ND	DU	0.21		
Sulfate	5		1720	В	1330	D	1100	D	
pH (Field Measurement)	0.10		6.05		6.97	H3	6.34		
Total Dissolved Solids	10		4180		4140		3500		
APPENDIX IV CONSTITUENTS									
Antimony	0.002	0.006 mg/L	ND	JB	ND	U	ND	U	
Arsenic	0.005	0.01 mg/L	ND	JB	0.0032		0.0032		
Barium	0.2	2 mg/L	ND	J	0.016		0.016		
Beryllium	0.002	0.004 mg/L	ND	J	ND	U	ND	U	
Cadmium	0.001	0.005 mg/L	ND		ND	U	ND	U	
Chromium	0.003	0.1 mg/L	0.00591	В	0.0006	J	ND	U	
Cobalt	0.005	0.006 mg/L	0.0122		0.010		0.015		
Fluoride	1	4 mg/L	ND	J	ND	DU	0.21		
Lead	0.005	0.015 mg/L	ND	J	ND	U	ND	U	
Lithium	0.05	0.040 mg/L	0.181		0.14		0.14		
Mercury	0.0002	0.002 mg/L	ND		ND	U	ND	U	
Molybdenum	0.01	0.1 mg/L	0.0185		0.007	J	0.01		
Radium 226 Radium 228	1	5 pCi/L	1.58		2.7		1.86		
Selenium	0.01	0.05 mg/L	ND	J	0.001	J	0.001	J	
Thallium	0.001	0.002 mg/L	ND	J	ND	U	ND	U	

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			DATE						
APPENDIX III CONSTITUENTS	Detection Limit	GWPS	11/2/20	18	6/27/201	19	11/8/	/2019	
					Character	ization			
Boron	0.08		ND	J	0.108	JB	ND	D2 M4 U	
Calcium	0.5		81.3		80.9		85.1	D2	
Chloride	3		33.3	В	33.3		35.3		
Fluoride	1		ND	J	0.343		0.36		
Sulfate	5		265	В	279		307	D	
pH (Field Measurement)	0.10		6.58		6.96	HF	6.61		
Total Dissolved Solids	10		781		760		728		
APPENDIX IV CONSTITUENTS									
Antimony	0.002	0.006 mg/L	ND	JB	0.000101	JB	ND	U	
Arsenic	0.005	0.01 mg/L	ND	JB	0.00414	J	0.0031		
Barium	0.2	2 mg/L	ND	J	0.0596	JB	0.059		
Beryllium	0.002	0.004 mg/L	ND		0.000134	J	ND	U	
Cadmium	0.001	0.005 mg/L	ND		ND		ND	U	
Chromium	0.003	0.1 mg/L	0.00321	В	0.00140	JB	0.0006	J	
Cobalt	0.005	0.006 mg/L	0.00263	J	0.00286	JB	ND	U	
Fluoride	1	4 mg/L	ND	J	0.343		0.36		
Lead	0.005	0.015 mg/L	ND	J	0.000164	J	ND	U	
Lithium	0.05	0.040 mg/L	ND		ND		ND	U	
Mercury	0.0002	0.002 mg/L	ND		ND		ND	U	
Molybdenum	0.01	0.1 mg/L	0.0111		0.00112	J	0.002	J	
Radium 226 Radium 228	1	5 pCi/L	1.22		0.187	U	0.425		
Selenium	0.01	0.05 mg/L	ND		ND		ND	U	
Thallium	0.001	0.002 mg/L	ND		ND		ND	U	

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			DATE						
APPENDIX III CONSTITUENTS	Detection Limit	GWPS	11/2/2018	6/27/201	11/8	3/2019			
				Characteri	zation				
Boron	0.08		ND J	0.0765	JB NI	U D2			
Calcium	0.5		227	221	25	' D1			
Chloride	3		11.8 B	12.7	13.2	2			
Fluoride	1		ND J	0.129	J NE) U			
Sulfate	5		639 JB	513	58	′ D M1			
pH (Field Measurement)	0.10		6.43	7.32	HF 6.64	Ļ			
Total Dissolved Solids	10		1410	1360	1490)			
APPENDIX IV CONSTITUENTS									
Antimony	0.002	0.006 mg/L	ND JB	0.000173	JB NI) U			
Arsenic	0.005	0.01 mg/L	ND JB	8 0.00174	J 0.002	7			
Barium	0.2	2 mg/L	ND J	0.0734	JB 0.064	Ļ			
Beryllium	0.002	0.004 mg/L	ND J	0.000142	J NE) U			
Cadmium	0.001	0.005 mg/L	ND	ND	NE) U			
Chromium	0.003	0.1 mg/L	0.00361 B	0.0178	B 0.003	7			
Cobalt	0.005	0.006 mg/L	0.00388 J	0.00164	JB NI) U			
Fluoride	1	4 mg/L	ND J	0.129	J NE) U			
Lead	0.005	0.015 mg/L	ND J	0.000785	J 0.002	2			
Lithium	0.05	0.040 mg/L	0.0326 J	0.0261	J 0.03	3			
Mercury	0.0002	0.002 mg/L	ND	ND	NE) U			
Molybdenum	0.01	0.1 mg/L	0.0124	0.00319	J NE) U			
Radium 226	1	5 pCi/l	2 16	0 952	1.24	L			
Radium 228	'	0 000	2.13	0.002	1.2				
Selenium	0.01	0.05 mg/L	ND	ND	N	U U			
Thallium	0.001	0.002 mg/L	ND	ND	NE	U U			

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J = Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value.

B = Compound was found in the blank and sample.

U = Target analyte was analyzed for, but was below detection limit

^ = Instrument related QC is outside acceptance limits

			DATE						
APPENDIX III CONSTITUENTS	Detection Limit	GWPS	11/2/2018		6/27/20	19	11/7/	2019	
					Character	ization			
Boron	0.08		ND	J	0.348	JB	ND	D2 M4 U	
Calcium	0.5		124		58.6		72.0	D2 M1	
Chloride	3		10.5	В	9.34		10.1		
Fluoride	1		ND	J	0.638		0.55		
Sulfate	5		216	JB	37.6		73.7	D	
pH (Field Measurement)	0.10		6.75		7.84	HF	7.51		
Total Dissolved Solids	10		747		548		612		
APPENDIX IV CONSTITUENTS									
Antimony	0.002	0.006 mg/L	ND	JB	0.000186	JB	ND	U	
Arsenic	0.005	0.01 mg/L	ND	JB	0.00186	J	ND	U	
Barium	0.2	2 mg/L	0.207		0.288	В	0.326		
Beryllium	0.002	0.004 mg/L	ND	J	0.000398	J	ND	U	
Cadmium	0.001	0.005 mg/L	ND		ND		ND	U	
Chromium	0.003	0.1 mg/L	0.00388	В	0.00784	В	ND	U	
Cobalt	0.005	0.006 mg/L	0.00488	J	0.00435	JB	ND	U	
Fluoride	1	4 mg/L	ND	J	0.638		0.55		
Lead	0.005	0.015 mg/L	ND	J	0.00326	J	ND	U	
Lithium	0.05	0.040 mg/L	0.0141	J	0.0278	J	0.03	M1	
Mercury	0.0002	0.002 mg/L	ND		ND		ND	U	
Molybdenum	0.01	0.1 mg/L	0.0131		0.00231	J	0.002	J	
Radium 226 Radium 228	1	5 pCi/L	1.08		0.558	U	0.829		
Selenium	0.01	0.05 mg/L	ND		ND		ND	U	
Thallium	0.001	0.002 mg/L	ND		0.0000510	J	ND	U	

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APPENDIX III CONSTITUENTS	Detection Limit	GWPS	11/2/20 ⁻	18	6/27/20 ⁻	19	11/7/20	19	
					Characteriza	ation			
Boron	0.08		ND	J	0.0716	JB	ND	U D2	
Calcium	0.5		33.8		38.9		47.6	D2	
Chloride	3		14.4	В	11.1		10.0		
Fluoride	1		ND	J	0.229		0.23		
Sulfate	5		102	В	70.0		61.2	D	
pH (Field Measurement)	0.10		6.93		7.26	HF	6.83		
Total Dissolved Solids	10		333		296		348		
APPENDIX IV CONSTITUENTS									
Antimony	0.002	0.006 mg/L	ND	JB	0.000130	JB	ND	U	
Arsenic	0.005	0.01 mg/L	ND	JB	0.00118	J	ND	U	
Barium	0.2	2 mg/L	ND	J	0.0535	JB	0.051		
Beryllium	0.002	0.004 mg/L	ND		ND		ND	U	
Cadmium	0.001	0.005 mg/L	ND		ND		ND	U	
Chromium	0.003	0.1 mg/L	0.00967	В	0.00217	JB	ND	U	
Cobalt	0.005	0.006 mg/L	0.00240	J	0.000827	JB	ND	U	
Fluoride	1	4 mg/L	ND	J	0.229		0.23		
Lead	0.005	0.015 mg/L	ND	J	0.000539	J	ND	U	
Lithium	0.05	0.040 mg/L	0.0122	J	ND		0.006	J	
Mercury	0.0002	0.002 mg/L	ND		ND		ND	U	
Molybdenum	0.01	0.1 mg/L	ND	J	ND		ND	U	
Radium 226 Radium 228	1	5 pCi/L	1.19		0.816		1.10		
Selenium	0.01	0.05 mg/L	ND		ND		ND	U	
Thallium	0.001	0.002 mg/L	ND		ND		ND	U	

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ND = Not Detected at or above Method Detection Limit

pCi/L = picoCuries per Liter

J = Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value.

B = Compound was found in the blank and sample.

HF = Hold time exceedence

^ = Instrument related QC is outside acceptance limits

Appendix D

Analytical Laboratory Reports

Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Pensacola 3355 McLemore Drive Pensacola, FL 32514 Tel: (850)474-1001

Laboratory Job ID: 400-172358-1

Laboratory Sample Delivery Group: D.B. Wilson Station Client Project/Site: Semi-Annual

For: Big Rivers Electric Corporation PO BOX 24 Henderson, Kentucky 42419

Attn: Mike Galbraith

Roxanne Cisneros

Authorized for release by: 8/21/2019 10:49:00 AM Roxanne Cisneros, Senior Project Manager (615)301-5761 roxanne.cisneros@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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3

Job ID: 400-172358-1

Laboratory: Eurofins TestAmerica, Pensacola

Narrative

Job Narrative 400-172358-1

Comments

Revised Report 8/14/2019 to add Zinc per client request.

Receipt

The samples were received on 6/28/2019 1:08 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.7° C and 4.0° C.

HPLC/IC

Method 9056: Due to the high concentration of Sulfate, the matrix spike / matrix spike duplicate (MS/MSD) for analytical batch 400-446394 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria.

Method 9056: The following samples were diluted to bring the concentration of target analytes within the calibration range: MW-102 (400-172358-1), MW-110 (400-172358-3), MW-104 (400-172358-4) and MW-7 (400-172358-5). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

Method 6020A: The continuing calibration verification (CCV) associated with batch 180-285155 recovered above the upper control limit for boron. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Narrative

Job Narrative 400-172358-3

Comments

No additional comments.

Receipt

The samples were received on 6/28/2019 1:08 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.7° C and 4.0° C.

RAD

Method(s) 903.0, 9315: Ra-226 Prep Batch 160-433443: Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-102 (400-172358-1), MW-105 (400-172358-2), MW-110 (400-172358-3), MW-104 (400-172358-4), MW-7 (400-172358-5), (LCS 160-433443/1-A), (MB 160-433443/23-A), (180-90467-A-2-A) and (180-90467-B-2-A DU)

Method(s) 904.0, 9320: Ra-228 Prep Batch 160-433455: Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-102 (400-172358-1), MW-105 (400-172358-2), MW-110 (400-172358-3), MW-104 (400-172358-4), MW-7 (400-172358-5), (LCS 160-433455/1-A), (MB 160-433455/23-A), (180-90467-A-2-B) and (180-90467-B-2-B DU)

Job ID: 400-172358-1 (Continued)

Laboratory: Eurofins TestAmerica, Pensacola (Continued)

Method(s) PrecSep_0: Radium 228 Prep Batch 160-433455: The following samples were prepared at a reduced aliquot due to yellow and brown discoloration: MW-104 (400-172358-4). Sample 480-155414-D-13 was prepared at a reduced aliquot due to limited volume.

Method(s) PrecSep-21: Radium 226 Prep Batch 160-433443: The following samples were prepared at a reduced aliquot due to yellow and brown discoloration: MW-104 (400-172358-4). Sample 480-155414-D-13 was prepared at a reduced aliquot due to limited volume.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client Sample ID: MW-102

Lab Sample ID: 400-172358-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D Method	Prep Type
Chloride	33.3		1.00	0.892	mg/L	1	9056	Total/NA
Fluoride	0.343		0.200	0.0820	mg/L	1	9056	Total/NA
Sulfate - DL	279		10.0	7.00	mg/L	10	9056	Total/NA
Antimony	0.000101	JB	0.00200	0.0000213	mg/L	1	6020A	Total
								Recoverable
Arsenic	0.00414	J	0.00500	0.000118	mg/L	1	6020A	Total
Devices	0.0500		0.000	0 000070			00004	Recoverable
Barium	0.0596	JB	0.200	0.000270	mg/L	1	6020A	l otal
Beryllium	0 000134		0.00200	0.000102	ma/l		60204	Total
Derymann	0.000134	5	0.00200	0.000102	ilig/L	i	0020A	Tulai Recoverable
Boron	0.108	JВ	1.00	0.00339	ma/L	1	6020A	Total
					0			Recoverable
Calcium	80.9		1.00	0.0412	mg/L	1	6020A	Total
								Recoverable
Chromium	0.00140	JB	0.00300	0.000339	mg/L	1	6020A	Total
0 - h - H	0.00000		0.00500	0.0000040			00004	Recoverable
Cobalt	0.00286	JB	0.00500	0.0000218	mg/L	1	6020A	Total
Iron	5880		50.0	14 1	uo/l	1	60204	Recoverable
	0000		50.0	14.1	ug/L	1	00207	Recoverable
Lead	0.000164	J	0.00500	0.0000675	ma/L		6020A	Total
					0			Recoverable
Magnesium	40900		1000	82.7	ug/L	1	6020A	Total
								Recoverable
Molybdenum	0.00112	J	0.0100	0.000873	mg/L	1	6020A	Total
NP-11			4.66	0.040			00004	Recoverable
NICKEI	2.52	В	1.00	0.312	ug/L	1	6020A	Total
Sodium	123000	в	1000	251	ua/l	1	6020A	Total
Coulum	120000	D	1000	201	ugit		0020/1	Recoverable
Zinc	0.00362	J	0.00500	0.00322	mg/L	1	6020A	Total
					-			Recoverable
рН	6.96	HF			SU	1	9040C	Total/NA
Temperature	24.4	HF			Degrees C	1	9040C	Total/NA
Specific Conductance	1070		5.00	5.00	umhos/cm	1	9050A	Total/NA
Total Organic Carbon	0.727	J	1.00	0.500	mg/L	1	9060A	Total/NA
TOC Result 1	0.721	J	1.00	0.500	mg/L	1	9060A	Total/NA
TOC Result 2	0.753	J	1.00	0.500	mg/L	1	9060A	Total/NA
TOC Result 3	0.732	J	1.00	0.500	mg/L	1	9060A	Total/NA
TOC Result 4	0.702	J	1.00	0.500	mg/L	1	9060A	Total/NA
Total Organic Carbon - Quad	0.727	J	1.00	0.500	mg/L	1	9060A	Total/NA
Alkalinity, Total	316		1.00	0.980	mg/L	1	SM 2320B	Total/NA
Total Dissolved Solids	760		10.0	6.80	mg/L	1	SM 2540C	Total/NA
_					-			

Client Sample ID: MW-105

Lab Sample ID: 400-172358-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	9.34		1.00	0.892	mg/L	1	_	9056	Total/NA
Fluoride	0.638		0.200	0.0820	mg/L	1		9056	Total/NA
Sulfate	37.6		1.00	0.700	mg/L	1		9056	Total/NA
Lithium	0.0278	J	0.0500	0.00959	mg/L	1		6010C	Total
Antimony	0.000186	JB	0.00200	0.0000213	mg/L	1		6020A	Recoverable Total Recoverable

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Pensacola

Client Sample ID: MW-105 (Continued)

Lab Sample ID: 400-172358-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.00186	J	0.00500	0.000118	mg/L	1	_	6020A	Total
									Recoverable
Barium	0.288	В	0.200	0.000270	mg/L	1		6020A	Total
									Recoverable
Beryllium	0.000398	J	0.00200	0.000102	mg/L	1		6020A	Total
Poron	0 349	ID	1.00	0 00330	ma/l	1		60204	Recoverable
Вогоп	0.540	JD	1.00	0.00339	ilig/L	1		0020A	l otal Recoverable
Calcium	58.6		1 00	0 0412	ma/l	1		6020A	Total
	00.0			0.0.1		·		0020/1	Recoverable
Chromium	0.00784	В	0.00300	0.000339	mg/L	1		6020A	Total
					-				Recoverable
Cobalt	0.00435	JВ	0.00500	0.0000218	mg/L	1		6020A	Total
									Recoverable
Iron	10100		50.0	14.1	ug/L	1		6020A	Total
	0.00000		0.00500						Recoverable
Lead	0.00326	J	0.00500	0.0000675	mg/L	1		6020A	Total
Magnosium	22000		1000	92.7	ug/l	1		60204	Recoverable
Magnesium	22000		1000	02.7	uy/L	1		0020A	l otal Recoverable
Molybdenum	0 00231	J	0 0100	0 000873	ma/l	1		6020A	Total
	0.00201	C C	010100	0.000010		·		0020/1	Recoverable
Nickel	7.91	В	1.00	0.312	ug/L	1		6020A	Total
					-				Recoverable
Sodium	122000	В	1000	251	ug/L	1		6020A	Total
									Recoverable
Thallium	0.0000510	J	0.00100	0.0000360	mg/L	1		6020A	Total
7	0.0404		0.00500	0 00000					Recoverable
ZINC	0.0161		0.00500	0.00322	mg/L	1		6020A	Total
Chemical Oxygen Demand	10.1		10.0	6.40	ma/l	1		410.4	Recoverable
	7.94		10.0	0.40	en en	1		410.4 0040C	Total/NA
Tomporatura	7.04				SU Dogrado C	1		90400	
	24.0	пг	5.00	F 00	Degrees C	1		90400	
Specific Conductance	839		5.00	5.00	umnos/cm	1		9050A	
	0.792	J	1.00	0.500	mg/L	1		9060A	Total/NA
TOC Result 1	0.793	J	1.00	0.500	mg/L	1		9060A	Total/NA
TOC Result 2	0.793	J	1.00	0.500	mg/L	1		9060A	Total/NA
TOC Result 3	0.791	J	1.00	0.500	mg/L	1		9060A	Total/NA
TOC Result 4	0.791	J	1.00	0.500	mg/L	1		9060A	Total/NA
Total Organic Carbon - Quad	0.792	J	1.00	0.500	mg/L	1		9060A	Total/NA
Alkalinity, Total	484		1.00	0.980	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	548		5.00	3.40	mg/L	1		SM 2540C	Total/NA

Client Sample ID: MW-110

Lab Sample ID: 400-172358-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	11.1		1.00	0.892	mg/L	1	_	9056	Total/NA
Fluoride	0.229		0.200	0.0820	mg/L	1		9056	Total/NA
Sulfate - DL	70.0		5.00	3.50	mg/L	5		9056	Total/NA
Antimony	0.000130	JB	0.00200	0.0000213	mg/L	1		6020A	Total Recoverable
Arsenic	0.00118	J	0.00500	0.000118	mg/L	1		6020A	Total
Barium	0.0535	JB	0.200	0.000270	mg/L	1		6020A	Total

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Pensacola

Client Sample ID: MW-110 (Continued)

Lab Sample ID: 400-172358-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	DM	ethod	Prep Type
Boron	0.0716	JB	1.00	0.00339	mg/L	1	60	020A	Total
									Recoverable
Calcium	38.9		1.00	0.0412	mg/L	1	60	020A	Total
	0.00047		0 00000	0 000000			0.0		Recoverable
Chromium	0.00217	JВ	0.00300	0.000339	mg/L	1	60	J20A	Total
Cobalt	0 000827		0.00500	0.0000218	ma/l		60	200	Recoverable
Cobait	0.000827	<u> </u>	0.00500	0.0000210	IIIg/L	I	00	J20A	l otal Deceverable
Iron	5130		50.0	14 1	ua/l	1	60	020A	Total
	0.00		0010		~ <u>9</u> , _				Recoverable
Lead	0.000539	J	0.00500	0.0000675	mg/L	1	60	020A	Total
					-				Recoverable
Magnesium	20200		1000	82.7	ug/L	1	60	020A	Total
									Recoverable
Nickel	3.57	В	1.00	0.312	ug/L	1	60	020A	Total
	00000		1000	054			0.0		Recoverable
Sodium	32900	В	1000	251	ug/L	1	60	J20A	Total
Zino	0 00304		0.00500	0 00322	ma/l	1	60	60204	Recoverable
	0.00334	5	0.00000	0.00322	ing/L		00	J20A	10lai Recoverable
рН	7.26	HF			SU	1	90	040C	Total/NA
Temperature	24.8	HF			Degrees C	1	90	040C	Total/NA
Specific Conductance	430		5 00	5 00	umhos/cm	1	90)50A	Total/NA
Total Organic Carbon	0 761	J	1 00	0 500	ma/l	1	90	060A	Total/NA
TOC Result 1	0 797		1.00	0.500	ma/l	1	90	060A	Total/NA
TOC Result 2	0.775		1.00	0.500	mg/L		90	160A	Total/NA
	0.741	1	1.00	0.000	mg/L	1	90		Total/NA
	0.741	5	1.00	0.000	mg/L	1	00		Total/NA
Total Organia Carbon Quad	0.733	J	1.00	0.500	mg/L		90		
	0.701	J	1.00	0.000	mg/L	1	90	100A	
Aikainiity, Totai	158		1.00	0.980	mg/L	1	51		
I OTAI DISSOIVED SOLIDS	296		5.00	3.40	mg/L	1	SI	W 2540C	i otal/NA

Client Sample ID: MW-104

Lab Sample ID: 400-172358-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	12.7		1.00	0.892	mg/L	1	_	9056	Total/NA
Fluoride	0.129	J	0.200	0.0820	mg/L	1		9056	Total/NA
Sulfate - DL	513		20.0	14.0	mg/L	20		9056	Total/NA
Lithium	0.0261	J	0.0500	0.00959	mg/L	1		6010C	Total
									Recoverable
Antimony	0.000173	JB	0.00200	0.0000213	mg/L	1		6020A	Total
									Recoverable
Arsenic	0.00174	J	0.00500	0.000118	mg/L	1		6020A	Total
,									Recoverable
Barium	0.0734	JB	0.200	0.000270	mg/L	1		6020A	Total
									Recoverable
Beryllium	0.000142	J	0.00200	0.000102	mg/L	1		6020A	Total
5	0.0705		4.00						Recoverable
Boron	0.0765	JB	1.00	0.00339	mg/L	1		6020A	Total
0.11				0.0440				00000	Recoverable
Calcium	221		1.00	0.0412	mg/L	1		6020A	Total
Chara misure	0.0470	Б	0 00000	0.000000		4		C000 A	Recoverable
Chromium	0.0178	В	0.00300	0.000339	mg/L	1		6020A	Total
Oshalt.	0.00404		0.00500	0.0000040		4		C000 A	Recoverable
Codait	0.00164	JВ	0.00500	0.0000218	mg/∟	1		6020A	Iotal
									Recoverable

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Pensacola
Client Sample ID: MW-104 (Continued)

Job ID: 400-172358-1 SDG: D.B. Wilson Station

Lab Sample ID: 400-172358-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D Metho	d Prep Type
Iron	6280		50.0	14.1	ug/L	1	6020A	Total
								Recoverable
Lead	0.000785	J	0.00500	0.0000675	mg/L	1	6020A	Total
								Recoverable
Magnesium	81200		1000	82.7	ug/L	1	6020A	Total
					<u>.</u>			Recoverable
Molybdenum	0.00319	J	0.0100	0.000873	mg/L	1	6020A	Total
		_	4.00	0.040				Recoverable
Nickel	3.96	В	1.00	0.312	ug/L	1	6020A	Total
	00.400	5	1000	054			00004	Recoverable
Soaium	80400	В	1000	251	ug/L	1	6020A	Total
7	0 00000		0.00500	0 00000	······································		0000	Recoverable
ZINC	0.00600		0.00500	0.00322	mg/L	1	6020A	lotal
	7.00				<u></u>	1	00400	Recoverable
pn - ·	7.32				50	1	90400	Total/NA
Iemperature	24.8	HF			Degrees C	1	9040C	I otal/NA
Specific Conductance	1550		5.00	5.00	umhos/cm	1	9050A	Total/NA
Total Organic Carbon	0.679	J	1.00	0.500	mg/L	1	9060A	Total/NA
TOC Result 1	0.708	J	1.00	0.500	mg/L	1	9060A	Total/NA
TOC Result 2	0.653	J	1.00	0.500	mg/L	1	9060A	Total/NA
TOC Result 3	0.669	J	1.00	0.500	mg/L	1	9060A	Total/NA
TOC Result 4	0.686	J	1.00	0.500	mg/L	1	9060A	Total/NA
Total Organic Carbon - Quad	0.679	J	1.00	0.500	mg/L	1	9060A	Total/NA
Alkalinity, Total	468		1.00	0.980	mg/L	1	SM 23	20B Total/NA
Total Dissolved Solids	1360		10.0	6.80	mg/L	1	SM 25	40C Total/NA

Client Sample ID: MW-7

Lab Sample ID: 400-172358-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	32.0		1.00	0.892	mg/L	1	_	9056	Total/NA
Fluoride	0.222		0.200	0.0820	mg/L	1		9056	Total/NA
Sulfate - DL	1030		50.0	35.0	mg/L	50		9056	Total/NA
Lithium	0.0323	J	0.0500	0.00959	mg/L	1		6010C	Total
									Recoverable
Antimony	0.000242	JB	0.00200	0.0000213	mg/L	1		6020A	Total
									Recoverable
Arsenic	0.00423	J	0.00500	0.000118	mg/L	1		6020A	Total
Darium	0.0164		0.000	0.000070				60204	Recoverable
Banum	0.0104	JB	0.200	0.000270	mg/∟	I		6020A	Iotal
Boron	1 75	в	1.00	0 00330	ma/l	1		60204	Recoverable
Beron	1.70	D	1.00	0.00000	iiig/∟	I		00207	Recoverable
Calcium	329		1.00	0.0412	ma/L	1		6020A	Total
					5				Recoverable
Chromium	0.0247	В	0.00300	0.000339	mg/L	1		6020A	Total
									Recoverable
Cobalt	0.00236	JB	0.00500	0.0000218	mg/L	1		6020A	Total
									Recoverable
Iron	7860		50.0	14.1	ug/L	1		6020A	Total
	0.0000.40								Recoverable
Lead	0.000348	J	0.00500	0.0000675	mg/L	1		6020A	Total
Magnaaium	122000		1000	007	ug/l	1		60204	Recoverable
Maynesium	133000		1000	02.7	uy/L	I		0020A	I OTAI Recoverable
Molybdenum	0 0142		0.0100	0 000873	ma/l	1		6020A	Total
	0.0112		0.0.00	0.000010					Recoverable

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-7 (Continued)

Job ID: 400-172358-1 SDG: D.B. Wilson Station

Lab Sample ID: 400-172358-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D Method	Prep Type	
Nickel	7.22	В	1.00	0.312	ug/L	1	6020A	Total	4
								Recoverable	
Selenium	0.000427	J	0.0100	0.000348	mg/L	1	6020A	Total	5
	00400	5	4000	054			00004	Recoverable	
Soaium	36100	В	1000	251	ug/L	1	6020A	Total	
Zinc	0.00484		0.00500	0 00322	ma/l		60204	Recoverable	
	0.00404	5	0.00500	0.00322	ilig/L	I	0020A	Total Recoverable	
На	7.05	HF			SU	1	9040C	Total/NA	
Temperature	24.5	HF			Degrees C	1	9040C	Total/NA	0
Specific Conductance	1990		5.00	5.00	umhos/cm	1	9050A	Total/NA	0
Total Organic Carbon	1.25		1.00	0.500	mg/L	1	9060A	Total/NA	0
TOC Result 1	1.25		1.00	0.500	mg/L	1	9060A	Total/NA	9
TOC Result 2	1.27		1.00	0.500	mg/L	1	9060A	Total/NA	
TOC Result 3	1.24		1.00	0.500	mg/L	1	9060A	Total/NA	
TOC Result 4	1.23		1.00	0.500	mg/L	1	9060A	Total/NA	
Total Organic Carbon - Quad	1.25		1.00	0.500	mg/L	1	9060A	Total/NA	
Alkalinity, Total	320		1.00	0.980	mg/L	1	SM 2320B	Total/NA	
Total Dissolved Solids	1820		10.0	6.80	mg/L	1	SM 2540C	Total/NA	
_									10
									13

Sample Summary

Client: Big Rivers Electric Corporation Project/Site: Semi-Annual

Job ID: 400-172358-1 SDG: D.B. Wilson Station

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
400-172358-1	MW-102	Water	06/27/19 09:10	06/28/19 13:08
400-172358-2	MW-105	Water	06/27/19 10:51	06/28/19 13:08
400-172358-3	MW-110	Water	06/27/19 12:25	06/28/19 13:08
400-172358-4	MW-104	Water	06/27/19 13:55	06/28/19 13:08
400-172358-5	MW-7	Water	06/27/19 15:10	06/28/19 13:08

Client Sample Results

Client: Big Rivers Electric Corporation Project/Site: Semi-Annual Job ID: 400-172358-1 SDG: D.B. Wilson Station

Client Sample ID: MW-102 Date Collected: 06/27/19 09:10 Date Received: 06/28/19 13:08

Lab Sample ID: 400-172358-1 Matrix: Water

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	33.3		1.00	0.892	ma/L			07/01/19 12:21	1
Fluoride	0.343		0.200	0.0820	mg/L			07/01/19 12:21	1
Mathadi 0056 Aniona Ian Ch		như Di							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analvzed	Dil Fac
Sulfate	279		10.0	7.00	mg/L			07/02/19 16:27	10
Method: 6010C - Metals (ICP) -	Total Reco	overable							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.0500	0.00959	mg/L		07/16/19 12:31	07/17/19 08:26	1
Mathad: 6020A - Matale (ICP/M	IS) - Total I	Recoverabl	•						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.000101	JB	0.00200	0.0000213	mg/L		07/16/19 12:33	07/17/19 13:48	1
Arsenic	0.00414	J	0.00500	0.000118	mg/L		07/16/19 12:33	07/17/19 13:48	1
Barium	0.0596	JB	0.200	0.000270	mg/L		07/16/19 12:33	07/17/19 13:48	1
Bervllium	0.000134	J	0.00200	0.000102	mg/L		07/16/19 12:33	07/17/19 13:48	1
Boron	0.108	JB	1.00	0.00339	mg/L		07/16/19 12:33	07/18/19 12:20	1
Cadmium	ND		0.00100	0.000152	mg/L		07/16/19 12:33	07/17/19 13:48	1
Calcium	80.9		1.00	0.0412	mg/L		07/16/19 12:33	07/17/19 13:48	1
Chromium	0.00140	JB	0.00300	0.000339	mg/L		07/16/19 12:33	07/17/19 13:48	1
Cobalt	0.00286	JB	0.00500	0.0000218	mg/L		07/16/19 12:33	07/17/19 13:48	1
Iron	5880		50.0	14.1	ug/L		07/16/19 12:33	07/17/19 13:48	1
Lead	0.000164	J	0.00500	0.0000675	mg/L		07/16/19 12:33	07/17/19 13:48	1
Magnesium	40900		1000	82.7	ug/L		07/16/19 12:33	07/17/19 13:48	1
Molybdenum	0.00112	J	0.0100	0.000873	mg/L		07/16/19 12:33	07/17/19 13:48	1
Nickel	2.52	В	1.00	0.312	ug/L		07/16/19 12:33	07/17/19 13:48	1
Selenium	ND		0.0100	0.000348	mg/L		07/16/19 12:33	07/17/19 13:48	1
Sodium	123000	В	1000	251	ug/L		07/16/19 12:33	07/17/19 13:48	1
Thallium	ND		0.00100	0.0000360	mg/L		07/16/19 12:33	07/17/19 13:48	1
Zinc	0.00362	J	0.00500	0.00322	mg/L		07/16/19 12:33	07/17/19 13:48	1
Method: 7470A - Mercury (CV/	AA)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.200	0.101	ug/L		07/10/19 08:40	07/10/19 18:03	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac

Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
ND		10.0	6.40	mg/L			07/11/19 14:05	1
6.96	HF			SU			06/29/19 22:17	1
24.4	HF			Degrees C			06/29/19 22:17	1
1070		5.00	5.00	umhos/cm			06/29/19 19:57	1
0.727	J	1.00	0.500	mg/L			06/29/19 10:28	1
0.721	J	1.00	0.500	mg/L			06/29/19 10:28	1
0.753	J	1.00	0.500	mg/L			06/29/19 10:28	1
0.732	J	1.00	0.500	mg/L			06/29/19 10:28	1
0.702	J	1.00	0.500	mg/L			06/29/19 10:28	1
0.727	J	1.00	0.500	mg/L			06/29/19 10:28	1
316		1.00	0.980	mg/L			07/01/19 12:42	1
760		10.0	6.80	mg/L			07/02/19 15:23	1
	Result ND 6.96 24.4 1070 0.727 0.721 0.753 0.732 0.702 0.727 316 760	Result Qualifier ND 6.96 4.4 HF 1070 0.727 0.727 J 0.723 J 0.753 J 0.702 J 0.702 J 0.727 J 0.763 J 0.764 HF	Result Qualifier RL ND 10.0 6.96 HF 24.4 HF 1070 5.00 0.727 J 1.00 0.721 J 1.00 0.753 J 1.00 0.732 J 1.00 0.702 J 1.00 0.727 J 1.00 0.760 10.0 10.0	Result Qualifier RL MDL ND 10.0 6.40 6.96 HF 6.40 24.4 HF 1070 5.00 5.00 0.727 J 1.00 0.500 0.721 J 1.00 0.500 0.753 J 1.00 0.500 0.732 J 1.00 0.500 0.702 J 1.00 0.500 0.727 J 0.00 0.500 0.732 J 1.00 0.500 0.727 J 1.00 0.500 0.727 J 0.00 0.500 316 1.00 0.980 6.80	Result Qualifier RL MDL Unit ND 10.0 6.40 mg/L 6.96 HF SU 24.4 HF Degrees C 1070 5.00 5.00 umhos/cm 0.727 J 1.00 0.500 mg/L 0.721 J 1.00 0.500 mg/L 0.753 J 1.00 0.500 mg/L 0.732 J 1.00 0.500 mg/L 0.702 J 1.00 0.500 mg/L 0.727 J 1.00 0.500 mg/L 0.732 J 1.00 0.500 mg/L 0.702 J 1.00 0.500 mg/L 0.727 J 1.00 0.500 mg/L 316 1.00 0.980 mg/L 760 10.0 6.80 mg/L	Result Qualifier RL MDL Unit D ND 10.0 6.40 mg/L mg/L 6.96 HF SU Degrees C 24.4 HF Degrees C Degrees C 1070 5.00 5.00 mg/L 0.727 J 1.00 0.500 mg/L 0.721 J 1.00 0.500 mg/L 0.753 J 1.00 0.500 mg/L 0.732 J 1.00 0.500 mg/L 0.702 J 1.00 0.500 mg/L 0.727 J 1.00 0.500 mg/L 0.722 J 1.00 0.500 mg/L 0.727 J 1.00 0.500 mg/L 316 1.00 0.980 mg/L 760 10.0 6.80 mg/L	Result Qualifier RL MDL Unit D Prepared ND 10.0 6.40 mg/L mg/L <td< td=""><td>Result Qualifier RL MDL Unit D Prepared Analyzed ND 10.0 6.40 mg/L 07/11/19 14:05 07/11/19 14:05 6.96 HF SU 06/29/19 22:17 06/29/19 22:17 24.4 HF Degrees C 06/29/19 12:17 1070 5.00 5.00 umhos/cm 06/29/19 19:57 0.727 J 1.00 0.500 mg/L 06/29/19 10:28 0.721 J 1.00 0.500 mg/L 06/29/19 10:28 0.753 J 1.00 0.500 mg/L 06/29/19 10:28 0.732 J 1.00 0.500 mg/L 06/29/19 10:28 0.702 J 1.00 0.500 mg/L 06/29/19 10:28 0.727 J 1.00 0.500 mg/L 06/29/19 10:28 0.727 J 1.00 0.500 mg/L 06/29/19 10:28 0.727 J 1.00 0.500 mg/L 06/29/19 10:2</td></td<>	Result Qualifier RL MDL Unit D Prepared Analyzed ND 10.0 6.40 mg/L 07/11/19 14:05 07/11/19 14:05 6.96 HF SU 06/29/19 22:17 06/29/19 22:17 24.4 HF Degrees C 06/29/19 12:17 1070 5.00 5.00 umhos/cm 06/29/19 19:57 0.727 J 1.00 0.500 mg/L 06/29/19 10:28 0.721 J 1.00 0.500 mg/L 06/29/19 10:28 0.753 J 1.00 0.500 mg/L 06/29/19 10:28 0.732 J 1.00 0.500 mg/L 06/29/19 10:28 0.702 J 1.00 0.500 mg/L 06/29/19 10:28 0.727 J 1.00 0.500 mg/L 06/29/19 10:28 0.727 J 1.00 0.500 mg/L 06/29/19 10:28 0.727 J 1.00 0.500 mg/L 06/29/19 10:2

07/02/19 12:58 08/19/19 16:03

Client Sample ID: MW-102 Date Collected: 06/27/19 09:10 **Date Receive**

Date Collected: (Date Received: (06/27/19 09:10 06/28/19 13:08)							Matrix	: Water
 Method: 903.0 -	Radium-226	(GFPC)								
		. ,	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.135	U	0.247	0.247	1.00	0.431	pCi/L	07/02/19 12:58	08/19/19 16:03	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac

Method: 904.0 - Radium-228 (GFPC)

83.6

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2 σ+/-)	(2 σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0521	U	0.215	0.215	1.00	0.379	pCi/L	07/02/19 14:27	08/19/19 09:07	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.6		40 - 110					07/02/19 14:27	08/19/19 09:07	1
Y Carrier	92.3		40 - 110					07/02/19 14:27	08/19/19 09:07	1

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

40 - 110

			Count	Total					
			Uncert.	Uncert.					
Analyte	Result	Qualifier	(2 σ+/-)	(2 σ+/-)	RL	MDC Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226	0.187	U	0.327	0.327	5.00	0.431 pCi/L		08/21/19 08:52	1
+ 228									

Ba Carrier

Lab Sample ID: 400-172358-1

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Client Sample ID: MW-105 Date Collected: 06/27/19 10:51 Date Received: 06/28/19 13:08

Total Organic Carbon

Total Organic Carbon - Quad

TOC Result 1

TOC Result 2

TOC Result 3

TOC Result 4

Alkalinity, Total

Total Dissolved Solids

Lab Sample ID: 400-172358-2 **Matrix: Water**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Chloride	9.34		1.00	0.892	mg/L			07/01/19 13:30	
Fluoride	0.638		0.200	0.0820	mg/L			07/01/19 13:30	
Sulfate	37.6		1.00	0.700	mg/L			07/01/19 13:30	1
Method: 6010C - Metals (ICI	P) - Total Reco	overable							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.0278	J	0.0500	0.00959	mg/L		07/16/19 12:31	07/17/19 08:31	
Method: 6020A - Metals (ICI	P/MS) - Total F	Recoverable)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.000186	JB	0.00200	0.0000213	mg/L		07/16/19 12:33	07/17/19 13:51	- 1
Arsenic	0.00186	J	0.00500	0.000118	mg/L		07/16/19 12:33	07/17/19 13:51	
Barium	0.288	В	0.200	0.000270	mg/L		07/16/19 12:33	07/17/19 13:51	
Beryllium	0.000398	J	0.00200	0.000102	mg/L		07/16/19 12:33	07/17/19 13:51	
Boron	0.348	JB	1.00	0.00339	mg/L		07/16/19 12:33	07/18/19 12:23	
Cadmium	ND		0.00100	0.000152	mg/L		07/16/19 12:33	07/17/19 13:51	
Calcium	58.6		1.00	0.0412	mg/L		07/16/19 12:33	07/17/19 13:51	• • • • • • •
Chromium	0.00784	В	0.00300	0.000339	mg/L		07/16/19 12:33	07/17/19 13:51	
Cobalt	0.00435	JB	0.00500	0.0000218	mg/L		07/16/19 12:33	07/17/19 13:51	
Iron	10100		50.0	14.1	ug/L		07/16/19 12:33	07/17/19 13:51	
Lead	0.00326	J	0.00500	0.0000675	mg/L		07/16/19 12:33	07/17/19 13:51	
Magnesium	22000		1000	82.7	ug/L		07/16/19 12:33	07/17/19 13:51	
Molybdenum	0.00231	J	0.0100	0.000873	mg/L		07/16/19 12:33	07/17/19 13:51	
Nickel	7.91	В	1.00	0.312	ug/L		07/16/19 12:33	07/17/19 13:51	
Selenium	ND		0.0100	0.000348	mg/L		07/16/19 12:33	07/17/19 13:51	
Sodium	122000	В	1000	251	ug/L		07/16/19 12:33	07/17/19 13:51	
Thallium	0.0000510	J	0.00100	0.0000360	mg/L		07/16/19 12:33	07/17/19 13:51	
Zinc	0.0161		0.00500	0.00322	mg/L		07/16/19 12:33	07/17/19 13:51	1
Method: 7470A - Mercury (C	CVAA)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.200	0.101	ug/L		07/10/19 08:40	07/10/19 18:05	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	10.1		10.0	6.40	mg/L			07/11/19 14:05	
рН	7.84	HF			SU			06/29/19 22:17	
Temperature	24.8	HF			Degrees C			06/29/19 22:17	
Specific Conductance	839		5.00	5.00	umhos/cm			06/29/19 19:57	
Total Organic Carbon	0.792	J	1.00	0.500	mg/L			06/29/19 10:28	-

06/29/19 10:28

06/29/19 10:28

06/29/19 10:28

06/29/19 10:28

06/29/19 10:28

07/01/19 12:51

07/02/19 15:23

1.00

1.00

1.00

1.00

1.00

1.00

5.00

0.500 mg/L

0.500 mg/L

0.500 mg/L

0.500 mg/L

0.500 mg/L

0.980 mg/L

3.40 mg/L

0.793 J

0.793 J

0.791 J

0.791 J

0.792 J

484

548

1

1

1

1

1

1

Client Sample ID: MW-105 Date Collected: 06/27/19 10:51 Date Received: 06/28/19 13:08

Method: 903.0 -	Radium-226	(GFPC)								
			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0989	U	0.323	0.323	1.00	0.614	pCi/L	07/02/19 12:58	08/19/19 16:03	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.3		40 - 110					07/02/19 12:58	08/19/19 16:03	1

Method: 904.0 - Radium-228 (GFPC)

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.460	U	0.526	0.527	1.00	0.865	pCi/L	07/02/19 14:27	08/19/19 09:07	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.3		40 - 110					07/02/19 14:27	08/19/19 09:07	1
Y Carrier	84.9		40 - 110					07/02/19 14:27	08/19/19 09:07	1

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

			Count	Total					
			Uncert.	Uncert.					
Analyte	Result	Qualifier	(2 σ+/-)	(2 σ+/-)	RL	MDC Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.558	U	0.617	0.618	5.00	0.865 pCi/L		08/21/19 08:52	1

Lab Sample ID: 400-172358-2

Matrix: Water

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Client Sample Results

Client: Big Rivers Electric Corporation Project/Site: Semi-Annual Job ID: 400-172358-1 SDG: D.B. Wilson Station

Client Sample ID: MW-110 Date Collected: 06/27/19 12:25 Date Received: 06/28/19 13:08

Lab Sample ID: 400-172358-3 Matrix: Water

watrix: Water

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Method: 9056 - Anions, Ion	Chromatogra	phy							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	11.1		1.00	0.892	mg/L			07/01/19 13:53	1
Fluoride	0.229		0.200	0.0820	mg/L			07/01/19 13:53	1
Method: 9056 - Anions, Ion	Chromatogra	phy - DL							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	70.0		5.00	3.50	mg/L			07/02/19 16:50	5
Method: 6010C - Metals (ICI	P) - Total Reco	overable							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.0500	0.00959	mg/L		07/16/19 12:31	07/17/19 08:36	1
Method: 6020A - Metals (ICI	P/MS) - Total F	Recoverable	e						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.000130	JB	0.00200	0.0000213	mg/L		07/16/19 12:33	07/17/19 13:58	1
Arsenic	0.00118	J	0.00500	0.000118	mg/L		07/16/19 12:33	07/17/19 13:58	1
Barium	0.0535	JB	0.200	0.000270	mg/L		07/16/19 12:33	07/17/19 13:58	1
Beryllium	ND		0.00200	0.000102	mg/L		07/16/19 12:33	07/17/19 13:58	1
Boron	0.0716	JB	1.00	0.00339	mg/L		07/16/19 12:33	07/18/19 12:26	1
Cadmium	ND		0.00100	0.000152	mg/L		07/16/19 12:33	07/17/19 13:58	1
Calcium	38.9		1.00	0.0412	mg/L		07/16/19 12:33	07/17/19 13:58	1
Chromium	0.00217	JB	0.00300	0.000339	mg/L		07/16/19 12:33	07/17/19 13:58	1
Cobalt	0.000827	JB	0.00500	0.0000218	mg/L		07/16/19 12:33	07/17/19 13:58	1
Iron	5130		50.0	14.1	ug/L		07/16/19 12:33	07/17/19 13:58	1
Lead	0.000539	J	0.00500	0.0000675	mg/L		07/16/19 12:33	07/17/19 13:58	1
Magnesium	20200		1000	82.7	ug/L		07/16/19 12:33	07/17/19 13:58	1
Molybdenum	ND		0.0100	0.000873	mg/L		07/16/19 12:33	07/17/19 13:58	1
Nickel	3.57	В	1.00	0.312	ug/L		07/16/19 12:33	07/17/19 13:58	1
Selenium	ND		0.0100	0.000348	mg/L		07/16/19 12:33	07/17/19 13:58	1
Sodium	32900	В	1000	251	ug/L		07/16/19 12:33	07/17/19 13:58	1
Thallium	ND		0.00100	0.0000360	mg/L		07/16/19 12:33	07/17/19 13:58	1
Zinc	0.00394	J	0.00500	0.00322	mg/L		07/16/19 12:33	07/17/19 13:58	1
Method: 7470A - Mercury (C	VAA)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.200	0.101	ug/L		07/10/19 08:40	07/10/19 18:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10.0	6.40	mg/L			07/11/19 14:05	1
pH	7.26	HF			SU			06/29/19 22:17	1
Temperature	24.8	HF			Degrees C			06/29/19 22:17	1
Specific Conductance	430		5.00	5.00	umhos/cm			06/29/19 19:57	1
Total Organic Carbon	0.761	J	1.00	0.500	mg/L			06/29/19 10:28	1
TOC Result 1	0.797	J	1.00	0.500	mg/L			06/29/19 10:28	1
TOC Result 2	0.775	J	1.00	0.500	mg/L			06/29/19 10:28	1
TOC Result 3	0.741	J	1.00	0.500	mg/L			06/29/19 10:28	1
TOC Result 4	0.733	J	1.00	0.500	mg/L			06/29/19 10:28	1
Total Organic Carbon - Quad	0.761	J	1.00	0.500	mg/L			06/29/19 10:28	1
Alkalinity, Total	158		1.00	0.980	mg/L			07/01/19 12:56	1
Total Dissolved Solids	296		5.00	3.40	mg/L			07/02/19 15:23	1

Matrix: Water

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Lab Sample ID: 400-172358-3

Client Sample ID: MW-110 Date Collected: 06/27/19 12:25 Date Received: 06/28/19 13:08

Method: 903.0 -	Radium-226	(GFPC)								
		. ,	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.275	U	0.209	0.211	1.00	0.297	pCi/L	07/02/19 12:58	08/19/19 16:05	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.9		40 - 110					07/02/19 12:58	08/19/19 16:05	1

Method: 904.0 - Radium-228 (GFPC)

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2 σ+/-)	(2 σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.541		0.276	0.280	1.00	0.405	pCi/L	07/02/19 14:27	08/19/19 09:08	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.9		40 - 110					07/02/19 14:27	08/19/19 09:08	1
Y Carrier	84.9		40 - 110					07/02/19 14:27	08/19/19 09:08	1

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

			Count	Total					
			Uncert.	Uncert.					
Analyte	Result	Qualifier	(2 σ+/-)	(2σ+/-)	RL	MDC Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.816		0.346	0.351	5.00	0.405 pCi/L		08/21/19 08:52	1

Client Sample Results

Client: Big Rivers Electric Corporation Project/Site: Semi-Annual

Job ID: 400-172358-1 SDG: D.B. Wilson Station

Client Sample ID: MW-104 Date Collected: 06/27/19 13:55 Date Received: 06/28/19 13:08

Lab Sample ID: 400-172358-4 Matrix: Water

Matrix: Water

5 6

Analyte	Result	Qualifier	RI	МО	Unit	р	Prepared	Analyzed	Dil Fac
Chloride	12.7		1 00	0.892	ma/l			$\overline{07/01/19}$ 14.16	1
Fluoride	0.129	a -	0.200	0.0820	ma/L			07/01/19 14:16	1
	0.120	•	0.200	0.0020					
Method: 9056 - Anions, Ion C	hromatogra	phy - DL							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	513		20.0	14.0	mg/L			07/02/19 17:13	20
Method: 6010C - Metals (ICP)	- Total Reco	overable							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.0261	J	0.0500	0.00959	mg/L		07/16/19 12:31	07/17/19 08:42	1
Method: 6020A - Metals (ICP/	MS) - Total F	Recoverable	a						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.000173	JB	0.00200	0.0000213	mg/L		07/16/19 12:33	07/17/19 14:02	1
Arsenic	0.00174	J	0.00500	0.000118	mg/L		07/16/19 12:33	07/17/19 14:02	1
Barium	0.0734	JB	0.200	0.000270	mg/L		07/16/19 12:33	07/17/19 14:02	1
Beryllium	0.000142	J	0.00200	0.000102	mg/L		07/16/19 12:33	07/17/19 14:02	1
Boron	0.0765	JB	1.00	0.00339	mg/L		07/16/19 12:33	07/18/19 12:30	1
Cadmium	ND		0.00100	0.000152	mg/L		07/16/19 12:33	07/17/19 14:02	1
Calcium	221		1.00	0.0412	mg/L		07/16/19 12:33	07/17/19 14:02	1
Chromium	0.0178	В	0.00300	0.000339	mg/L		07/16/19 12:33	07/17/19 14:02	1
Cobalt	0.00164	JB	0.00500	0.0000218	mg/L		07/16/19 12:33	07/17/19 14:02	1
Iron	6280		50.0	14.1	ug/L		07/16/19 12:33	07/17/19 14:02	1
Lead	0.000785	J	0.00500	0.0000675	mg/L		07/16/19 12:33	07/17/19 14:02	1
Magnesium	81200		1000	82.7	ug/L		07/16/19 12:33	07/17/19 14:02	1
Molybdenum	0.00319	J	0.0100	0.000873	mg/L		07/16/19 12:33	07/17/19 14:02	1
Nickel	3.96	В	1.00	0.312	ug/L		07/16/19 12:33	07/17/19 14:02	1
Selenium	ND		0.0100	0.000348	mg/L		07/16/19 12:33	07/17/19 14:02	1
Sodium	80400	В	1000	251	ug/L		07/16/19 12:33	07/17/19 14:02	1
Thallium	ND		0.00100	0.0000360	mg/L		07/16/19 12:33	07/17/19 14:02	1
Zinc	0.00600		0.00500	0.00322	mg/L		07/16/19 12:33	07/17/19 14:02	1
Method: 7470A - Mercurv (CV	/AA)								
Analyte	, Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.200	0.101	ug/L		07/10/19 08:40	07/10/19 18:07	1

MDL Unit RL Dil Fac Analyte **Result Qualifier** D Prepared Analyzed **Chemical Oxygen Demand** ND 10.0 6.40 mg/L 07/11/19 14:05 1 рΗ 7.32 HF SU 06/29/19 22:17 1 Degrees C Temperature 24.8 HF 06/29/19 22:17 1 5.00 5.00 umhos/cm 06/29/19 19:57 1 **Specific Conductance** 1550 0.500 mg/L **Total Organic Carbon** 0.679 J 1.00 06/29/19 10:28 1 1.00 0.500 mg/L **TOC Result 1** 06/29/19 10:28 1 0.708 J 0.500 mg/L **TOC Result 2** 0.653 J 1.00 06/29/19 10:28 1 **TOC Result 3** 0.669 J 1.00 0.500 mg/L 06/29/19 10:28 1 **TOC Result 4** 1.00 0.500 mg/L 06/29/19 10:28 1 0.686 J 1.00 0.500 mg/L 06/29/19 10:28 **Total Organic Carbon - Quad** 0.679 J 1 0.980 mg/L 1.00 07/01/19 13:14 Alkalinity, Total 468 1 **Total Dissolved Solids** 1360 10.0 6.80 mg/L 07/02/19 15:23 1

Matrix: Water

6

Lab Sample ID: 400-172358-4

Client Sample ID: MW-104 Date Collected: 06/27/19 13:55 Dat 4. 00/00/40 40

Method: 903.0 -	Radium-226	(GFPC)								
		. ,	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.343	U	0.307	0.308	1.00	0.466	pCi/L	07/02/19 12:58	08/19/19 16:04	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.9		40 - 110					07/02/19 12:58	08/19/19 16:04	1

Count Total Uncert. Uncert. Analyte **Result Qualifier** (2**σ**+/-) (2**σ**+/-) MDC Unit RL Prepared Analyzed Dil Fac 0.550 pCi/L 07/02/19 14:27 08/19/19 09:08 0.365 0.369 1.00 Radium-228 0.610 1 Carrier %Yield Qualifier Limits Prepared Analyzed Dil Fac Ba Carrier 85.9 40 - 110 07/02/19 14:27 08/19/19 09:08 1 Y Carrier 86.4 40 - 110 07/02/19 14:27 08/19/19 09:08 1

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

			Count	Total					
			Uncert.	Uncert.					
Analyte	Result	Qualifier	(2 σ+/-)	(2σ+/-)	RL	MDC Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.952		0.477	0.481	5.00	0.550 pCi/L		08/21/19 08:52	1

Client Sample Results

Client: Big Rivers Electric Corporation Project/Site: Semi-Annual Job ID: 400-172358-1 SDG: D.B. Wilson Station

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Client Sample ID: MW-7 Date Collected: 06/27/19 15:10 Date Received: 06/28/19 13:08

Lab Sample ID: 400-172358-5 Matrix: Water

Date Received: 06/28/19 13	5:08								
	on Chromatogra	phy							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	32.0		1.00	0.892	mg/L			07/01/19 14:38	1
Fluoride	0.222		0.200	0.0820	mg/L			07/01/19 14:38	1
_ Method: 9056 - Anions, Io	on Chromatogra	phy - DL							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1030		50.0	35.0	mg/L			07/02/19 18:21	50
	CP) - Total Reco	overable							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.0323	J	0.0500	0.00959	mg/L		07/16/19 12:31	07/17/19 08:47	1
	CP/MS) - Total I	Recoverabl	e						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.000242	JB	0.00200	0.0000213	mg/L		07/16/19 12:33	07/17/19 14:05	1
Arsenic	0.00423	J	0.00500	0.000118	mg/L		07/16/19 12:33	07/17/19 14:05	1
Barium	0.0164	JB	0.200	0.000270	mg/L		07/16/19 12:33	07/17/19 14:05	1
Beryllium	ND		0.00200	0.000102	mg/L		07/16/19 12:33	07/17/19 14:05	1

					•			
Beryllium	ND		0.00200	0.000102	mg/L	07/16/19 12:33	07/17/19 14:05	1
Boron	1.75	В	1.00	0.00339	mg/L	07/16/19 12:33	07/18/19 12:33	1
Cadmium	ND		0.00100	0.000152	mg/L	07/16/19 12:33	07/17/19 14:05	1
Calcium	329		1.00	0.0412	mg/L	07/16/19 12:33	07/17/19 14:05	1
Chromium	0.0247	В	0.00300	0.000339	mg/L	07/16/19 12:33	07/17/19 14:05	1
Cobalt	0.00236	JB	0.00500	0.0000218	mg/L	07/16/19 12:33	07/17/19 14:05	1
Iron	7860		50.0	14.1	ug/L	07/16/19 12:33	07/17/19 14:05	1
Lead	0.000348	J	0.00500	0.0000675	mg/L	07/16/19 12:33	07/17/19 14:05	1
Magnesium	133000		1000	82.7	ug/L	07/16/19 12:33	07/17/19 14:05	1
Molybdenum	0.0142		0.0100	0.000873	mg/L	07/16/19 12:33	07/17/19 14:05	1
Nickel	7.22	В	1.00	0.312	ug/L	07/16/19 12:33	07/17/19 14:05	1
Selenium	0.000427	J	0.0100	0.000348	mg/L	07/16/19 12:33	07/17/19 14:05	1
Sodium	36100	В	1000	251	ug/L	07/16/19 12:33	07/17/19 14:05	1
Thallium	ND		0.00100	0.0000360	mg/L	07/16/19 12:33	07/17/19 14:05	1
Zinc	0.00484	J	0.00500	0.00322	mg/L	07/16/19 12:33	07/17/19 14:05	1
Mathadi 7470A Maraumi								
WELLOU, 7470A - WELCULY	ILVAAI							

Method. 1410A - Mercury (CVA)	~)							
Analyte	Result Qualifier	RL	MDL Ur	nit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	0.200	0.101 ug	/L	_	07/10/19 08:40	07/10/19 18:08	1

General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10.0	6.40	mg/L			07/11/19 14:05	1
pH	7.05	HF			SU			06/29/19 22:17	1
Temperature	24.5	HF			Degrees C			06/29/19 22:17	1
Specific Conductance	1990		5.00	5.00	umhos/cm			06/29/19 19:57	1
Total Organic Carbon	1.25		1.00	0.500	mg/L			06/29/19 10:28	1
TOC Result 1	1.25		1.00	0.500	mg/L			06/29/19 10:28	1
TOC Result 2	1.27		1.00	0.500	mg/L			06/29/19 10:28	1
TOC Result 3	1.24		1.00	0.500	mg/L			06/29/19 10:28	1
TOC Result 4	1.23		1.00	0.500	mg/L			06/29/19 10:28	1
Total Organic Carbon - Quad	1.25		1.00	0.500	mg/L			06/29/19 10:28	1
Alkalinity, Total	320		1.00	0.980	mg/L			07/01/19 13:29	1
Total Dissolved Solids	1820		10.0	6.80	mg/L			07/02/19 16:42	1

Method: 903.0 - Radium-226 (GFPC)

Client Sample ID: MW-7 Date Collected: 06/27/19 15:10 Date Received: 06/28/19 13:08

Lab Sample ID: 400-172358-5

Matrix: Water

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.235	U	0.208	0.209	1.00	0.313	pCi/L	07/02/19 12:58	08/19/19 16:03	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.0		40 - 110					07/02/19 12:58	08/19/19 16:03	1
Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.362		0.259	0.261	1.00	0.403	pCi/L	07/02/19 14:27	08/19/19 09:08	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.0		40 - 110					07/02/19 14:27	08/19/19 09:08	1
Y Carrier	84.9		40 - 110					07/02/19 14:27	08/19/19 09:08	1
	01.0							01102110111.21	00,10,10,00.00	

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

			Count	Total					
			Uncert.	Uncert.					
Analyte	Result	Qualifier	(2 σ+/-)	(2σ+/-)	RL	MDC Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.597		0.332	0.334	5.00	0.403 pCi/L		08/21/19 08:52	1

Dilution Factor

Detection Limit (DoD/DOE)

Estimated Detection Limit (Dioxin)

Limit of Detection (DoD/DOE)

Method Detection Limit

Minimum Level (Dioxin)

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Calculated

Quality Control

Limit of Quantitation (DoD/DOE)

Duplicate Error Ratio (normalized absolute difference)

Decision Level Concentration (Radiochemistry)

Minimum Detectable Activity (Radiochemistry)

Minimum Detectable Concentration (Radiochemistry)

Reporting Limit or Requested Limit (Radiochemistry)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Qualifiers

DER

DL

DLC

EDL

LOD

LOQ

MDA

MDC

MDL

ML

NC

ND

PQL

QC

RER

RPD TEF

TEQ

RL

Dil Fac

DL, RA, RE, IN

Qualifier	Qualifier Description	
F1	MS and/or MSD Recovery is outside acceptance limits.	
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.	4
Metals		
Qualifier	Qualifier Description	
В	Compound was found in the blank and sample.	
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.	
General Che	emistrv	_
Qualifier	Qualifier Description	8
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.	
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.	g
Rad		_
Qualifier	Qualifier Description	
U	Result is less than the sample detection limit.	
Glossary		1
Abbreviation	These commonly used abbreviations may or may not be present in this report.	1
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis	Ľ
%R	Percent Recovery	4
CFL	Contains Free Liquid	
CNF	Contains No Free Liquid	

Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample

HPLC/IC

Analysis Batch: 446394

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total/NA	Water	9056	
400-172358-2	MW-105	Total/NA	Water	9056	
400-172358-3	MW-110	Total/NA	Water	9056	
400-172358-4	MW-104	Total/NA	Water	9056	
400-172358-5	MW-7	Total/NA	Water	9056	
MB 400-446394/4	Method Blank	Total/NA	Water	9056	
LCS 400-446394/5	Lab Control Sample	Total/NA	Water	9056	
LCSD 400-446394/6	Lab Control Sample Dup	Total/NA	Water	9056	
400-172358-1 MS	MW-102	Total/NA	Water	9056	
400-172358-1 MSD	MW-102	Total/NA	Water	9056	

Analysis Batch: 446646

LCS 400-446394/5	Lab Control Sample	I otal/NA	Water	9056		
LCSD 400-446394/6	Lab Control Sample Dup	Total/NA	Water	9056		8
400-172358-1 MS	MW-102	Total/NA	Water	9056		
400-172358-1 MSD	MW-102	Total/NA	Water	9056		9
Analysis Batch: 446	646					10
Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch	
400-172358-1 - DL	MW-102	Total/NA	Water	9056		
400-172358-3 - DL	MW-110	Total/NA	Water	9056		
400-172358-4 - DL	MW-104	Total/NA	Water	9056		
400-172358-5 - DL	MW-7	Total/NA	Water	9056		
MB 400-446646/4	Method Blank	Total/NA	Water	9056		
LCS 400-446646/5	Lab Control Sample	Total/NA	Water	9056		13
LCSD 400-446646/6	Lab Control Sample Dup	Total/NA	Water	9056		

Metals

Prep Batch: 284352

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total/NA	Water	7470A	
400-172358-2	MW-105	Total/NA	Water	7470A	
400-172358-3	MW-110	Total/NA	Water	7470A	
400-172358-4	MW-104	Total/NA	Water	7470A	
400-172358-5	MW-7	Total/NA	Water	7470A	
MB 180-284352/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-284352/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 284460

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total/NA	Water	7470A	284352
400-172358-2	MW-105	Total/NA	Water	7470A	284352
400-172358-3	MW-110	Total/NA	Water	7470A	284352
400-172358-4	MW-104	Total/NA	Water	7470A	284352
400-172358-5	MW-7	Total/NA	Water	7470A	284352
MB 180-284352/1-A	Method Blank	Total/NA	Water	7470A	284352
LCS 180-284352/2-A	Lab Control Sample	Total/NA	Water	7470A	284352

Prep Batch: 284931

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total Recoverable	Water	3005A	
400-172358-2	MW-105	Total Recoverable	Water	3005A	
400-172358-3	MW-110	Total Recoverable	Water	3005A	
400-172358-4	MW-104	Total Recoverable	Water	3005A	
400-172358-5	MW-7	Total Recoverable	Water	3005A	
MB 180-284931/1-A	Method Blank	Total Recoverable	Water	3005A	

QC Association Summary

Job ID: 400-172358-1 SDG: D.B. Wilson Station

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Metals (Continued)

Prep Batch: 284931 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 180-284931/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
Prep Batch: 284933					
Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total Recoverable	Water	3005A	
400-172358-2	MW-105	Total Recoverable	Water	3005A	
400-172358-3	MW-110	Total Recoverable	Water	3005A	
400-172358-4	MW-104	Total Recoverable	Water	3005A	
400-172358-5	MW-7	Total Recoverable	Water	3005A	
MB 180-284933/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-284933/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch	
400-172358-1	MW-102	Total Recoverable	Water	6010C	284931	
400-172358-2	MW-105	Total Recoverable	Water	6010C	284931	
400-172358-3	MW-110	Total Recoverable	Water	6010C	284931	
400-172358-4	MW-104	Total Recoverable	Water	6010C	284931	
400-172358-5	MW-7	Total Recoverable	Water	6010C	284931	
MB 180-284931/1-A	Method Blank	Total Recoverable	Water	6010C	284931	
LCS 180-284931/2-A	Lab Control Sample	Total Recoverable	Water	6010C	284931	

Analysis Batch: 285155

Lab Sample ID	Client Sample ID	Ргер Туре	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total Recoverable	Water	6020A	284933
400-172358-2	MW-105	Total Recoverable	Water	6020A	284933
400-172358-3	MW-110	Total Recoverable	Water	6020A	284933
400-172358-4	MW-104	Total Recoverable	Water	6020A	284933
400-172358-5	MW-7	Total Recoverable	Water	6020A	284933
MB 180-284933/1-A	Method Blank	Total Recoverable	Water	6020A	284933
LCS 180-284933/2-A	Lab Control Sample	Total Recoverable	Water	6020A	284933

Analysis Batch: 285296

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total Recoverable	Water	6020A	284933
400-172358-2	MW-105	Total Recoverable	Water	6020A	284933
400-172358-3	MW-110	Total Recoverable	Water	6020A	284933
400-172358-4	MW-104	Total Recoverable	Water	6020A	284933
400-172358-5	MW-7	Total Recoverable	Water	6020A	284933

General Chemistry

Analysis Batch: 446304

Lab Sample ID	Client Sample ID	Ргер Туре	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total/NA	Water	9050A	
400-172358-2	MW-105	Total/NA	Water	9050A	
400-172358-3	MW-110	Total/NA	Water	9050A	
400-172358-4	MW-104	Total/NA	Water	9050A	
400-172358-5	MW-7	Total/NA	Water	9050A	
MB 400-446304/1	Method Blank	Total/NA	Water	9050A	
LCS 400-446304/2	Lab Control Sample	Total/NA	Water	9050A	

General Chemistry

Analysis Batch: 446307

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total/NA	Water	9040C	
400-172358-2	MW-105	Total/NA	Water	9040C	
400-172358-3	MW-110	Total/NA	Water	9040C	
400-172358-4	MW-104	Total/NA	Water	9040C	
400-172358-5	MW-7	Total/NA	Water	9040C	
LCS 400-446307/4	Lab Control Sample	Total/NA	Water	9040C	

Analysis Batch: 446416

Lab Sample ID	Client Sample ID	Ргер Туре	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total/NA	Water	SM 2320B	
400-172358-2	MW-105	Total/NA	Water	SM 2320B	
400-172358-3	MW-110	Total/NA	Water	SM 2320B	
400-172358-4	MW-104	Total/NA	Water	SM 2320B	
400-172358-5	MW-7	Total/NA	Water	SM 2320B	
MB 400-446416/4	Method Blank	Total/NA	Water	SM 2320B	
LCS 400-446416/5	Lab Control Sample	Total/NA	Water	SM 2320B	
400-172358-4 DU	MW-104	Total/NA	Water	SM 2320B	

Analysis Batch: 446594

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total/NA	Water	SM 2540C	
400-172358-2	MW-105	Total/NA	Water	SM 2540C	
400-172358-3	MW-110	Total/NA	Water	SM 2540C	
400-172358-4	MW-104	Total/NA	Water	SM 2540C	
MB 400-446594/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 400-446594/2	Lab Control Sample	Total/NA	Water	SM 2540C	
400-172358-4 DU	MW-104	Total/NA	Water	SM 2540C	

Analysis Batch: 446609

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-172358-5	MW-7	Total/NA	Water	SM 2540C	
MB 400-446609/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 400-446609/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 447375

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total/NA	Water	9060A	
400-172358-2	MW-105	Total/NA	Water	9060A	
400-172358-3	MW-110	Total/NA	Water	9060A	
400-172358-4	MW-104	Total/NA	Water	9060A	
400-172358-5	MW-7	Total/NA	Water	9060A	
MB 400-447375/3	Method Blank	Total/NA	Water	9060A	
LCS 400-447375/5	Lab Control Sample	Total/NA	Water	9060A	

Analysis Batch: 447589

Lab Sample ID	Client Sample ID	Ргер Туре	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total/NA	Water	410.4	
400-172358-2	MW-105	Total/NA	Water	410.4	
400-172358-3	MW-110	Total/NA	Water	410.4	
400-172358-4	MW-104	Total/NA	Water	410.4	
400-172358-5	MW-7	Total/NA	Water	410.4	

Job ID: 400-172358-1

SDG: D.B. Wilson Station

QC Association Summary

General Chemistry (Continued)

Analysis Batch: 447589 (Continued)

Client Sample ID	Prep Type	Matrix	Method	Prep Batch
Method Blank	Total/NA	Water	410.4	
Lab Control Sample	Total/NA	Water	410.4	
MW-102	Total/NA	Water	410.4	
MW-102	Total/NA	Water	410.4	
	Client Sample ID Method Blank Lab Control Sample MW-102 MW-102	Client Sample ID Prep Type Method Blank Total/NA Lab Control Sample Total/NA MW-102 Total/NA MW-102 Total/NA	Client Sample ID Prep Type Matrix Method Blank Total/NA Water Lab Control Sample Total/NA Water MW-102 Total/NA Water MW-102 Total/NA Water	Client Sample IDPrep TypeMatrixMethodMethod BlankTotal/NAWater410.4Lab Control SampleTotal/NAWater410.4MW-102Total/NAWater410.4MW-102Total/NAWater410.4

Rad

Prep Batch: 433443

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total/NA	Water	PrecSep-21	
400-172358-2	MW-105	Total/NA	Water	PrecSep-21	
400-172358-3	MW-110	Total/NA	Water	PrecSep-21	
400-172358-4	MW-104	Total/NA	Water	PrecSep-21	
400-172358-5	MW-7	Total/NA	Water	PrecSep-21	
MB 160-433443/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-433443/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Prep Batch: 433455

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-172358-1	MW-102	Total/NA	Water	PrecSep_0	
400-172358-2	MW-105	Total/NA	Water	PrecSep_0	
400-172358-3	MW-110	Total/NA	Water	PrecSep_0	
400-172358-4	MW-104	Total/NA	Water	PrecSep_0	
400-172358-5	MW-7	Total/NA	Water	PrecSep_0	
MB 160-433455/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-433455/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

Job ID: 400-172358-1

SDG: D.B. Wilson Station

Lab Sample ID: MB 400-446394/4								С	lie	nt Sam	ple ID: M	ethod	Blanl
Matrix: Water											Prep Ty	be: Tot	al/N
Analysis Batch: 446394													
	r	ИВ МВ											
Analyte	Res	ult Qualifier	RL		MDL	Unit		D	Pr	repared	Analyz	ed	Dil Fa
Chloride		ND	1.00	C	.892	mg/L				_	07/01/19	11:11	
Fluoride	I	ND	0.200	0.	0820	mg/L					07/01/19	11:11	
Sulfate	I	ND	1.00	C	0.700	mg/L					07/01/19	11:11	
Lab Sample ID: LCS 400-446394/	5						Cli	ent S	Sar	nple ID	: Lab Con	trol Sa	ampl
Matrix: Water											Prep Ty	be: Tot	al/N
Analysis Batch: 446394													
-			Spike	LCS	LCS						%Rec.		
Analyte			Added	Result	Qual	ifier	Unit		D	%Rec	Limits		
Chloride			10.0	9.543			mg/L		_	95	90 - 110		
Fluoride			10.0	9.881			mg/L			99	90 - 110		
Sulfate			10.0	10.14			mg/L			101	90 - 110		
ab Sample ID: LCSD 400-44639	4/6					С	lient S	amp	le	ID: Lab	Control	Sample	e Du
Matrix: Water								1			Prep Ty	be: Tot	al/N
Analysis Batch: 446394													
			Spike	LCSD	LCSI	D					%Rec.		RP
Analyte			Added	Result	Qual	ifier	Unit		D	%Rec	Limits	RPD	Lim
Chloride			10.0	9.531			mg/L			95	90 - 110	0	1
luoride			10.0	9.768			mg/L			98	90 - 110	1	1
Sulfate			10.0	10.08			mg/L			101	90 - 110	1	1
_ab Sample ID: 400-172358-1 MS	;									Clier	t Sample	ID: M	V-10 :
Matrix: Water											Prep Ty	be: Tot	al/N/
Analysis Batch: 446394													
Sa	mple \$	Sample	Spike	MS	MS				_		%Rec.		
Analyte R	esult	Qualifier	Added	Result	Qual	ifier	Unit		D	%Rec	Limits		
Chloride	33.3		10.0	42.64			mg/L			94	80 - 120		
Fluoride	0.343		10.0	10.07			mg/L			97	80 - 120		
Sulfate	NQ I	-1	10.0	NQ	F1		mg/L			0	80 - 120		
	D									Clier	t Sample	ID: M	V-10 :
Lab Sample ID: 400-172358-1 MS											Prep Ty	be: Tot	al/N
Lab Sample ID: 400-172358-1 MS Matrix: Water													
Lab Sample ID: 400-172358-1 MS Matrix: Water Analysis Batch: 446394	mplo	Samplo	Spike	Men	Men						%Pee		PD
Lab Sample ID: 400-172358-1 MS Matrix: Water Analysis Batch: 446394 Sa Analyte R	mple (Sample Qualifier	Spike Added	MSD Result	MSD Qual	ifier	Unit		D	%Rec	%Rec. Limits	RPD	RP Lim
Lab Sample ID: 400-172358-1 MS Matrix: Water Analysis Batch: 446394 Sa Analyte R Chloride	mple s esult 0 33.3	Sample Qualifier	Spike Added 10.0	MSD Result 42.36	MSD Qual	ifier	Unit mg/L		D	%Rec 91	%Rec. Limits 80 - 120	RPD	RP Lim
Lab Sample ID: 400-172358-1 MS Matrix: Water Analysis Batch: 446394 Sa Analyte Chloride	mple 9 esult 0 33.3	Sample Qualifier	Spike Added 10.0 10.0	MSD Result 42.36 10.01	MSD Qual	ifier	<mark>Unit</mark> mg/L mg/L		D	%Rec 91 97	%Rec. Limits 80 - 120 80 - 120	RPD 1	RP Lim 2 2
Lab Sample ID: 400-172358-1 MS Matrix: Water Analysis Batch: 446394 Sa Analyte Nhoride Juoride Sulfate	mple 3 esult 0 33.3 0.343 NO 1	Sample Qualifier	Spike Added 10.0 10.0 10.0	MSD Result 42.36 10.01 NO	MSD Qual	ifier	Unit mg/L mg/L mg/L		D	%Rec 91 97 0	%Rec. Limits 80 - 120 80 - 120 80 - 120	RPD 1 1 NC	RP Lim 2 2 2

chent Sample ID: Method Blank Prep Type: Total/NA

Matrix: Water Analysis Batch: 446646

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00	0.892	mg/L			07/02/19 10:52	1
Fluoride	ND		0.200	0.0820	mg/L			07/02/19 10:52	1
Sulfate	ND		1.00	0.700	mg/L			07/02/19 10:52	1

5 6

9

Method: 9056 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 400-44664 Matrix: Water	46/5					Clie	ent Sai	mple ID:	Lab Cont Prep Typ	rol Sa e: Tot	ample tal/NA
Analysis Balch: 440040			Snike	1.05	1.05				%Rec		
Analyte				Result	Qualifier	Unit	р	%Rec	l imits		
Chloride				9 585		ma/l			90 - 110		
Fluoride			10.0	9 661		ma/l		97	90_110		
Sulfate			10.0	10.28		mg/L		103	90 - 110		
Lab Sample ID: LCSD 400-446 Matrix: Water	646/6				C	Client Sa	ample	ID: Lab	Control S Prep Typ	ample e: Tot	e Dup tal/NA
Analysis Batch: 446646											
			Spike	LCSD	LCSD				%Rec.		RPD
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chloride			10.0	9.562		mg/L		96	90 - 110	0	15
Fluoride			10.0	9.733		mg/L		97	90 - 110	1	15
Sulfate			10.0	10.34		mg/L		103	90 - 110	1	15
Method: 6010C - Metals (IC	CP)										
Lab Sample ID: MB 180-28493	1/1 -A						Clie	ent Sam	ple ID: Me	thod	Blank
Matrix: Water							P	rep Typ	e: Total R	ecove	erable
Analysis Batch: 285066									Prep Bat	ch: 2	84931
	MB	MB							-		
Analyte	Result	Qualifier	RL		MDL Unit		D P	repared	Analyze	+d	Dil Fac
Lithium	ND		0.0500	0.0	0959 mg/L		07/1	6/19 12:3 [,]	1 07/17/19 0	8:05	1
Lab Sample ID: LCS 180-28493	31/2-A					Clie	nt Sa	mple ID:	Lab Cont	rol Sa	ample
Matrix: Water							P	Prep Tvp	e: Total R	ecove	erable
Analysis Batch: 285066									Prep Bat	ch: 28	84931
			Spike	LCS	LCS				%Rec.		
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits		
Lithium			0.500	0.4874		mg/L		97	80 - 120		

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 180-284933/1-A Matrix: Water Analysis Batch: 285155

Client Sample ID: Method Blank Prep Type: Total Recoverable Prep Batch: 284933

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.00006100	J	0.00200	0.0000213	mg/L		07/16/19 12:33	07/17/19 12:24	1
Arsenic	ND		0.00500	0.000118	mg/L		07/16/19 12:33	07/17/19 12:24	1
Barium	0.0003340	J	0.200	0.000270	mg/L		07/16/19 12:33	07/17/19 12:24	1
Beryllium	ND		0.00200	0.000102	mg/L		07/16/19 12:33	07/17/19 12:24	1
Boron	0.02694	J	1.00	0.00339	mg/L		07/16/19 12:33	07/17/19 12:24	1
Cadmium	ND		0.00100	0.000152	mg/L		07/16/19 12:33	07/17/19 12:24	1
Calcium	ND		1.00	0.0412	mg/L		07/16/19 12:33	07/17/19 12:24	1
Chromium	0.0007650	J	0.00300	0.000339	mg/L		07/16/19 12:33	07/17/19 12:24	1
Cobalt	0.00002700	J	0.00500	0.0000218	mg/L		07/16/19 12:33	07/17/19 12:24	1
Iron	ND		50.0	14.1	ug/L		07/16/19 12:33	07/17/19 12:24	1
Lead	ND		0.00500	0.0000675	mg/L		07/16/19 12:33	07/17/19 12:24	1
Magnesium	ND		1000	82.7	ug/L		07/16/19 12:33	07/17/19 12:24	1
Molybdenum	ND		0.0100	0.000873	mg/L		07/16/19 12:33	07/17/19 12:24	1
Nickel	0.6280	J	1.00	0.312	ug/L		07/16/19 12:33	07/17/19 12:24	1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 180-284933/1-A Matrix: Water

Analysis Batch: 285155								Prep Batch:	284933
-	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.0100	0.000348	mg/L		07/16/19 12:33	07/17/19 12:24	1
Sodium	368.4	J	1000	251	ug/L		07/16/19 12:33	07/17/19 12:24	1
Thallium	ND		0.00100	0.0000360	mg/L		07/16/19 12:33	07/17/19 12:24	1

Lab Sample ID: LCS 180-284933/2-A Matrix: Water Analysis Batch: 285155

Analysis Batch: 285155							Prep Batch: 284933
-	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits
Antimony	0.250	0.2717		mg/L		109	80 - 120
Arsenic	1.00	1.069		mg/L		107	80 - 120
Barium	1.00	1.057		mg/L		106	80 - 120
Beryllium	0.500	0.5231		mg/L		105	80 - 120
Boron	1.25	1.249		mg/L		100	80 - 120
Cadmium	0.500	0.5296		mg/L		106	80 - 120
Calcium	25.0	27.50		mg/L		110	80 - 120
Chromium	0.500	0.5347		mg/L		107	80 - 120
Cobalt	0.500	0.5371		mg/L		107	80 - 120
Iron	5000	5770		ug/L		115	80 - 120
Lead	0.500	0.5177		mg/L		104	80 - 120
Magnesium	25000	27540		ug/L		110	80 - 120
Molybdenum	0.500	0.5258		mg/L		105	80 - 120
Nickel	500	540.7		ug/L		108	80 - 120
Selenium	1.00	1.096		mg/L		110	80 - 120
Sodium	25000	26850		ug/L		107	80 - 120
Thallium	1.00	1.032		mg/L		103	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-28 Matrix: Water Analysis Batch: 284460	4352/1-A MB	МВ							Clie	ent Samp	ole ID: Method Prep Type: T Prep Batch:	d Blank otal/NA 284352
Analyte	Result	Qualifier		RL	I	MDL	Unit	D	Р	repared	Analyzed	Dil Fac
Mercury	ND			0.200	0	.101	ug/L		07/1	0/19 08:40	07/10/19 18:01	1
Lab Sample ID: LCS 180-2	84352/2-A							Client	Sa	mple ID:	Lab Control	Sample
Matrix: Water											Prep Type: T	otal/NA
Analysis Batch: 284460											Prep Batch:	284352
			Spike		LCS	LCS	;				%Rec.	
Analyte			Added		Result	Qua	lifier	Unit	D	%Rec	Limits	
Mercury			2.50		2.667			ug/L		107	80 - 120	

Client Sample ID: Method Blank Prep Type: Total Recoverable Prep Batch: 284933

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Method: 410.4 - COD

Lab Sample ID: MB 400-447	7589/4									•	Clie	ent Sam	ple ID: Metho	d Blank
Matrix: Water Analysis Batch: 447589													Prep Type:	otal/NA
Analysis Datch. 447303		мв	мв											
Analyte	Re	sult	Qualifier		RL		MDL	Unit		D	Pi	repared	Analvzed	Dil Fac
Chemical Oxygen Demand		ND			10.0		6.40	mg/L					07/11/19 14:05	5 1
Lab Sample ID: LCS 400-44 Matrix: Water	7589/5								Cli	ent	Sar	nple ID	: Lab Control Prep Type: ∃	Sample Fotal/NA
Analysis Batch: 447589				Spike		LCS	LCS	5					%Rec.	
Analyte				Added		Result	Qua	alifier	Unit		D	%Rec	Limits	
Chemical Oxygen Demand				50.0		45.58			mg/L		_	91	90 - 110	
Lab Sample ID: 400-172358 Matrix: Water	-1 MS											Clien	t Sample ID: Prep Type: 1	MW-102 Fotal/NA
Analysis Batch: 447589	0	•		0									0/ D	
Ameluta	Sample	San	nple	Spike		MS	MS		11		_	0/ D	%Rec.	
Analyte Chemical Oxygen Demand		Qua		Added		Result	Qua	alitier			<u> </u>	MC -	Limits	
	ND			3.75		ND			IIIg/L			NC	90-110	
Lab Sample ID: 400-172358 Matrix: Water	-1 MSD											Clien	t Sample ID: Prep Type: 1	MW-102 Fotal/NA
Analysis Batch: 447589														
	Sample	San	nple	Spike		MSD	MS	D			_		%Rec.	RPD
Analyte	Result	Qua	alifier	Added		Result	Qua	alifier	Unit		D	%Rec	Limits RF	D Limit
Chemical Oxygen Demand	ND			3.75		ND			mg/L			NC	90-110 N	IC 13
Method: 9050A - Specif	ic Condu	cta	nce											
Lab Sample ID: MB 400-446 Matrix: Water	6304/1									•	Clie	ent Sam	ple ID: Metho Prep Type: 1	d Blank ſotal/NA
Analysis Batch: 446304		MR	MB											
Analyte	Re	sult	Qualifier		RL		MDL	Unit		D	Pi	repared	Analyzed	Dil Fac
Specific Conductance		ND			5.00		5.00	umho	s/cm				06/29/19 19:57	<u> </u>
Lab Sample ID: LCS 400-44 Matrix: Water	6304/2								Cli	ent	Sar	nple ID:	Lab Control Prep Type: 1	Sample Fotal/NA
Analysis Batch: 446304				Omilia		1.00							0/ D = =	
Analyta				Spike		Booult			Unit		_	% Baa	%Rec.	
Specific Conductance				10.0		10 02	Qua		umhos	/cm	_	100	98 - 102	
				10.0		10.02			annioo	0		100	00 - 102	
Method: 9060A - Organi	c Carboı	1, T	otal (To	C)										
Method: 9060A - Organi Lab Sample ID: MB 400-447 Matrix: Water Analysis Batch: 447375	c Carboı ′375/3	п, Т	otal (T(DC)							Clie	ent Sam	ple ID: Metho Prep Type: 1	d Blank Fotal/NA
Method: 9060A - Organi Lab Sample ID: MB 400-447 Matrix: Water Analysis Batch: 447375	c Carboı ′375/3	п, Т МВ	otal (ТС	DC)						(Clie	ent Sam	ple ID: Metho Prep Type: ⊺	od Blank Γotal/NA
Method: 9060A - Organi Lab Sample ID: MB 400-447 Matrix: Water Analysis Batch: 447375 Analyte	c Carboı /375/3 	n, T MB esult	MB Qualifier	DC)	RL		MDL	Unit		D	Clie	e <mark>nt Sam</mark> repared	ple ID: Metho Prep Type: 1 Analyzed	d Blank Fotal/NA Dil Fac
Method: 9060A - Organi Lab Sample ID: MB 400-447 Matrix: Water Analysis Batch: 447375 Analyte Total Organic Carbon	c Carboı 7375/3 	n, T MB esult ND	MB Qualifier	OC)	RL 1.00	C	MDL	Unit mg/L		D .	Clie Pi	ent Sam	ple ID: Metho Prep Type: 1 - Analyzed - 06/29/19 10:28	d Blank Total/NA Dil Fac
Method: 9060A - Organi Lab Sample ID: MB 400-447 Matrix: Water Analysis Batch: 447375 Analyte Total Organic Carbon TOC Result 1 TOC Result 2	c Carboı 7375/3 	n, T MB sult ND ND	MB Qualifier	DC)	RL 1.00 1.00	0	MDL .500	Unit mg/L mg/L		D .	Clie Pi	ent Sam	ple ID: Metho Prep Type: 1 Analyzed 06/29/19 10:28 06/29/19 10:28	d Blank Fotal/NA Dil Fac
Method: 9060A - Organi Lab Sample ID: MB 400-447 Matrix: Water Analysis Batch: 447375 Analyte Total Organic Carbon TOC Result 1 TOC Result 2 TOC Result 3	<mark>с Carboı</mark> /375/3 	MB sult ND ND	MB Qualifier	DC)	RL 1.00 1.00 1.00		MDL .500 .500	Unit mg/L mg/L mg/L		D	Clie Pi	ent Sam	ple ID: Metho Prep Type: 7 Analyzed 06/29/19 10:28 06/29/19 10:28 06/29/19 10:28	d Blank Fotal/NA Dil Fac

QC Sample Results

Method: 9060A - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: MB 400-447375/3								Clie	ent Sam	ple ID: Method	Blank
Matrix: water										Prep Type: 10	otal/NA
Analysis Batch: 44/3/5	мр	MD									
Analista	NIB Decult	NIB Overlifier			MDI	11				A	
	Result	Qualifier		RL		Unit	U	P	repared		
TOC Result 4				1.00	0.500	mg/L				06/29/19 10:28	1
I otal Organic Carbon - Quad	ND			1.00	0.500	mg/L				06/29/19 10:28	1
Lab Sample ID: I CS 400-447375/							Clion	t Sa	mple ID	· Lab Control 9	Samplo
Matrix: Wator	, ,						Oller	t Sa		Pron Type: T	
Analysis Batch: 447375										пер туре. П	
Analysis Daten. 447070			Snike			s				%Rec	
Analyte			babbA	Re	esult Qu	alifier	Unit	р	%Rec	Limits	
Total Organic Carbon			10.0		239		ma/l		92	80 - 120	
TOC Result 1			10.0	g	178		ma/l		92	80 - 120	
TOC Result 2			10.0	g	356		ma/l		94	80 - 120	
TOC Result 3			10.0	G	330		mg/L		93	80 - 120	
TOC Result 4			10.0	c	0.000		ma/l		91	80 - 120	
Total Organic Carbon - Quad			10.0	c	239		mg/L		92	80 120	
			10.0		.200		ing/E		02	00-120	
Method: SM 2320B - Alkalinit	y										
Method: SM 2320B - Alkalinit	y							Clic	ont Sam	nlo ID: Mothor	Blank
Method: SM 2320B - Alkalinit Lab Sample ID: MB 400-446416/4	y							Clie	ent Sam	ple ID: Method	d Blank
Method: SM 2320B - Alkalinit Lab Sample ID: MB 400-446416/4 Matrix: Water	y							Clie	ent Sam	iple ID: Method Prep Type: To	d Blank otal/NA
Method: SM 2320B - Alkalinit Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416	<u>у</u> мв	МВ						Clie	ent Sam	iple ID: Method Prep Type: Te	d Blank otal/NA
Method: SM 2320B - Alkalinit Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416	S y MB Result	MB		PI	MDI	Unit		Clie	ent Sam	ple ID: Method Prep Type: To	d Blank otal/NA
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte	MB Result	MB Qualifier		RL	MDL	Unit	D	Clie	ent Sam	ple ID: Method Prep Type: To Analyzed	d Blank otal/NA Dil Fac
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total	MB Result ND	MB Qualifier		RL 1.00	MDL 0.980	Unit mg/L	<u>D</u>	Clie P	ent Sarr	ple ID: Method Prep Type: To Analyzed 07/01/19 11:32	d Blank otal/NA Dil Fac
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/5	MB Result ND	MB Qualifier		RL 1.00	MDL 0.980	Unit mg/L	D	Clie P	ent Sam repared mple ID	Prep Type: To Analyzed 07/01/19 11:32 : Lab Control S	d Blank otal/NA Dil Fac 1 Sample
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/5 Matrix: Water	MB Result ND	MB Qualifier		RL 1.00	MDL 0.980	Unit mg/L	Clien	Clie P	ent Sam repared mple ID	Analyzed 07/01/19 11:32 Characteristics of the second se	d Blank otal/NA Dil Fac 1 Sample otal/NA
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/5 Matrix: Water Analysis Batch: 446416	MB Result ND	MB Qualifier		RL 1.00	MDL 0.980	Unit mg/L	D	Clie P t Sa	ent Sam repared mple ID	Analyzed OT/01/19 11:32 Charles Control S Prep Type: To	d Blank otal/NA
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/5 Matrix: Water Analysis Batch: 446416	MB Result ND	MB Qualifier	Spike	RL 1.00	<u>MDL</u> 0.980	Unit mg/L	D	Clie P at Sai	ent Sam repared mple ID	Analyzed OT/01/19 11:32 Characteristics of the sector of	d Blank otal/NA Dil Fac 1 Sample otal/NA
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/8 Matrix: Water Analysis Batch: 446416 Analyte	MB Result ND	MB Qualifier	Spike	RL	MDL 0.980 LCS LC	Unit mg/L S alifier	Clien Unit	Clie P t Sai	ent Sam repared mple ID %Rec	Analyzed - Analyzed 07/01/19 11:32 : Lab Control S Prep Type: Te %Rec. Limits	d Blank otal/NA Dil Fac 1 Sample otal/NA
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/8 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total	MB Result ND	MB Qualifier	Spike Added 100	RL 1.00 	MDL 0.980 LCS LC esult Qu 02.3	Unit mg/L S alifier	Clien Unit mg/L	Clie P t Sai	ent Sam repared mple ID <u>%Rec</u> 102	Analyzed OT/01/19 11:32 Characteristics Control S Prep Type: To %Rec. Limits 80 - 120	d Blank otal/NA Dil Fac 1 Sample otal/NA
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/9 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total	MB Result ND	MB Qualifier	Spike Added 100	RL 1.00 	MDL 0.980 LCS LC3 esult Qu 02.3	Unit mg/L S alifier	Clien Unit mg/L	Clie P at Sar	repared mple ID <u>%Rec</u> 102	Analyzed OT/01/19 11:32 Characteristics Control S Prep Type: To %Rec. Limits 80 - 120	d Blank otal/NA Dil Fac 1 Sample otal/NA
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/5 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: 400-172358-4 DU	MB Result ND	MB Qualifier	Spike Added 100	RL	MDL 0.980 LCS LC esult Qu 02.3	Unit mg/L S alifier	Clien Unit mg/L	Clie P t Sau	ent Sam repared mple ID <u>%Rec</u> 102	Analyzed Analyzed Analyzed 07/01/19 11:32 : Lab Control S Prep Type: To %Rec. Limits 80 - 120 Analyzed 07/01/19 11:32 NRec. Limits 80 - 120	d Blank otal/NA Dil Fac 1 Sample otal/NA
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/5 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: 400-172358-4 DU Matrix: Water	MB Result ND	MB Qualifier	Spike Added 100	RL	MDL 0.980 LCS LC esult Qu 02.3	Unit mg/L S alifier	Clien Unit mg/L	Clie P t Sar	ent Sam repared mple ID <u>%Rec</u> 102 Clier	Analyzed Analyzed 07/01/19 11:32 Characteristics NRec. Limits 80 - 120 Analyzed 07/01/19 11:32 Characteristics NRec. Limits Rec. Limits Rec. Difference NRec. Limits Rec. Difference NRec. Limits Rec. Difference Rec. Limits Rec. Difference Rec. Limits Rec. Difference Rec. Difference Rec. Difference Rec. Difference Rec. Difference Rec. Difference Rec. Difference Rec. Difference Rec. Difference Rec. Difference Rec. Rec. Rec. Difference Rec. Re	d Blank otal/NA
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/8 Matrix: Water Analysis Batch: 446416 Lab Sample ID: 400-172358-4 DU Matrix: Water Analysis Batch: 446416	MB Result ND	MB Qualifier	Spike Added 100	RL	MDL 0.980 LCS LC esult Qu 02.3	Unit mg/L S alifier	Clien Unit mg/L	Clie P t Sau	repared mple ID <u>%Rec</u> 102 Clier	Analyzed Analyzed 07/01/19 11:32 Characteristics Prep Type: To %Rec. Limits 80 - 120 Analyzed 07/01/19 11:32 Characteristics Prep Type: To Analyzed 07/01/19 11:32 Characteristics Prep Type: To Prep Type: To	d Blank otal/NA
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: 400-172358-4 DU Matrix: Water Analysis Batch: 446416 Sam	MB Result ND	MB Qualifier	Spike Added 100	RL 1.00 	MDL 0.980 LCS LC: esult Qui 02.3 UU	Unit mg/L S alifier	Clien Unit mg/L	Clie P t Sal	repared mple ID <u>%Rec</u> 102 Clier	Analyzed Analyzed 07/01/19 11:32 Characteristics Prep Type: To %Rec. Limits 80 - 120 Analyzed 07/01/19 11:32 Characteristics Prep Type: To Analyzed 07/01/19 11:32 Characteristics Prep Type: To	d Blank otal/NA
Method: SM 2320B - Alkalinii Lab Sample ID: MB 400-446416/4 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/5 Matrix: Water Analysis Batch: 446416 Analyte Alkalinity, Total Lab Sample ID: LCS 400-446416/5 Matrix: Water Analyte Alkalinity, Total Lab Sample ID: 400-172358-4 DU Matrix: Water Analysis Batch: 446416 Sample ID: 400-172358-4 Report	MB Result ND 5	MB Qualifier	Spike Added 100	RL	MDL 0.980 LCS LC: asult Qu 02.3 DU DU asult Qu	Unit mg/L S alifier	Unit Unit Unit	Clie P t San D D	repared mple ID <u>%Rec</u> 102 Clier	Analyzed OT/01/19 11:32 Characteristics Prep Type: To %Rec. Limits 80 - 120 Analyzed OT/01/19 11:32 Characteristics Prep Type: To Prep Type: To RPE	d Blank otal/NA

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 400-446594/ Matrix: Water Analysis Batch: 446594	1						Client Sam	ple ID: Method Prep Type: To	l Blank otal/NA
	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		5.00	3.40	mg/L			07/02/19 15:23	1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCS 400-44 Matrix: Water	46594/2					Cli	ent Sa	mple ID:	Lab Control S Prep Type: T	Sample otal/NA
Analysis Batch: 446594			.						0/ D	
Anchita			Spike	LCS	LCS	Unit		% Bee	%Rec.	
Total Dissolved Solids			293	276 (D	94	78-122	
			200	210.0	, ,	ing/L		01	10-122	
Lab Sample ID: 400-172358 Matrix: Water	8-4 DU							Client	t Sample ID: M Prep Type: T	WW-104 otal/NA
Analysis Batch: 446594										
_	Sample S	Sample		DU	DU					RPD
Analyte	Result C	Qualifier		Result	Qualifier	Unit	D		RPI	D Limit
Total Dissolved Solids	1360			1380)	mg/L				2 5
Lab Sample ID: MB 400-44	6609/1						Cli	ent Samı	ple ID: Metho	d Blank
Analysis Batch: 446609									Prep Type. 1	Otal/NA
Analysis Batch. 440005	N	ИВ МВ								
Analyte	Res	ult Qualifier		RL	MDL Unit		DF	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	[ND		5.00	3.40 mg/L	-		•	07/02/19 16:42	1
					-					
Lab Sample ID: LCS 400-44 Matrix: Water	16609/2					Cli	ent Sa	mple ID:	Lab Control 3 Prep Type: T	Sample otal/NA
Analysis Batch: 446609										
			Spike	LCS			_	~ -	%Rec.	
Analyte			Added	Result	Qualifier		D	<u>%Rec</u>	Limits	
Total Dissolved Solids			293	200.0)	mg/L		09	70-122	
Method: 903.0 - Radium	-226 (GFP	PC)								
Lab Sample ID: MB 160-43	3443/23-A						Cli	ent Sam	ple ID: Metho	d Blank
Matrix: Water									Prep Type: T	otal/NA
Analysis Batch: 439859		Count	Total						Prep Batch:	433443
M	R MR	Uncert	Uncert							
Analyte Resu	lt Qualifier	(2σ+/-)	(2σ+/-)	RI	MDC	Unit	F	Prenared	Analyzed	Dil Fac
Radium-226 -0.106	$\frac{1}{13} \frac{1}{10}$	0.122	0.122	1.00	0.318	pCi/L	- 07/	02/19 12:58	<u>3</u> 08/19/19 18:00	1
						•				
M Occurriere (Vice	B MB	1							Ameliment	
Carrier % Yiel							1 07/	-repared	Analyzed	
Ba Carrier 92	.7	40 - 110					077	02/19 12.00	5 00/19/19 10.00	I
Lab Sample ID: LCS 160-43	33443/1- A					Cli	ent Sa	mple ID:	Lab Control	Sample
Analysis Batch: 439859									Pren Batch	433443
Analysis Baton. 40000				Total					. Top Baton.	
				11					a. –	
	Spike	e LCS	LCS	Uncert.					%Rec.	
Analyte	Spike Addee	e LCS d Result	LCS Qual	Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	
Analyte	Spike Addeo 11.4	e LCS d Result 4 10.36	LCS Qual	Uncert. (2σ+/-) 1.34	RL 1.00	MDC 0.411	Unit pCi/L		%Rec. Limits 75 - 125	
Analyte	Spika Addeo 11.4	e LCS d Result 4 10.36	LCS Qual	(2σ+/-) 1.34	RL 1.00	MDC 0.411	Unit pCi/L	%Rec 91	%Rec. Limits 75 - 125	
Analyte Radium-226 LCS LCS Carrier %Yield Qualifi	Spike Added 11.4	e LCS d Result 4 10.36	LCS Qual	(2σ+/-) 1.34	RL 1.00	MDC 0.411	Unit pCi/L	_	%Rec. Limits 75 - 125	

Method: 904.0 - Radium-228 (GFPC)

Lab Sample Matrix: Wate	ID: MB 1 r	60-4334	155/23-A						Clie	ent Samp	ole ID: Method Prep Type: To	I Blank otal/NA
Analysis Bat	ich: 4399	009		Count	Total						Prep Batch:	433455
		MB	MB	Uncert.	Uncert.							
Analyte		Result	Qualifier	(2 σ+/-)	(2σ+/-)	RL	MDC	Unit	P	repared	Analyzed	Dil Fac
Radium-228		0.4270		0.265	0.267	1.00	0.403	pCi/L	07/0	02/19 14:27	08/19/19 09:13	1
		MB	МВ									
Carrier		%Yield	Qualifier	Limits					F	Prepared	Analyzed	Dil Fac
Ba Carrier		92.7		40 - 110					07/0	02/19 14:27	08/19/19 09:13	1
Y Carrier		84.9		40 - 110					07/0	02/19 14:27	08/19/19 09:13	1
Lab Sample Matrix: Wate Analysis Bat	ID: LCS r ich: 4399	160-433 946	455/1-A			Total		Cli	ent Sa	mple ID:	Lab Control S Prep Type: To Prep Batch:	Sample otal/NA 433455
			Spike	LCS	LCS	Uncert.					%Rec.	
Analyte			Added	Result	Qual	(2 σ+/-)	RL	MDC	Unit	%Rec	Limits	
Radium-228			8.92	10.43		1.19	1.00	0.411	pCi/L	117	75 - 125	
	LCS	LCS										
Carrier	%Yield	Qualifier	· Limits									
Ba Carrier	92.7		40 - 110	_								
Y Carrier	86.7		40 - 110									

Client Sample ID: MW-102 Date Collected: 06/27/19 09:10 Date Received: 06/28/19 13:08

5 6 7

10

12 13

Lab Sample ID: 400-172358-1 Matrix: Water

Pren Tyne	Batch	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	lah
Total/NA	Analysis	9056		1		Amount	446394	07/01/19 12:21	BAW	TAL PEN
Total/NA	Analysis	9056	DL	10			446646	07/02/19 16:27	BAW	TAL PEN
Total Recoverable Total Recoverable	Prep Analysis	3005A 6010C		1	50 mL	50 mL	284931 285066	07/16/19 12:31 07/17/19 08:26	NAM RJG	TAL PIT TAL PIT
Total Recoverable Total Recoverable	Prep Analysis	3005A 6020A		1	50 mL	50 mL	284933 285155	07/16/19 12:33 07/17/19 13:48	NAM KAK	TAL PIT TAL PIT
Total Recoverable Total Recoverable	Prep Analysis	3005A 6020A		1	50 mL	50 mL	284933 285296	07/16/19 12:33 07/18/19 12:20	NAM KAK	TAL PIT TAL PIT
Total/NA Total/NA	Prep Analysis	7470A 7470A		1	50 mL	50 mL	284352 284460	07/10/19 08:40 07/10/19 18:03	RJR RJR	TAL PIT TAL PIT
Total/NA	Analysis	410.4		1	2 mL	2 mL	447589	07/11/19 14:05	DN1	TAL PEN
Total/NA	Analysis	9040C		1			446307	06/29/19 22:17	DEK	TAL PEN
Total/NA	Analysis	9050A		1			446304	06/29/19 19:57	DEK	TAL PEN
Total/NA	Analysis	9060A		1			447375	06/29/19 10:28	RRC	TAL PEN
Total/NA	Analysis	SM 2320B		1			446416	07/01/19 12:42	BAB	TAL PEN
Total/NA	Analysis	SM 2540C		1	25 mL	50 mL	446594	07/02/19 15:23	VLS	TAL PEN
Total/NA Total/NA	Prep Analysis	PrecSep-21 903.0		1	1000.49 mL	1.0 g	433443 439859	07/02/19 12:58 08/19/19 16:03	ORM CDR	TAL SL TAL SL
Total/NA Total/NA	Prep Analysis	PrecSep_0 904.0		1	1000.49 mL 1.0 mL	1.0 g 1.0 mL	433455 439946	07/02/19 14:27 08/19/19 09:07	ORM CDR	TAL SL TAL SL
Total/NA	Analysis	Ra226_Ra228		1			440111	08/21/19 08:52	SMP	TAL SL

Client Sample ID: MW-105 Date Collected: 06/27/19 10:51 Date Received: 06/28/19 13:08

Lab Sample ID: 400-172358-2 Matrix: Water

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1			446394	07/01/19 13:30	BAW	TAL PEN
Total Recoverable	Prep	3005A			50 mL	50 mL	284931	07/16/19 12:31	NAM	TAL PIT
Total Recoverable	Analysis	6010C		1			285066	07/17/19 08:31	RJG	TAL PIT
Total Recoverable	Prep	3005A			50 mL	50 mL	284933	07/16/19 12:33	NAM	TAL PIT
Total Recoverable	Analysis	6020A		1			285155	07/17/19 13:51	KAK	TAL PIT
Total Recoverable	Prep	3005A			50 mL	50 mL	284933	07/16/19 12:33	NAM	TAL PIT
Total Recoverable	Analysis	6020A		1			285296	07/18/19 12:23	KAK	TAL PIT
Total/NA	Prep	7470A			50 mL	50 mL	284352	07/10/19 08:40	RJR	TAL PIT
Total/NA	Analysis	7470A		1			284460	07/10/19 18:05	RJR	TAL PIT
Total/NA	Analysis	410.4		1	2 mL	2 mL	447589	07/11/19 14:05	DN1	TAL PEN
Total/NA	Analysis	9040C		1			446307	06/29/19 22:17	DEK	TAL PEN
Total/NA	Analysis	9050A		1			446304	06/29/19 19:57	DEK	TAL PEN
Total/NA	Analysis	9060A		1			447375	06/29/19 10:28	RRC	TAL PEN
Total/NA	Analysis	SM 2320B		1			446416	07/01/19 12:51	BAB	TAL PEN
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	446594	07/02/19 15:23	VLS	TAL PEN

Client Sample ID: MW-105 Date Collected: 06/27/19 10:51 Date Received: 06/28/19 13:08

	u. 00/20/19 1	5.00								
	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			500.59 mL	1.0 g	433443	07/02/19 12:58	ORM	TAL SL
Total/NA	Analysis	903.0		1			439859	08/19/19 16:03	CDR	TAL SL
Total/NA	Prep	PrecSep_0			500.59 mL	1.0 g	433455	07/02/19 14:27	ORM	TAL SL
Total/NA	Analysis	904.0		1	1.0 mL	1.0 mL	439946	08/19/19 09:07	CDR	TAL SL

1

Client Sample ID: MW-110 Date Collected: 06/27/19 12:25 Date Received: 06/28/19 13:08

Analysis

Ra226 Ra228

Total/NA

Lab Sample ID: 400-172358-3 Matrix: Water

08/21/19 08:52 SMP

440111

Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Analysis	9056		1			446394	07/01/19 13:53	BAW	TAL PEN
Analysis	9056	DL	5			446646	07/02/19 16:50	BAW	TAL PEN
Prep	3005A			50 mL	50 mL	284931	07/16/19 12:31	NAM	TAL PIT
Analysis	6010C		1			285066	07/17/19 08:36	RJG	TAL PIT
Prep	3005A			50 mL	50 mL	284933	07/16/19 12:33	NAM	TAL PIT
Analysis	6020A		1			285155	07/17/19 13:58	KAK	TAL PIT
Prep	3005A			50 mL	50 mL	284933	07/16/19 12:33	NAM	TAL PIT
Analysis	6020A		1			285296	07/18/19 12:26	KAK	TAL PIT
Prep	7470A			50 mL	50 mL	284352	07/10/19 08:40	RJR	TAL PIT
Analysis	7470A		1			284460	07/10/19 18:06	RJR	TAL PIT
Analysis	410.4		1	2 mL	2 mL	447589	07/11/19 14:05	DN1	TAL PEN
Analysis	9040C		1			446307	06/29/19 22:17	DEK	TAL PEN
Analysis	9050A		1			446304	06/29/19 19:57	DEK	TAL PEN
Analysis	9060A		1			447375	06/29/19 10:28	RRC	TAL PEN
Analysis	SM 2320B		1			446416	07/01/19 12:56	BAB	TAL PEN
Analysis	SM 2540C		1	50 mL	50 mL	446594	07/02/19 15:23	VLS	TAL PEN
Prep	PrecSep-21			1000.25 mL	1.0 g	433443	07/02/19 12:58	ORM	TAL SL
Analysis	903.0		1			439859	08/19/19 16:05	CDR	TAL SL
Prep	PrecSep_0			1000.25 mL	1.0 g	433455	07/02/19 14:27	ORM	TAL SL
Analysis	904.0		1	1.0 mL	1.0 mL	439946	08/19/19 09:08	CDR	TAL SL
Analysis	Ra226_Ra228		1			440111	08/21/19 08:52	SMP	TAL SL
	Batch Type Analysis Prep Analysis Prep Analysis Prep Analysis Analysis Analysis Analysis Analysis Analysis Analysis Prep Analysis Prep Analysis Prep Analysis	Batch Batch Type Method Analysis 9056 Analysis 9056 Prep 3005A Analysis 6010C Prep 3005A Analysis 6020A Prep 7470A Analysis 9040C Analysis 9050A Analysis 9050A Analysis 9050A Analysis SM 2320B Analysis SM 2540C Prep PrecSep-21 Analysis 903.0 Prep PrecSep_0 Analysis 904.0	Batch TypeBatch MethodRunType9056RunAnalysis9056DLAnalysis9050DLPrep3005AAnalysisAnalysis6010CYeepAnalysis6020AYeepAnalysis6020AYeepAnalysis6020AYeepAnalysis6020AYeepAnalysis6020AYeepAnalysis6020AYeepAnalysis6020AYeepAnalysis6020AYeepAnalysis6020AYeepAnalysis6020AYeepAnalysis9040CYeepAnalysis9050AYeepAnalysis9050AYeepAnalysisSM 2320BYeepAnalysisSM 2540CYeepPrepPrecSep-21YeesAnalysis903.0YeesPrepPrecSep_0YeesAnalysis904.0YeesAnalysis8226_Ra228	Batch TypeBatch MethodRunDil FactorAnalysis9056DL5Prep3005ADL5Prep3005A1Analysis6010C1Prep3005A1Analysis6020A1Prep3005A1Analysis6020A1Prep3005A1Analysis6020A1Prep3005A1Analysis6020A1Analysis6020A1Analysis6020A1Analysis6020A1Analysis6020A1Analysis9050A1Analysis9040C1Analysis9050A1Analysis9050A1AnalysisSM 2320B1AnalysisSM 2540C1PrepPrecSep-211Analysis903.01PrepPrecSep_01Analysis904.01	Batch TypeBatch MethodRunDil FactorInitial AmountAnalysis9056DL5Analysis9056DL5Prep3005A150 mLAnalysis6010C150 mLAnalysis6020A150 mLAnalysis6020A150 mLAnalysis6020A150 mLAnalysis6020A150 mLAnalysis6020A150 mLAnalysis6020A150 mLAnalysis7470A50 mLAnalysis7470A12 mLAnalysis9040C12 mLAnalysis9050A11Analysis9050A11Analysis9050A11Analysis9050A11Analysis9050A11PrepPrecSep-211000.25 mLAnalysis903.011.0 mLPrepPrecSep_011.0 mLAnalysis904.011.0 mLAnalysis904.011.0 mLAnalysis904.011.0 mLAnalysis904.011.0 mLAnalysis904.011.0 mLAnalysis904.011.0 mLAnalysis904.011.0 mLAnalysis904.011.0 mLAnalysis904.011.0 mLAnalysis904.0<	Batch TypeBatch MethodRunDil FactorInitial AmountFinal AmountAnalysis9056DL5Analysis905ADL50Prep3005A150 mLAnalysis6010C150 mLPrep3005A150 mLAnalysis6020A150 mLPrep3005A150 mLAnalysis6020A150 mLPrep3005A50 mL50 mLAnalysis6020A150 mLPrep3005A150 mLAnalysis6020A150 mLAnalysis6020A150 mLAnalysis6020A150 mLAnalysis9050A12 mLAnalysis9040C12 mLAnalysis9060A11Analysis9060A150 mLAnalysisSM 2320B150 mLAnalysis903.011000.25 mLPrepPrecSep-2111.0 nLAnalysis904.011.0 mLPrepPrecSep_011.0 mLAnalysis904.01Analysis904.01	Batch TypeBatch MethodRunDil FactorInitial AmountFinal AmountBatch NumberAnalysis9056DL5446394Analysis9056DL50 mL284931Prep3005A150 mL284931Analysis6010C150 mL284933Analysis6020A150 mL284933Analysis6020A150 mL284933Analysis6020A150 mL284933Analysis6020A150 mL284933Analysis6020A150 mL284933Analysis6020A150 mL284933Analysis6020A150 mL284933Analysis6020A150 mL284933Analysis6020A12 mL28460Prep7470A12 mL2 mLAnalysis7470A12 mL447589Analysis9040C12 mL446307Analysis9060A1446307Analysis9060A1446304AnalysisSM 2320B150 mL446416AnalysisSM 2540C150 mL1.0 gAnalysis903.011000.25 mL1.0 gPrepPrecSep_011.0 mL1.0 gAnalysis904.011.0 mL439455Analysis904.011.0 mL439455A	Batch TypeBatch MethodRunFactor FactorInitial AmountFinal AmountBatch MumberPrepared or AnalyzedAnalysis9056DL5-44639407/01/19 13:53Analysis9056DL5-44664607/02/19 16:50Prep3005ADL50 mL50 mL284931 28506607/16/19 12:31Analysis6010C1-50 mL28493307/16/19 12:33Analysis6020A150 mL50 mL28493307/16/19 12:33Analysis6020A1-50 mL28493307/16/19 12:33Analysis6020A150 mL28493307/16/19 12:33Analysis6020A1-2850607/17/19 08:40Analysis6020A12 mL2840307/16/19 12:33Analysis7470A50 mL28493307/16/19 12:33Analysis7470A12 mL2 mL28400Analysis9040C12 mL2 mL447589Analysis9050A144630706/29/19 22:17Analysis9050A144630406/29/19 19:57Analysis9060A150 mL44630406/29/19 19:57AnalysisSM 2300B150 mL44630407/01/19 12:56AnalysisSM 2540C150 mL50 mL44654407/02/19 15:23PrepPrecSep_011000.25 mL1.0 g<	Batch TypeBatch MethodRunDil FactorInitial AmountFinal AmountBatch MumberPrepared or AnalyzedAnalysisAnalysis9056DL544639407/01/19 13:53BAWAnalysis9056DL544664607/02/19 16:50BAWPrep3005AL150 mL50 mL28493107/16/19 12:31NAMAnalysis6010C150 mL50 mL28493307/16/19 12:33NAMAnalysis6020A150 mL50 mL28515507/17/19 13:58KAKPrep3005A150 mL50 mL28493307/16/19 12:33NAMAnalysis6020A150 mL50 mL28526607/18/19 12:33NAMAnalysis6020A150 mL28493307/16/19 12:33NAMAnalysis6020A150 mL28493307/16/19 12:33NAMAnalysis6020A150 mL28493307/16/19 12:33NAMAnalysis6020A12228515507/17/19 08:40RRAnalysis7470A122207/10/19 18:60RJRAnalysis9040C12244630706/29/19 19:57DEKAnalysis9050A1244630406/29/19 19:57DEKAnalysisSM 2320B150 mL50 mL44630406/29/19 10:28RRAnalysis

Client Sample ID: MW-104 Date Collected: 06/27/19 13:55 Date Received: 06/28/19 13:08

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1			446394	07/01/19 14:16	BAW	TAL PEN
Total/NA	Analysis	9056	DL	20			446646	07/02/19 17:13	BAW	TAL PEN
Total Recoverable	Prep	3005A			50 mL	50 mL	284931	07/16/19 12:31	NAM	TAL PIT
Total Recoverable	Analysis	6010C		1			285066	07/17/19 08:42	RJG	TAL PIT
Total Recoverable	Prep	3005A			50 mL	50 mL	284933	07/16/19 12:33	NAM	TAL PIT
Total Recoverable	Analysis	6020A		1			285155	07/17/19 14:02	KAK	TAL PIT

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Eurofins TestAmerica, Pensacola

Lab Sample ID: 400-172358-4

Matrix: Water

8/21/2019

Job ID: 400-172358-1 SDG: D.B. Wilson Station

Lab Sample ID: 400-172358-2 Matrix: Water

TAL SL

Initial

Amount

50 mL

50 mL

2 mL

25 mL

750.62 mL

750.62 mL

1.0 mL

Final

Amount

50 mL

50 mL

2 mL

50 mL

1.0 g

1.0 g

1.0 mL

Batch

Number

284933

285296

284352

284460

447589

446307

446304

447375

446416

446594

433443

439859

433455

439946

440111

Dil

1

1

1

1

1

1

1

1

1

1

1

Factor

Run

Batch

Туре

Prep

Prep

Analysis

Prep

Prep

Batch

3005A

6020A

7470A

7470A

410.4

9040C

9050A

9060A

903.0

904.0

SM 2320B

SM 2540C

PrecSep-21

PrecSep_0

Ra226_Ra228

Method

Client Sample ID: MW-104 Date Collected: 06/27/19 13:55 Date Received: 06/28/19 13:08

Prep Type

Total/NA

Total Recoverable

Total Recoverable

Lab Sample ID: 400-172358-4 Matrix: Water

Analyst

NAM

Lab

TAL PIT

TAL SL

TAL SL

TAL SL

TAL SL

TAL SL

Prepared

or Analyzed

07/16/19 12:33

07/18/19 12:30 KAK

07/10/19 08:40 RJR

07/10/19 18:07 RJR

07/11/19 14:05 DN1

06/29/19 22:17 DEK

06/29/19 19:57 DEK

06/29/19 10:28 RRC

07/01/19 13:14 BAB

07/02/19 15:23 VLS

07/02/19 12:58 ORM

08/19/19 16:04 CDR

07/02/19 14:27 ORM

08/19/19 09:08 CDR

08/21/19 08:52 SMP

TAL PIT TAL PIT TAL PIT TAL PEN TAL PEN TAL PEN TAL PEN TAL PEN 10 TAL PEN

Client Sample ID: MW-7 Date Collected: 06/27/19 15:10 Date Received: 06/28/19 13:08

Lab Sample ID: 400-172358-5 Matrix: Water

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1			446394	07/01/19 14:38	BAW	TAL PEN
Total/NA	Analysis	9056	DL	50			446646	07/02/19 18:21	BAW	TAL PEN
Total Recoverable	Prep	3005A			50 mL	50 mL	284931	07/16/19 12:31	NAM	TAL PIT
Total Recoverable	Analysis	6010C		1			285066	07/17/19 08:47	RJG	TAL PIT
Total Recoverable	Prep	3005A			50 mL	50 mL	284933	07/16/19 12:33	NAM	TAL PIT
Total Recoverable	Analysis	6020A		1			285155	07/17/19 14:05	KAK	TAL PIT
Total Recoverable	Prep	3005A			50 mL	50 mL	284933	07/16/19 12:33	NAM	TAL PIT
Total Recoverable	Analysis	6020A		1			285296	07/18/19 12:33	KAK	TAL PIT
Total/NA	Prep	7470A			50 mL	50 mL	284352	07/10/19 08:40	RJR	TAL PIT
Total/NA	Analysis	7470A		1			284460	07/10/19 18:08	RJR	TAL PIT
Total/NA	Analysis	410.4		1	2 mL	2 mL	447589	07/11/19 14:05	DN1	TAL PEN
Total/NA	Analysis	9040C		1			446307	06/29/19 22:17	DEK	TAL PEN
Total/NA	Analysis	9050A		1			446304	06/29/19 19:57	DEK	TAL PEN
Total/NA	Analysis	9060A		1			447375	06/29/19 10:28	RRC	TAL PEN
Total/NA	Analysis	SM 2320B		1			446416	07/01/19 13:29	BAB	TAL PEN
Total/NA	Analysis	SM 2540C		1	25 mL	50 mL	446609	07/02/19 16:42	VLS	TAL PEN
Total/NA	Prep	PrecSep-21			1000.74 mL	1.0 g	433443	07/02/19 12:58	ORM	TAL SL
Total/NA	Analysis	903.0		1			439859	08/19/19 16:03	CDR	TAL SL
Total/NA	Prep	PrecSep_0			1000.74 mL	1.0 g	433455	07/02/19 14:27	ORM	TAL SL
Total/NA	Analysis	904.0		1	1.0 mL	1.0 mL	439946	08/19/19 09:08	CDR	TAL SL
Total/NA	Analysis	Ra226_Ra228		1			440111	08/21/19 08:52	SMP	TAL SL

Client Sample ID: Method Blank Date Collected: N/A Date Received: N/A

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			1000 mL	1.0 g	433443	07/02/19 12:58	ORM	TAL SL
Total/NA	Analysis	903.0		1			439859	08/19/19 18:00	CDR	TAL SL

Client Sample ID: Method Blank Date Collected: N/A Date Received: N/A

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep_0			1000 mL	1.0 g	433455	07/02/19 14:27	ORM	TAL SL
Total/NA	Analysis	904.0		1	1.0 mL	1.0 mL	439909	08/19/19 09:13	CDR	TAL SL

Client Sample ID: Method Blank Date Collected: N/A

Date Received: N/A

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			50 mL	50 mL	284352	07/10/19 08:40	RJR	TAL PIT
Total/NA	Analysis	7470A		1			284460	07/10/19 18:01	RJR	TAL PIT

Client Sample ID: Method Blank Date Collected: N/A Date Received: N/A

Ргер Туре	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	284931	07/16/19 12:31	NAM	TAL PIT
Total Recoverable	Analysis	6010C		1			285066	07/17/19 08:05	RJG	TAL PIT

Client Sample ID: Method Blank Date Collected: N/A Date Received: N/A

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	284933	07/16/19 12:33	NAM	TAL PIT
Total Recoverable	Analysis	6020A		1			285155	07/17/19 12:24	KAK	TAL PIT

Client Sample ID: Method Blank Date Collected: N/A Date Received: N/A

Lak	o Sample	ID:	MB	400-446	304/1
				Matrix:	Wate

Lab Sample ID: MB 180-284931/1-A

Lab Sample ID: MB 180-284933/1-A

Matrix: Water

Matrix: Water

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9050A		1			446304	06/29/19 19:57	DEK	TAL PEN

Matrix: Water

5 6 7

10

Lab Sample ID: MB 400-446394/4

Client Sample ID: Method Blank Date Collected: N/A Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analvzed	Analvst	Lab
Total/NA	Analysis	9056		1			446394	07/01/19 11:11	BAW	TAL PEN
Client Samp Date Collected Date Received	le ID: Met I: N/A : N/A	hod Blank					Lab Sa	ample ID: N	1B 400- Ma	446416/4 trix: Water
Γ	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2320B		1			446416	07/01/19 11:32	BAB	TAL PEN
Client Samp Date Collected Date Received	le ID: Met I: N/A : N/A	hod Blank					Lab Sa	ample ID: N	1B 400- Ma	446594/1 trix: Water
Γ	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	446594	07/02/19 15:23	VLS	TAL PEN
Client Samp Date Collected Date Received	le ID: Met I: N/A : N/A	hod Blank					Lab Sa	ample ID: N	1B 400- Ma	446609/1 trix: Water
	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	446609	07/02/19 16:42	VLS	TAL PEN
Client Samp Date Collected Date Received	le ID: Met I: N/A : N/A	hod Blank					Lab Sa	ample ID: N	1B 400- Ma	446646/4 trix: Water
Г	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1			446646	07/02/19 10:52	BAW	TAL PEN
Client Samp Date Collected Date Received	le ID: Met I: N/A : N/A	hod Blank					Lab Sa	ample ID: N	1B 400- Ma	447375/3 trix: Water
Г	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9060A		1			447375	06/29/19 10:28	RRC	TAL PEN
Client Samp	le ID: Met	hod Blank					Lab Sa	ample ID: N	1B 400-	447589/4
Date Collected Date Received	I: N/A : N/A								Ma	trix: Water
Г	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	410.4		1	2 mL	2 mL	447589	07/11/19 14:05	DN1	TAL PEN

Lab Sample ID: LCS 180-284352/2-A

Lab Sample ID: LCS 180-284931/2-A

Lab Sample ID: LCS 180-284933/2-A

Lab Sample ID: LCS 400-446304/2

Client Sample ID: Lab Control Sample Date Collected: N/A Date Received: N/A

Ргер Туре	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			1000 mL	1.0 g	433443	07/02/19 12:58	ORM	TAL SL
Total/NA	Analysis	903.0		1			439859	08/19/19 14:05	CDR	TAL SL

Client Sample ID: Lab Control Sample Date Collected: N/A Date Received: N/A

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep_0			1000 mL	1.0 g	433455	07/02/19 14:27	ORM	TAL SL
Total/NA	Analysis	904.0		1			439946	08/19/19 09:06	CDR	TAL SL

Client Sample ID: Lab Control Sample Date Collected: N/A

Date Received: N/A

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			50 mL	50 mL	284352	07/10/19 08:40	RJR	TAL PIT
Total/NA	Analysis	7470A		1			284460	07/10/19 18:02	RJR	TAL PIT

Client Sample ID: Lab Control Sample Date Collected: N/A Date Received: N/A

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	284931	07/16/19 12:31	NAM	TAL PIT
Total Recoverable	Analysis	6010C		1			285066	07/17/19 08:10	RJG	TAL PIT

Client Sample ID: Lab Control Sample Date Collected: N/A Date Received: N/A

Bron Tuno	Batch	Batch Method	Bun	Dil	Initial Amount	Final	Batch	Prepared	Analyst	Lab
Total Recoverable	Type Pren	30054	Run	Factor	50 ml	50 ml	28/033	07/16/10 12:33		
Total Recoverable	Analvsis	6020A		1	JUIL	50 IIIL	285155	07/17/19 12:27	KAK	

Client Sample ID: Lab Control Sample Date Collected: N/A Date Received: N/A

	Batch	Batch		Dil	Initial	Final	Batch	Prepared			
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab	
Total/NA	Analysis	9050A		1			446304	06/29/19 19:57	DEK	TAL PEN	_

10

Matrix: Water

Matrix: Water

Matrix: Water

Matrix: Water

Lab

Lab

I ab

Matrix: Water

Lab

Matrix: Water

Lab

Matrix: Water

Lab

Matrix: Water

TAL PEN

TAL PEN

TAL PEN

TAL PEN

Client Sample ID: Lab Control Sample Lab Sample ID: LCS 400-446307/4 **Date Collected: N/A** Date Received: N/A Batch Batch Dil Initial Batch Final Prepared Method Prep Type Type Run Factor Amount Amount Number or Analyzed Analyst Total/NA 9040C 446307 DEK Analysis 06/29/19 22:17 1 **Client Sample ID: Lab Control Sample** Lab Sample ID: LCS 400-446394/5 Date Collected: N/A Date Received: N/A Batch Dil Initial Final Batch Batch Prepared Prep Type Туре Method Run Factor Amount Amount Number or Analyzed Analyst 07/01/19 11:34 BAW Total/NA Analysis 9056 1 446394 **Client Sample ID: Lab Control Sample** Lab Sample ID: LCS 400-446416/5 Date Collected: N/A Date Received: N/A Dil Batch Batch Initial Final Batch Prepared Туре Method Amount Number Analyst Prep Type Run Factor Amount or Analyzed SM 2320B Total/NA Analysis 446416 07/01/19 11:40 BAB 1 **Client Sample ID: Lab Control Sample** Lab Sample ID: LCS 400-446594/2 Date Collected: N/A **Date Received: N/A** Batch Batch Dil Initial Final Batch Prepared Prep Type Type Method Run Factor Amount Amount Number or Analyzed Analyst Total/NA Analysis SM 2540C 50 mL 50 mL 446594 07/02/19 15:23 VLS Client Sample ID: Lab Control Sample Lab Sample ID: LCS 400-446609/2 **Date Collected: N/A** Date Received: N/A Batch Dil Initial Final Batch Prepared Batch Prep Type Method Run Factor Amount Amount Number or Analyzed Type Analyst Total/NA SM 2540C 50 mL 446609 07/02/19 16:42 VLS Analysis 50 mL 1 Lab Sample ID: LCS 400-446646/5 **Client Sample ID: Lab Control Sample** Date Collected: N/A Date Received: N/A Batch Batch Dil Initial Final Batch Prepared Method Amount Number or Analyzed Prep Type Туре Run Factor Amount Analyst Total/NA Analysis 9056 446646 07/02/19 11:14 BAW 1 **Client Sample ID: Lab Control Sample** Lab Sample ID: LCS 400-447375/5 **Date Collected: N/A** Date Received: N/A

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9060A		1			447375	06/29/19 10:28	RRC	TAL PEN

10

Client Sample ID: Lab Control Sample Lab Sample ID: LCS 400-447589/5 Date Collected: N/A Matrix: Water Date Received: N/A Batch Dil Initial Batch Batch Final Prepared Method Prep Type Type Run Factor Amount Amount Number or Analyzed Analyst Lab 447589 Total/NA Analysis 410.4 2 mL 2 mL 07/11/19 14:05 DN1 TAL PEN 1 Client Sample ID: Lab Control Sample Dup Lab Sample ID: LCSD 400-446394/6 Date Collected: N/A Matrix: Water Date Received: N/A Dil Initial Batch Batch Final Batch Prepared Prep Type Туре Method Run Factor Amount Amount Number or Analyzed Analyst Lab Total/NA Analysis 9056 1 446394 07/01/19 11:57 BAW TAL PEN Client Sample ID: Lab Control Sample Dup Lab Sample ID: LCSD 400-446646/6 **Date Collected: N/A** Matrix: Water Date Received: N/A Batch Batch Dil Initial Final Batch Prepared Method Prep Type Туре Run Factor Amount Amount Number or Analyzed Analyst I ab 9056 446646 07/02/19 11:37 BAW TAL PEN Total/NA Analysis 1 Client Sample ID: MW-102 Lab Sample ID: 400-172358-1 MS Date Collected: 06/27/19 09:10 Matrix: Water Date Received: 06/28/19 13:08 Batch Batch Dil Initial Final Batch Prepared Prep Type Type Method Run Factor Amount Amount Number or Analyzed Analyst Lab Total/NA Analysis 9056 446394 07/01/19 12:44 BAW TAL PEN 1 Total/NA Analysis 410.4 1 2 mL 2 mL 447589 07/11/19 14:05 DN1 TAL PEN Client Sample ID: MW-102 Lab Sample ID: 400-172358-1 MSD Date Collected: 06/27/19 09:10 Matrix: Water Date Received: 06/28/19 13:08 Batch Batch Dil Initial Final Batch Prepared Prep Type Type Method Run Factor Amount Amount Number or Analyzed Analyst Lab 446394 07/01/19 13:07 Total/NA Analysis 9056 1 BAW TAL PEN Total/NA Analysis 447589 07/11/19 14:05 DN1 TAL PEN 410.4 1 2 mL 2 mL **Client Sample ID: MW-104** Lab Sample ID: 400-172358-4 DU Date Collected: 06/27/19 13:55 Matrix: Water Date Received: 06/28/19 13:08 Batch Batch Dil Initial Final Batch Prepared Prep Type Type Method Run Factor Amount Amount Number or Analyzed Analyst Lab Total/NA Analysis SM 2320B 446416 07/01/19 13:23 BAB TAL PEN Total/NA Analysis SM 2540C 1 25 mL 50 mL 446594 07/02/19 15:23 VLS TAL PEN

Laboratory References:

TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001 TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Method Summary

Client: Big Rivers Electric Corporation Project/Site: Semi-Annual

Job ID: 400-172358-1 SDG: D.B. Wilson Station

Method	Method Description	Protocol	Laboratory
9056	Anions, Ion Chromatography	SW846	TAL PEN
6010C	Metals (ICP)	SW846	TAL PIT
6020A	Metals (ICP/MS)	SW846	TAL PIT
7470A	Mercury (CVAA)	SW846	TAL PIT
410.4	COD	MCAWW	TAL PEN
9040C	pH	SW846	TAL PEN
9050A	Specific Conductance	SW846	TAL PEN
9060A	Organic Carbon, Total (TOC)	SW846	TAL PEN
SM 2320B	Alkalinity	SM	TAL PEN
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PEN
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT
7470A	Preparation, Mercury	SW846	TAL PIT

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions. SM = "Standard Methods For The Examination Of Water And Wastewater" SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

12 13

Laboratory: Eurofins TestAmerica, Pensacola

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority		Program	Identification Number	Expiration Date
Kentucky (WW)		State Program	98030	12-31-19
The following analyte the agency does not of	s are included in this offer certification.	report, but the laboratory is r	not certified by the governing authority.	This list may include analytes for whic
Analysis Method	Prep Method	Matrix	Analyte	
9040C		Water	pH	
9040C		Water	Temperature	
9050A		Water	Specific Conductance	
9056		Water	Chloride	
9056		Water	Fluoride	
9056		Water	Sulfate	
9060A		Water	TOC Result 1	
9060A		Water	TOC Result 2	
9060A		Water	TOC Result 3	
9060A		Water	TOC Result 4	
9060A		Water	Total Organic Carbon	
9060A		Water	Total Organic Carbon - Qua	d

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-20
Arkansas DEQ	State Program	88-0690	06-27-20
California	State	2891	04-30-20
California	State Program	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Connecticut	State Program	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Florida	NELAP	E871008	06-30-20
Illinois	NELAP	200005	06-30-20
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	01-31-20
Kansas	NELAP	E-10350	03-31-20
Kentucky (UST)	State Program	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-19
Kentucky (WW)	State Program	KY98043	12-31-19
Louisiana	NELAP	04041	06-30-20
Minnesota	NELAP	042-999-482	12-31-19
Minnesota	NELAP	042-999-482	12-31-19
Nevada	State Program	PA00164	07-31-20
New Hampshire	NELAP	2030	04-04-20
New Jersey	NELAP	PA005	06-30-20
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	03-31-20
New York	NELAP	11182	04-01-20
North Carolina (WW/SW)	State Program	434	12-31-19
North Dakota	State Program	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-20
Oregon	NELAP	PA-2151	02-06-20
Pennsylvania	NELAP	02-00416	04-30-20

Client: Big Rivers Electric Corporation Project/Site: Semi-Annual

Job ID: 400-172358-1 SDG: D.B. Wilson Station

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date	
Pennsylvania	NELAP	02-00416	04-30-20	
Rhode Island	State	LAO00362	12-30-19	
Rhode Island	State Program	LAO00362	12-30-19	
South Carolina	State Program	89014	04-30-20	
Гехаз	NELAP	T104704528-15-2	03-31-20	
Texas	NELAP	T104704528	03-31-20	
JS Fish & Wildlife	Federal	LE94312A-1	07-31-19	
JS Fish & Wildlife	US Federal Programs	058448	07-31-20	
JSDA	Federal	P-Soil-01	06-26-22	
JSDA	US Federal Programs	P330-16-00211	06-26-22	
Jtah	NELAP	PA001462015-4	05-31-20	
Jtah	NELAP	PA001462019-8	05-31-20	
/irginia	NELAP	460189	09-14-19	
/irginia	NELAP	10043	09-14-19	
Vest Virginia DEP	State	142	01-31-20	
Vest Virginia DEP	State Program	142	01-31-20	
Visconsin	State	998027800	08-31-19	
Visconsin	State Program	998027800	08-31-19	
	-			
Accreditation/Certification Summary

Client: Big Rivers Electric Corporation Project/Site: Semi-Annual

Job ID: 400-172358-1 SDG: D.B. Wilson Station

12 13 14

Laboratory: Eurofins TestAmerica, St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	DoD	L2305	04-06-22
ANAB	DOE	L2305.01	04-06-22
Arizona	State	AZ0813	12-08-19
Arizona	State Program	AZ0813	12-08-19
California	State	2886	06-30-20
California	State Program	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Connecticut	State Program	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
Florida	NELAP	E87689	06-30-20
Hawaii	State Program	NA	06-30-20
Illinois	NELAP	200023	11-30-19
Illinois	NELAP	004553	11-30-19
owa	State Program	373	12-01-20
Kansas	NELAP	E-10236	10-31-19
Kentucky (DW)	State	KY90125	12-31-19
Kentucky (DW)	State Program	KY90125	12-31-19
ouisiana	NFLAP	04080	06-30-20
ouisiana (DW)	NEL AP		12-31-19
	State		12-31-10
	State	310	00-30-20
Manyland	State Brogram	310	09-30-20
	State Program	310	09-30-20
		9005	00-30-20
VIISSOURI	State	780	06-30-22
VIISSOURI	State Program	780	06-30-20
Nevada	State	MO000542020-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	03-31-20
New York	NELAP	11616	04-01-20
North Dakota	State	R-207	06-30-20
North Dakota	State Program	R207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-19
Oklahoma	State Program	9997	08-31-19 *
Pennsylvania	NELAP	68-00540	02-28-20
Pennsylvania	NELAP	68-00540	02-28-20
South Carolina	State Program	85002001	06-30-20
Texas	NELAP	T104704193-19-14	07-31-20
Texas	NELAP	T104704193-19-13	07-31-20
JS Fish & Wildlife	Federal	058448	07-31-20
JSDA	Federal	P330-17-0028	02-02-20
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	460230	06-14-20
Virginia	NELAP	10310	06-14-20
Washington	State Program	C592	08-30-19
West Virginia DEP	State Program	381	08-31-19 *
	State i Togram	501	00-01-10

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins TestAmerica, Pensacola

Pensacola	
TestAmerica,	ore Drive
urofins	55 McLemo
ш	33

Chain of Custody Record



Reurofins Environment Testing

ensacola, FL 32514 Phone: 850-474-1001 Fax: 850-478-2671	د		CUSI	any Ke	cord				TestAmerica
Client Information	Sampler P. C.	DMC		Lab PM. Cisnero	os, Roxanne	400-172358 COC	Carrier Tracking No(s):	COC No: 400-84746-31747	F
Sient Contact: Mike Galbraith	Phone: S 27	0-83	168-2	E-Mail:	e.cisneros@te	estamericainc.com		Page: Page 1 of 1	
company: Big Rivers Electric Corporation						Analysis Re	quested	Job #:	
Address: PO BOX 24	Due Date Requeste	ASA in	C					Preservation Code	is i
city: Henderson State, Zip: KY, 42419	TAT Requested (da	iys):						A - HCL B - NaOH C - Zm Acetate D - Nitric Acid E - NaHSO4	M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3
Phone	PO#: 254922			(0				F - MeOH G - Amchlor H - Accorbic Acid	R - Na2S203 S - H2SO4 T - TSP Dodecahvdrata
Email: mike.galbraith@bigrivers.com	#OM				EPC No)	۶		1- Ice J - Di Water	U - Acetone V - MCAA
Project Name: Big Rivers CCR and SA GW	Project # 40010908			6X) 91	1228 G	40506 '		K - EDIA L - EDA	W - pH 4-5 Z - other (specify)
Sile D.B. Wilson	SSOW#:			omes	AOTAT AOTAT	9040C		of Other:	
Samole Identification	Sample Date	Sample Time	Sample Type (C=comp, G=arab)	Matrix (wwwater, segold, Orwaster(ot, ITTEALE, Arak)	Perform MSNM 903.0, 904.0, R: 6010C, 6020A,	410.4 - COD 9066A - TOC 23208, 2540C,		Total Number Social Co Co Co Co Co Co Co Co Co Co Co Co Co	tructions/Note
	X	X	Preservat	ion Code:	a ax	N N N			
MW-102	6/22/9	01:60	0	Water	7	123		10	
201-(MW	11	15:01	11	Water	7	1111		10	
011-MW	11	12:25	11	Water	7	1222		10	
MW-104	н	13:55	N	Water	7	truch		0)	
MW-7	11	(5310	N	Water	7	tritit		0-	
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					
Possible Hazard Identification	Doison B Unkr	nwor	adiological		Sample Di	sposal (A fee may b in To Client	assessed if samples ar Disposal By Lab	a retained longer than 1 Archive For	(month) Months
Deliverable Requested: I, II, III, IV, Other (specify)					Special Ins	itructions/QC Required	rents:		
Empty Kit Relinquished by:		Date:			Time:		Method of Shipment:		
Relinquished by: Relevance	Date/Time:	1/6	0;00	Company	Receive	the part of	Date/Time	28.19 856	Company
Relinquished by:	Date/Time;			Company	Receive	d by:	Date/Time		Company
Custody Seals Intact: Custody Seal No.: A Yes A No					Cooler 1	emperature(s) "C and Othe	r Remarks. 4.0.C	12.7.0 T	CR8
	0								Ver: 01/16/2019



Client: Big Rivers Electric Corporation

Login Number: 172358 List Number: 1 Creator: Perez, Trina M

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	4.0°C, 2.7°C IR-8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Job Number: 400-172358-3 SDG Number: D.B. Wilson Station

List Source: Eurofins TestAmerica, Pensacola

Login Sample Receipt Checklist

Client: Big Rivers Electric Corporation

Login Number: 172358 List Number: 2 Croator: Harris Lorin C

Job Number: 400-172358-3
SDG Number: D.B. Wilson Station

List Creation: 06/29/19 09:32 AM

List Source: Eurofins TestAmerica, St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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Certificate of Analysis 9103066

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/04/2019 16:56

Project Name:	MW-1 Wilson 092-00004	Workorder:	9103066
---------------	-----------------------	------------	---------

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/04/2019 16:05.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

This certificate of analysis may not be reproduced without the written consent of McCoy & McCoy Laboratories, Inc.



Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias		Matrix	Date Collected	Date Received	Sampled By
9103066-01	MW1/		Water	11/04/2019 13:10	11/04/2019 16:05	Travis Sneed
LabNumber	Measurement	Value				
9103066-01	Field Conductance	3660				
	Field pH	5.10				
	Field Temp (C)	16.77				

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ANALYTICAL RESULTS

Lab Sample ID: 9103066-01 Description: MW1

Sample Collection Date Time: 11/04/2019 13:10 Sample Received Date Time: 11/04/2019 16:05

Metals by SW846 6000 Series Methods

Apolyto	Popult	Flog	Linito	MDI	MDI	Mothod	Proparad	Apolyzod	Apolyot
Analyte	Result	Flay	Units	IVITE	WDL	Methou	Fiepaieu	Analyzeu	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:42	DMH
Arsenic	0.0020		mg/L	0.0010	0.0004	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:42	DMH
Barium	0.007		mg/L	0.004	0.001	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:42	DMH
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:42	DMH
Boron	ND	D2,	mg/L	1.00	1.00	SW846 6010 B	11/06/2019 09:00	11/07/2019 15:40	AKB
		M1,							
O a data isana	0.0070	M4, U	···· ·· //	0.0040	0.0004	C) N/0.4.C. C.0.2.C. A	44/06/0040 00:00	44/00/0040 40:40	
Cadmium	0.0079		mg/L	0.0010	0.0001	SVV846-6020 A	11/06/2019 09:00	11/06/2019 16:42	DIVIH
Calcium	500	D1, M2	mg/L	40.0	13.0	SW846 6010 B	11/06/2019 09:00	11/07/2019 15:44	AKB
Chromium	ND	U	mg/L	0.0020	0.0006	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:42	DMH
Copper	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:42	DMH
Iron	73.2	D2	mg/L	1.00	0.500	SW846 6010 B	11/06/2019 09:00	11/07/2019 15:40	AKB
Lead	ND	U	mg/L	0.002	0.0005	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:42	DMH
Lithium	0.14	M1	mg/L	0.02	0.005	SW846-6020 A	11/06/2019 09:00	11/07/2019 11:23	DBP
Magnesium	197	D1, M1	mg/L	20.0	9.00	SW846 6010 B	11/06/2019 09:00	11/07/2019 15:44	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:42	DMH
Molybdenum	0.002	J	mg/L	0.01	0.002	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:42	DMH
Nickel	0.812	M2	mg/L	0.003	0.001	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:42	DMH
Potassium	12.3	D2, M2, M4	mg/L	5.00	2.20	SW846 6010 B	11/06/2019 09:00	11/07/2019 15:40	AKB
Selenium	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/06/2019 09:00	11/07/2019 11:23	DBP
Sodium	111	D1, M2	mg/L	26.0	10.0	SW846 6010 B	11/06/2019 09:00	11/07/2019 15:44	AKB
Thallium	0.0006	J	mg/L	0.0020	0.0001	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:42	DMH
Zinc	1.40	D1, M3	mg/L	0.20	0.20	SW846-6020 A	11/06/2019 09:00	11/07/2019 11:26	DBP

Conventional Chemistry Analyses Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as CaCO3	71		mg/L	4		2320 B-2011	11/18/2019 09:38	11/18/2019 09:38	HMF
Carbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 09:38	11/18/2019 09:38	HMF
Total Alkalinity	71		mg/L	4		2320 B-2011	11/18/2019 09:38	11/18/2019 09:38	HMF
Chemical Oxygen Demand	48		mg/L	5	5	HACH 8000	11/19/2019 15:37	11/19/2019 15:37	HMF
Specific Conductance (Lab)	3220		umhos/cm	1	1	2510 B-2011	11/22/2019 12:33	11/22/2019 12:33	DJK
Hardness as CaCO3	1940	D	mg/L	5	5	2340 C (as HACH 8226)	11/07/2019 09:16	11/07/2019 09:16	ALT
Total Dissolved Solids	3410		mg/L	500	500	2540 C-2011	11/05/2019 12:35	11/06/2019 16:31	MAG
Total Organic Carbon	1.2		mg/L	0.5		5310 C-2011	11/07/2019 13:33	11/08/2019 04:13	HMF
Subcontracted Analyses									
Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst



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Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	0.145	_Sub	pCi/L			EPA 903.1	12/04/2019 10:56	12/04/2019 10:58	AND
Radium-228	0.808	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND
Radium	0.953	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND

Ion Chromatography Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	113	D	mg/L	25.0	18.0	EPA 300.0 REV 2.1	11/11/2019 10:20	11/11/2019 10:20	CSC
Fluoride	1.10		mg/L	0.20		EPA 300.0 REV 2.1	11/11/2019 10:20	11/11/2019 10:20	CSC
Sulfate	2260	D	mg/L	100	50.0	EPA 300.0 REV 2.1	11/11/2019 10:20	11/11/2019 10:20	CSC



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Notes for work order 9103066

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.
- MMLI does not provide interpretation of these results unless otherwise stated.
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

- _Sub See subcontractors report.
- D Results reported from dilution.
- D1 Sample required dilution due to high concentration of target analyte.
- D2 Sample required dilution due to matrix interference.
- E Concentration exceeds calibration range
- J Estimated value.
- J5 Concentration estimated. Internal standard recoveries did not meet method acceptance criteria.
- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M3 The accuracy of the spike recovery value is reduced since the analyte concentration in the sample is disproportionate to spike level. The method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).

Standard Quallifiers/Acronymns

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than
	Less than



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Certified Analyses included in this Repo	rt	
Analyte	Certifications	
2320 B-2011 in Water		
Bicarbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Carbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Total Alkalinity	KY Drinking Water Mdv (00030)	
2340 C (as HACH 8226) in Water		
Hardness as CaCO3	KY Drinking Water Mdv (00030)	
2510 B-2011 in Water		
Specific Conductance (Lab)	KY Drinking Water Mdv (00030)	
2540 C-2011 in Water		
Total Dissolved Solids	KY Drinking Water Mdv (00030)	
5310 C-2011 in Water		
Total Organic Carbon	KY Drinking Water Mdv (00030)	
EPA 300.0 REV 2.1 in Water		
Chloride	KY Drinking Water Mdv (00030)	
Fluoride	KY Drinking Water Mdv (00030)	
Sulfate	KY Drinking Water Mdv (00030)	
HACH 8000 in Water		
Chemical Oxygen Demand	KY Wastewater Mdv (00030)	

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9103066
Shipped By: Client	Temperature: 1.20° Celcius
Condition	
Check if Custody Seals are Present/Intact	
Check if Custody Signatures are Present	
Check if Collector Signature Present	
Check if bottles are intact	
Check if bottles are correct	
Check if bottles have sufficient volume	
Check if samples received on ice	
Check if VOA headspace is acceptable	
Check if samples received in holding time.	
Check if samples are preserved properly	

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory	Chain c	of Custody			
P.O. Box 907 Madisonville, KÝ 42431	Scheduled	for: <u>10/14/2019</u>		N X MANI N N M X X X N N N N N N N N	
Client: Big Rivers Electric Corporation Wilson Station Project: MW-1 Wilson 092-00004	Report To: Big Rivers Electr Station Mike Galbraith PO Box 24 Henderson, KY 4	ic Corporation Wilson	Invoice To: Big Rivers Electric Corporation Wilson Station Brian Edwards PO Box 24 Henderson, KY 42419		
Diana Drink I aribit	Phone: <u>(270) 844</u> PWS ID#: State: 1 4	<u>1-6000</u>	PO#: <u>2</u>	52827-36	
Callested by (Signature):		Y	Compli	ance Monitoring? Yes No	
required in	itormation*	·	Samole	es Chlorinated? Yes No	
*For composite samples please indicate begin time, e	nd time and temp(oC) a	t end time below:	Gampic		
Influent: Start Date Start time	End Date	End Time T	emp (oC)		
Effluent: Start Date Start time	End Date	End Time1	emp (oC)		
MMLI USE ONLY *required information* Workorder # Date Collection 9103066 (mm/dd/yy): Time (24 hr): Bottle Sample ID# 11-04-19	e and Preservative	Sample Description	Composite	Sample Analysis Requested	
9103066-01 A <u>11-04-19</u> <u>13:10</u> 9103066-01 B <u>11-04-19</u> <u>13:10</u> Pla	Plastic 1L 1 stic 500mL pH<2 1 w/HNO3	MW1 	g / c g / c	Alkalinity Total Chloride 300.0 Conductivity (Lab) Fluoride 300.0 Sulfate 300.0 Alkalinity Bicarbonate TDS Alkalinity Carbonate Arsenic Tot 6020 Antimony Tot 6020 Barium Tot 6020 Iron Tot 6010B Selenium Tot 6020 Hardness Titration Beryllium Tot 6020 Boron Tot 6010B Cadmium Tot 6020 Calcium Tot 6010B Chromium Tot 6020 Sodium Tot 6010B Lead Tot 6020 Lithium Tot 6020 Mercury Tot 6020	
Prese 9103066-01 C <u> -04-19</u> <u> 3:10</u> Pla Prese	rvation Check: pH : <u>↓</u> stic 500mL pH<2 1 w/H2SO4 rvation Check: pH : <u>↓</u>		g/c		
9103066-01 D <u>11-04-19 (3:10</u> Plasti Prese	ic 1L pH<2 w/HNO3 1 Rad 226 (Sub) rvation Check: pH :	MW1	g / c	Radium 226 (sub)	
Preservation Check Performed by:		1	.2		
Field data collected by: Travis Sne	Date (mm/dd/yy)	1 - 0 4 - 1 9 Time (24 hr) _	3:10		
pH <u>5.10</u> Cond (umho) <u>3660</u>	_ Res CI (mg/L) _	Tot CI (mg/L)	Fr	ee CI (mg/L)	
Temp (oC) <u>16,77</u> or (oF)	Static Water Level	DO (mg/L)	1	urb. (NTU)	
Flow (MGD) or (CFS)	or (g/min)		•		
Relinquished by: (Signature)	Received by: (Signatu	ire)	Date (mm.	/dd/yy) Time (24 hr) 1-1960.5	
MMLI - Check here if trip charge applied to	associated COC	·rinted: 10	/31/2019 5:49	:31AM Page 7 of 19	

Page 7 of 19

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1	Chain of Custody	2019	
oratories, Inc.	Scheduled for: 10/14/		
cal Laboratory		Invoice 10: Dia Divers Flec	stric Corporation Wilson Station
e, KY 42431	Report To:	filson Big Rivers Lio	1
Big Rivers Electric Corporation Wilson	Big Rivers Electric Corporation	Brian Edwards	-
מישטאר און דייייי בייי	Mike Galbraith	PO Box 24	Y 42419
	PO Box 24	Henderson, K	1. M. 9. 1
ect: MW-1 Wilson 092-00004	Henderson, KY 42419	26	128211-51
	Phone: (270) 844-6000	PU#. 02	
	PWS ID#:	Quote#	
	Spate: KY	Compli	ance Monitoring? Yes No
loase Print Legibly		- Comp	as Chlorinated? Yes No
Trancing Intering	ed information*	Sampl	
ollected by (Signature)requir	he, end time and temp(oC) at end time be		
For composite samples please indicate begin tim	End Time	3 Temp (oC)	
FUI COMPOSITO CARA Start time	End Date End that	e Temp (oC)	
nfluent: Start Date Start time	End Date End Tim		
Effluent: Start Date Start time		•	
	S		
MMLIUSE ONLY *required information*		uple Description Composite	e Sample Analysis Request
Workorder # Date Collection (mm/dd/vv): Time (24 hr):	Bottle and Preservative E Sar		Radium 229 (nub)
9103066		MW1 g/c	nauium 228 (SUD)
Sample 10#	Plastic 1L pH<2 w/HNO3 / Rad 228 (Sub)		
9103066-01 E	Preservation Check: pH : 1/	i	Radium 228 (aub)
	Plastic 11 pH<2 w/HNO3 1	MW1 g/c	Mauluiti 220 (SUD)
9103066-01 F 11-04-19 13:10	Rad 228 (Sub)		
5,100000011	Preservation Check: pH : //	RA\A/4	Radium Total (cub)
	Plastic 1L pH<2 w/HNO3 1 /	IVIVVI GIC	, waanin 70km (SUU)
9103066-01 G 11-04-19 13:10	- (Sub)		
	Preservation Uneck: Pri 2	r	
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		N. Contraction	
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	Arod		
	<u> </u>		
Preservation Check Performed by:			
Preservation Check Performed by:		1-19 Time (24 hr)	
Preservation Check Performed by:	ineed Date (mm/dd/yy) 11-0-	<u>1-19</u> Time (24 hr) : 10	
Preservation Check Performed by:	Date (mm/dd/yy) <u>11-05</u> 3.660 Res CI (mg/L)	<u>-19</u> Time (24 hr)	Free CI (mg/L)
Preservation Check Performed by: Field data collected by: <u>Trauis</u> pH <u>5.10</u> Cond (umho)	Date (mm/dd/yy) 11-04 3 660 Res CI (mg/L)	<u>-19</u> Time (24 hr) <u>/0</u> Tot Cl (mg/L) DO (mg/L)	Free CI (mg/L)
Preservation Check Performed by: Field data collected by: <u>Trauis</u> pH <u>5.10</u> Cond (umho) Temp (oC) <u>16,77</u> or (oF)	Date (mm/dd/yy) II-05 3660 Res CI (mg/L) Static Water Level	<u>-19</u> Time (24 hr) <u>//0</u> Tot Cl (mg/L) DO (mg/L)	Free CI (mg/L) Turb. (NTU)
Preservation Check Performed by: Field data collected by: Training PH 5.10 Cond (umbo) Temp (oC) 16,77 or (oF)	Date (mm/dd/yy) 11-05 3 660 Res CI (mg/L) Static Water Level or (g/min)	<u>-19</u> Time (24 hr) <u>/0</u> Tot CI (mg/L) DO (mg/L)	Free CI (mg/L) Turb. (NTU)
Preservation Check Performed by: Field data collected by: Trauis pH 5.10 Cond (umho) Temp (oC) 16,77 or Flow (MGD) or	Date (mm/dd/yy) 11-04 3 660 Res CI (mg/L) Static Water Level or (g/min)	'-19 Time (24 hr) : 10 Tot Cl (mg/L) DO (mg/L)	Free CI (mg/L) Turb. (NTU)
Preservation Check Performed by: Field data collected by: <u>Trauis</u> pH <u>5.10</u> Cond (umho) Temp (oC) <u>16.77</u> or (oF) Flow (MGD) or (CFS)	Date (mm/dd/yy) II-04 3 660 Res CI (mg/L) Static Water Level or (g/min) Received by: (Signature)	'-19 Time (24 hr) : 10 Tot Cl (mg/L)	Free CI (mg/L) Turb. (NTU) 1m/dd/yy) Time (24 hr)
Preservation Check Performed by: Field data collected by: Trauis 9 pH 5.10 Cond (umho) Temp (oC) 16.77 or (oF) Flow (MGD) or (CFS) Relinquished by: (Signature) Image: Construct of the second s	Date (mm/dd/yy) II-04 3 660 Res CI (mg/L) Static Water Level or (g/min) Received by: (Signature)	'-19 Time (24 hr) : 10 Tot Cl (mg/L)	Free CI (mg/L) Turb. (NTU) Im/dd/yy) Time (24 hr) Im/dd/yy)
Preservation Check Performed by: Field data collected by: Trauis pH 5.10 Cond (umho) Temp (oC) 16.77 or (oF) Flow (MGD) or (CFS) Relinquished by: (Signature) 0	Date (mm/dd/yy) 11-04 3 660 Res CI (mg/L) Static Water Level or (g/min) Received by: (Signature) March Market Marke	-19 Time (24 hr) / / 0 Tot Cl (mg/L) DO (mg/L) Dot (mg/L) Date (m	Free CI (mg/L) Turb. (NTU) Im/dd/yy) Time (24 hr) 4 - 1 9 16 0.5
Preservation Check Performed by: Field data collected by: Trauis pH 5.10 Cond (umho) Temp (oC) 16.77 or (oF) Flow (MGD) or (CFS) Relinquished by: (Signature) Manual	Date (mm/dd/yy) 11-04 3 660 Res CI (mg/L) Static Water Level or (g/min) Received by: (Signature) Mark Mark	-19 Time (24 hr) / / 0 Tot Cl (mg/L) DO (mg/L) Date (m	Free CI (mg/L) Turb. (NTU) Im/dd/yy) Time (24 hr) Y -1.9 LG o.S
Preservation Check Performed by: Field data collected by: Trauis pH 5.10 Cond (umho) Temp (oC) 16.77 or (oF) Flow (MGD) or (CFS) Relinquished by: (Signature) Manual	Date (mm/dd/yy) II-04 3 660 Res CI (mg/L) Static Water Level or (g/min) Received by: (Signature)	-19 Time (24 hr) //0 Tot Cl (mg/L) DO (mg/L) Date (m	Free CI (mg/L) Turb. (NTU) m/dd/yy) Time (24 hr) 4 -1 96 0.5
Preservation Check Performed by: Field data collected by: Trauis pH 5.10 Cond (umho) Temp (oC) 16,77 or (oF) Flow (MGD) or (CFS) Relinquished by: (Signature) Man Man	Date (mm/dd/yy) II-04 3 660 Res Cl (mg/L)	-19 Time (24 hr) : 10 Tot Cl (mg/L) DO (mg/L) Date (m	Free CI (mg/L)
Preservation Check Performed by: Field data collected by: Trauis pH 5.10 Cond (umho) Temp (oC) 16.77 or (oF) Flow (MGD) or (CFS) Relinquished by: (Signature) Man Man Man	Date (mm/dd/yy) II-04 3 660 Res CI (mg/L)	-19 Time (24 hr) / 10 Tot Cl (mg/L) DO (mg/L) Date (m pate (m	Free CI (mg/L)
Preservation Check Performed by: Field data collected by: Trauis pH 5.10 Cond (umho) Temp (oC) 16.77 or (oF) Flow (MGD) or (CFS) Relinquished by: (Signature) Management Signature	Date (mm/dd/yy) 11-04 3 660 Res CI (mg/L) Static Water Level	-19 Time (24 hr) / 10 Tot Cl (mg/L) DO (mg/L) Date (m gas yrinted: 9 5:45	Free CI (mg/L)



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 04, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9103066 Pace Project No.: 30334693

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 09, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9103066

 Pace Project No.:
 30334693

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS



SAMPLE SUMMARY

30334693001	9103066-01	Water	11/04/19 13:10	11/09/19 10:00
Lab ID	Sample ID	Matrix	Date Collected	Date Received
Pace Project No	.: 30334693			
Project:	9103066			

REPORT OF LABORATORY ANALYSIS



SAMPLE ANALYTE COUNT

 Project:
 9103066

 Pace Project No.:
 30334693

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30334693001	9103066-01	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9103066 Page Project No : 30334693

Pace	Project No.:	30334693	

Sample: 9103066-01	Lab ID: 303346930	001 Collected: 11/04/19 13:10	Received:	11/09/19 10:00	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Comments: • Sample collection	n dates and times were not pre	sent on the sample containers.				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1).145 ± 0.314 (0.580) C:NA T:96%	pCi/L	12/02/19 11:26	13982-63-3	
Radium-228	EPA 904.0	0.808 ± 0.343 (0.539) C:87% T:92%	pCi/L	11/27/19 11:17	15262-20-1	
Total Radium	Total Radium (Calculation	0.953 ± 0.657 (1.12)	pCi/L	12/04/19 09:28	3 7440-14-4	

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103066						
Pace Project No.:	30334693						
QC Batch:	370980		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 228			
Associated Lab San	nples: 30334693	001					
METHOD BLANK:	1800091		Matrix: Water				
Associated Lab San	nples: 30334693	001					
Paran	neter	Act ±	Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.0321 ± 0.281	(0.648) C:85% T:88%	pCi/L	11/27/19 11:14		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103066						
Pace Project No.:	30334693						
QC Batch:	370981		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description:	903.1 Radium-226			
Associated Lab San	nples: 30334693	001					
METHOD BLANK:	1800092		Matrix: Water				
Associated Lab San	nples: 30334693	001					
Paran	neter	Act ±	Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.0408 ± 0.330	(0.647) C:NA T:94%	pCi/L	12/02/19 10:59		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALIFIERS

Project:	9103066		
Pace Project No.:	30334693		

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

Chain of Custody			Pace Analytical	
Workorder: 9103066	Workorder Name: MW-	1 Wilson 092-00004 Owner Receive	d Date: 11/4/2019 Results Requested Bv:	
Report To:	Subcontract To:		Requested Analysis	\square
McCoy & McCoy Labs P.O. Box 907 Madisonville, KY 42409 270-821-7375	Pace Analytical 9 1638 Rosey Tow Greensburg, PA (724) 850-5615	Services LLC Greensburg P∉ ⁄n Rd Suite 2,3,4 15601		
Item Sample ID	Sample Collect Type Date/Time Lab II	Matrix	0.509 Aq3 0.409 Aq3 0.409 Aq3 0.409 Aq3	ALX N
2 9103066-01 3	11/04/19 13:10	R44-McCoy Water	X X X	
5			M0#:30334693	
0				
9 10				
Transfers Released By	ver the second second bate/Time	Reveived By	Date/Time	
1 2 2 2	1-8-16	160	11-974 10-20	
8				
Cooler Temperature on Receipt ***In order to maintain client con This chain of custody is considered	<u> </u>	Yor N Receiv the sampling site, sampler's name an mation is available in the owner lab	ed on ide Y or N Sample Intagt Y or N d signature may not be provided on this COC for statory.	
Beriday, June 17, 2016 11:01:34 AM	5	FMT-ALL-C-00	2rev.00 24March2009 Page 1 of	of 1

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of 11 f 19

SUBCONTRACT ORDER

McCoy & McCoy Laboratories, Inc.

9103066

SENDING LABORATORY:

McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal

RECEIVING LABORATORY:

Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 Phone :(724) 850-5615 Fax:

Please return shipping cooler to return address on shipping label.

Analysis		Expires	Laboratory ID	Comments	
Sample ID: 9103066-01	Water	Sampled:11/04/2019 13:10	Specific Method		
Radium Total (sub)		05/02/2020 13:10	EPA 903.0		
Radium 228 (sub)		05/02/2020 13:10	EPA 904.0		
Radium 226 (sub)		05/02/2020 13:10	EPA 903.1		

4-30334693

l 4-9-14 10:00 <u>||-8-19</u> Date Received By Released Date

Released By

Pittsburgh Lab Sample Condi	tion	Upoi	n Re	eceipt	
Pace Analytical' Client Name:		McC	ny l	<u>& McCay</u> Project = 303346) 3
Courier: Fed Ex UPS USPS Clien	it 🗋	Comme	erciaí	Pace Other Lims Login	
Custody Seal on Cooler/Box Present: Zyes		- 10	Seal	Is intact; Zives Dino	
Thermometer Used 1/	Туре	of Ice	: We	Blue None	
Cooler Temperature Observed Temp	.9	۰c	Corr		· .
Temp should be above freezing to 6°C		-			
				pH paper Lot# Date and Initials of person examining	
Comments:	Yes	No	N/A		
Chain of Custody Present:	\swarrow			1	
Chain of Custody Filled Out:	\mathbb{Z}			2.	
Chain of Custody Relinquished:				3.	
Sampler Name & Signature on COC:				4.	
Sample Labels match COC:	L	K		5. No time/ date on samples	
-Includes date/time/ID Matrix:	<u> </u>	7			
Samples Arrived within Hold Time:		1		6.	
Short Hold Time Analysis (<72hr remaining):				7.	
Rush Turn Around Time Requested:		2		8.	
Sufficient Volume:				9.	
Correct Containers Used:		[10.	
-Pace Containers Used:					
Containers Intact:		1		11.	
Orthophosphate field filtered				12.	
Hex Cr Aqueous sample field filtered				13.	
Organic Samples checked for dechlorination:				14.	
Filtered volume received for Dissolved tests				15.	
All containers have been checked for preservation.		[16. N.A.	
exceptions: VOA, coliform, TOC, O&G, Phenolics, Non-aqueous matrix	Řadon,			price	
All containers meet method preservation requirements.	\angle			Initial when DIC Date/time of preservation	
				LOT # of added preservative	
Headspace in VOA Vials (>6mm):				17.	
Trip Blank Present:				18	
Trip Blank Custody Seals Present				· .	•
Rad Samples Screened < 0.5 mrem/hr				Initial when DH Date: 11-11-19	·
Client Notification/ Resolution:					
Person Contacted:			Date/	Time:Contacted-By:	
Comments/ Resolution:					
A check in this box indicates that addit	lional	inform	natior	n has been stored in erenorfs.	

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Managar closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Managament\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5April2019)

McCOY & McCOY LABORATORIES, Inc.

P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com
 Pikeville, KY
 Farmersburg, IN

 606.432.3104
 812.696.5076

Lexington, KY Pade 859.299.7775 270.

Paducah, KY 270.444.6547

"Providing Tomorrow's Analytical Capabilities Today"

Certificate of Analysis 9103068

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/06/2019 15:38

Project Name:	MW-102 Wilson 092-00004	Workorder:	9103068

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/08/2019 15:35.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

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Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



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Lexington, KY Paducah, KY 859.299.7775

270.444.6547

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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alia	S	Matrix	Date Collected	Date Received	Sampled By
9103068-01	MW102/		Water	11/08/2019 12:25	11/08/2019 15:35	Travis Sneed
LabNumber	Measurement	Value				
9103068-01	Field Conductance	1190				
	Field pH	6.61				
	Field Temp (C)	15.62				

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ANALYTICAL RESULTS

Lab Sample ID: 9103068-01 Description: MW102

Sample Collection Date Time: 11/08/2019 12:25 Sample Received Date Time: 11/08/2019 15:35

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Arsenic	0.0031		mg/L	0.0010	0.0004	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Barium	0.059		mg/L	0.004	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Boron	ND	D2,	mg/L	1.00	1.00	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:03	AKB
		M4, U							
Cadmium	ND	U	mg/L	0.0010	0.0001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Calcium	85.1	D2	mg/L	4.00	1.30	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:03	AKB
Chromium	0.0006	J	mg/L	0.0020	0.0006	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Copper	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Iron	4.43	D2, M1	mg/L	1.00	0.500	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:03	AKB
Lead	ND	U	mg/L	0.002	0.0005	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Lithium	ND	U	mg/L	0.02	0.005	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Magnesium	36.9	D2, M1	mg/L	2.00	0.900	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:03	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Molybdenum	0.002	J	mg/L	0.01	0.002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Nickel	0.002	J	mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Potassium	ND	D2, L1,	mg/L	5.00	2.20	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:03	AKB
		M4, U							
Selenium	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Sodium	126	D1, M1	mg/L	26.0	10.0	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:06	AKB
Thallium	ND	U	mg/L	0.0020	0.0001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH
Zinc	ND	U	mg/L	0.02	0.02	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:02	DMH

Conventional Chemistry Analyses Madisonville

Analyte Res	ult	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as 2	86		mg/L	4		2320 B-2011	11/18/2019 09:45	11/18/2019 09:45	HMF
CaCO3									
Carbonate Alkalinity as CaCO3	١D	U	mg/L	4		2320 B-2011	11/18/2019 09:45	11/18/2019 09:45	HMF
Total Alkalinity 2	86		mg/L	4		2320 B-2011	11/18/2019 09:45	11/18/2019 09:45	HMF
Chemical Oxygen Demand	25		mg/L	5	5	HACH 8000	11/27/2019 17:25	11/27/2019 17:25	HMF
Specific Conductance 11	20		umhos/cm	1	1	2510 B-2011	11/22/2019 12:34	11/22/2019 12:34	DJK
(Lab)									
Hardness as CaCO3 3	48		mg/L	1	1	2340 C (as HACH	11/12/2019 11:06	11/12/2019 11:06	ALT
Total Dissolved Solida	20		ma/l	50	50	0220) 2540 C 2011	11/12/2010 16:52	11/13/2010 16:26	MAG
	20		iiig/L	50	50	2340 0-2011	11/12/2019 10.52	11/13/2019 10.20	MAG
Total Organic Carbon	1.2		mg/L	0.5		5310 C-2011	11/11/2019 16:27	11/13/2019 00:34	HMF

Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	-0.180	_Sub	pCi/L			EPA 903.1	12/06/2019 13:37	12/06/2019 13:38	AND
Radium-228	0.425	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/06/2019 13:37	12/06/2019 13:38	AND



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Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium	0.425	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/06/2019 13:37	12/06/2019 13:38	AND
Ion Chromatography Madisonville									
Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	35.3		mg/L	0.5	0.4	EPA 300.0 REV 2.1	11/15/2019 21:25	11/15/2019 21:25	CSC
Fluoride	0.36		mg/L	0.20		EPA 300.0 REV 2.1	11/15/2019 21:25	11/15/2019 21:25	CSC
Sulfate	307	D	mg/L	50.0	25.0	EPA 300.0 REV 2.1	11/15/2019 21:25	11/15/2019 21:25	CSC



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Notes for work order 9103068

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.
- MMLI does not provide interpretation of these results unless otherwise stated.
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

- _Sub See subcontractors report.
- D Results reported from dilution.
- D1 Sample required dilution due to high concentration of target analyte.
- D2 Sample required dilution due to matrix interference.
- J Estimated value.
- L1 The associated blank spike recovery was above method acceptance limits.
- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).

Standard Quallifiers/Acronymns

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than
-	

Less than



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Certifications
KY Drinking Water Mdv (00030)
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KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Wastewater Mdv (00030)

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9103068
Shipped By: Client	Temperature: 1.60° Celcius
Condition	
Check if Custody Seals are Present/Intact	
Check if Custody Signatures are Present	
Check if Collector Signature Present	
Check if bottles are intact	
Check if bottles are correct	
Check if bottles have sufficient volume	
Check if samples received on ice	
Check if VOA headspace is acceptable	
Check if samples received in holding time.	
Check if samples are preserved properly	

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory P.O. Box 907 Madisonville, KY 42431		Chạin	Chain of Custody						
		Schedule	Scheduled for: <u>10/14/2019</u>						
Client: Big Rivers Electric Corporation Wilson Station Project: MW-102 Wilson 092-00004		Report To: Big Rivers Ele Station Mike Galbraitl PO Box 24 Henderson, K	Report To: Big Rivers Electric Corporation Wilson Station Mike Galbraith PO Box 24 Hondorson KY 42410		Invoice To: Big Rivers Electric Corporation Wilson Station Brian Edwards PO Box 24 Henderson KX 42419				
Please Print Legibly		Phone: <u>(270)</u> PWS ID#: State:	<u>844-600</u>		PO#: <u>ک</u>	52827-35			
Collected by (Signature):	Inon' Som	ntormation*		_	Compli	ance Monitoring? Yes No			
*For composite samples please indicate begin time, and time and temp(oC) at and time below:			time below:	Samples Chlorinated? Yes No					
Influent: Start Date	Start time	End Date	End Date End Time			Temp (oC)			
Effluent: Start Date	Start time	End Date	E	End Time	Temp (oC)	· .			
MMLI USE ONLY *required Workorder # Date 9103068 (mm/dd/yy):	information* Collection Time (24 hr): Bottl	e and Preservative	ontainers	Sample Description	Composite	Controle Applying Resulted			
9103068-01 A 11-08-19	12:25	Plastic 1L	$\frac{\ddot{O}}{1}$	MW102	q/c	Alkalinity Total Chloride 300.0			
9103068-01 B <u>11.08-(9</u>	<u>12:25</u> Pla	istic 500mL pH<2 w/HNO3	1	MW102	g/c	Conductivity (Lab) Fluoride 300.0 Sulfate 300.0 Alkalinity Bicarbonate TDS Alkalinity Carbonate Arsenic Tot 6020 Antimony Tot 602 Barium Tot 6020 Iron Tot 6010B Selenium Tot 6020 Hardness Titration Beryllium Tot 6020 Boron Tot 6010B Cadmium Tot 6020 Calcium Tot 6010B Chromium Tot 6020 Sodium Tot 6010B Lead Tot 6020 Lithium Tot 6020 Mercury To 6020			
9103068-01 C <u>(1-08-19</u>	<u>12:25</u> Pla Prese	stic 500mL pH<2 w/H2SO4 rvation Check: pH :		MW102	g / c				
9103068-01 D <u>[-of-19</u>	<u>la:25</u> Plasti Prese	ic 1L pH<2 w/HNO3 Rad 226 (Sub) rvation Check: pH :	<u>/</u>	MW102	g / c	Radium 226 (sub)			
Preservation Check Perform	əd by:\Ou					1			
Field data collected by:	will sneed	Date (mm/dd/yy) <u>H-08</u>	- <i>14</i> Time (24 hr)	12:25	- ·			
рН <u>(0.61</u> Со	nd (umho) <u>1190</u>	_ Res Cl (mg/L))	Tot CI (mg/L)	Fre	ee CI (mg/L)			
Temp (oC) <u>15,62</u> or Flow (MGD) or	(oF) (CFS)	Static Water Level or (g/min)		DO (mg/L)	Т	urb. (NTU)			
Relinquished by: (Signature)	1	Received by: (Sign	nature)		Date (mm/	dd/yy) Time (24 hr) -19 1535			
MMLI - Check here if	trip charge applied to	associated COC		²rinted: 10	//31/2019 5:52	:19AM Page 7 of 10			

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory P.O. Box 907 Medisenville, KX, 42421	Chain of (Scheduled for	Custody : 10/14/2019					
]				
Client: Big Rivers Electric Corporation Wilson Station Project: MW-102 Wilson 092-00004	Report To: Big Rivers Electric Co Station Mike Galbraith PO Box 24 Henderson, KY 42419	orporation Wilson 9	Invoice To Big Rivers Brian Edwa PO Box 24 Henderson	Invoice To: Big Rivers Electric Corporation Wilson Station Brian Edwards PO Box 24 Henderson, KY 42419			
Please Print Legibly	PHONE: (270) 844-600 PWS ID#: State: K 1/	<u>10</u>	PO#: <u></u>	62827-35			
Collected by (Signature):			Comp	liance Monitoring? Yes No			
For composite samples please indicate begin time	a Information e, end time and temp(oC) at end	 I time below:	Sampl	les Chlorinated? Yes No			
Influent: Start Date Start time	End Date E	nd Time	Temp (oC)				
Effluent: Start Date Start time	End Date E	nd Time	Temp (oC)				
MMLI USE ONLY *required information* Workorder # Date Collection 9103068 (mm/dd/yy): Time (24 hr): Bit Sample ID# 9103068-01 E 11-06-19 12:25 Plate	ottle and Preservative	Sample Description MW102	Composite g / c	Sample Analysis Requested Radium 228 (sub)			
Pre 9103068-01 F <u>۱۱-۵۶-۱۹ اع: ح</u> Pla Pre	servation Check: pH :	MW102	g / c	Radium 228 (sub)			
9103068-01 G <u>וו-סק-וק וב; א</u> ר Pla Pre	astic 1L pH<2 w/HNO3 1/ (Sub) servation Check: pH :	MW102	g / c	Radium Total (sub)			
Preservation Check Performed by:				•			
Field data collected by: Image: Trace of Source of Cond (umho) Inge pH Cond (umho) pH Cond (umho) Temp (oC) or (oF) Flow (MGD) or (CFS)	Date (mm/dd/yy) Res CI (mg/L) Static Water Level or (g/min)	z -/ 9 Time (24 hr) Tot CI (mg/L) _ DO (mg/L)	<u>IL;25</u> Fr 1	ee Cl (mg/L) Furb. (NTU)			
Relinquished by: (Signature)	Received by: (Signature)	qu	Date (mm	/dd/yy) Time (24 hr) 8 - 19 1535			
MMLI - Check here if trip charge applied	to associated COC	rinted: 1		:19AM			



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 06, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9103068 Pace Project No.: 30335308

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 13, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9103068

 Pace Project No.:
 30335308

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS



SAMPLE SUMMARY

30335308001	9103068-01	Water	11/08/19 12:25	11/13/19 10:10		
Lab ID	Sample ID	Matrix	Date Collected	Date Received		
Pace Project No.: 30335308						
Project:	9103068					

REPORT OF LABORATORY ANALYSIS



SAMPLE ANALYTE COUNT

 Project:
 9103068

 Pace Project No.:
 30335308

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30335308001	9103068-01	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS


ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9103068

Pace Project No.: 30335308

Sample: 9103068-01	Lab ID: 30335308	Collected: 11/08/19 12:25	Received:	11/13/19 10:10 N	latrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.180 ± 0.408 (0.845) C:NA T:93%	pCi/L	12/06/19 11:18	13982-63-3	
Radium-228	EPA 904.0	0.425 ± 0.333 (0.645) C:75% T:82%	pCi/L	12/04/19 14:17	15262-20-1	
Total Radium	Total Radium Calculation	0.425 ± 0.741 (1.49)	pCi/L	12/06/19 13:24	7440-14-4	

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103068						
Pace Project No.:	30335308						
QC Batch:	371026		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description:	903.1 Radium-226			
Associated Lab San	nples: 30335308	001					
METHOD BLANK:	1800179		Matrix: Water				
Associated Lab San	nples: 30335308	001					
Paran	neter	Act :	LUnc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.139 ± 0.459	(0.772) C:NA T:92%	pCi/L	12/06/19 10:57		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103068						
Pace Project No.:	30335308						
QC Batch:	371027		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 228			
Associated Lab Sar	nples: 30335308	001					
METHOD BLANK:	1800180		Matrix: Water				
Associated Lab Sar	nples: 30335308	001					
Parar	neter	Act :	LUnc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.969 ± 0.446	(0.738) C:81% T:74%	pCi/L	12/04/19 11:10		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALIFIERS

Project:	9103068
Pace Project No.:	30335308

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

· · · ·			 					LAB USE ONLY	Ce													or N			Page 1 of 1
Face Analytical	sults Requested By:	ted Analysis	 									5208						Comments				Sample Intact 7	rovided on this COC		
	te: 11/8/2019 Res	Reques	 - 1844 - , 			0, 1, 0,	£06 ⊅ ₽06 ⊅	Eb) Eb) Eb)	× × ×			104.2023	うううう・キファ			0335308		ate/Time	314 1010			on Ice V or N	gnature may not be p orv.		/ 00 24March2009
	0 Owner Received Dat		DUIS FF			Preserved Contain	ltrix		iter									D	-1)			Received o	ampler's name and si in the owner laborat		FMT-AI1-C-002 rev
	V-102 Wilson 092-000	0:	ai services LLC Greens own Rd Suite 2,3,4	A 15601	Ŋ		D Ma		IR44-McCoy Wa									ne Reveived By	A. C.	2		al Y or N	of the sampling site, s formation is available		
	rkorder Name: MW	Subcontract To	Pace Analytica 1638 Rosey Tc	Greensburg, P	(724) 850-561		Collect Date/Time Lab		11/08/19 12:25									Date/Tir				°C Custody Se	lity, location/name c		
	Wo						Sample Type	•														eipt $O_{\mathcal{A}}$	lient confidentia		01-24 AM
of Custody	Workorder: 9103068	rt To:	iy & MicLoy Labs tox 907	sonville, KY 42409	121-7375	a@mccoylabs.com	Sample ID	-	9103068-01									sfers Released By				r Temperature on Reco	1 order to maintain cl-		V 11.017 2016 11.0
Chain		Repor	P.O.B	Madis	270-8	angel	ltem	٦	5	ŝ	4	5	6	7	8	6	10	Trans		5	ε	Coole	This r	F	

J.

Page 17 of 19



SUBCONTRACT ORDER

McCoy & McCoy Laboratories, Inc.

9103068

SENDING LABORATORY:

McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal

RECEIVING LABORATORY:

Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 Phone :(724) 850-5615 Fax:

Please return shipping cooler to return address on shipping label.

Analysis		Expires	Laboratory ID	Comments	
Sample ID: 9103068-01	Water	Sampled:11/08/2019 12:25	Specific Method		
Radium Total (sub)		05/06/2020 12:25	EPA 903.0		
Radium 228 (sub)		05/06/2020 12:25	EPA 904.0		
Radium 226 (sub)		05/06/2020 12:25	EPA 903.1		

#_30335308

uni Received By Date

11-13-19 10-10 Date

Released By

Received By

Pittsburgh Lab Sample Conditio	n Up	on F	Recei	ipt	r e	E 7 N 7 7	(530 A
Pace Analytical' Client Name: _	M	Cay	QN	hloy	Project	₽ <u></u>	
Courier:		nmercli	at E	Pace Other _		Label_//	m
Custody Seal on Cooler/Box Present: Uyes	[⊂ n0	S	ieals inf	tact: Lyes			
Thermometer Used	Type of	fice:	Wel	Blue None	•C ===	Internet O.K	• C
Cooler Temperature Observed Temp	<u> </u>	•	Correct	tion Factor: <u>C</u>	= ru		
Temp should be above freezing to 6°C			व	H paper Lot#	Date a	nd Initials of person ex	amining 49
r	Val	No	N/A	1000391	cont	ents: <u>////////////////////////////////////</u>	
Comments:	Tes						
Chain of Custody Present:	$ \rightarrow $	+		·			
Chain of Custody Filled Out:		+		<u>.</u>			
Chain of Custody Relinquished:		$ \rightarrow $	-+	<u>،</u>			
Sampler Name & Signature on COC:			ť	*	······		
Sample Labels match COC:	117		`	э.		_	
-Includes date/time/ID Matrix:							
Samples Arrived within Hold Time:	\leftarrow			6			
Short Hold Time Analysis (<72hr remaining):				7			
Rush Turn Around Time Requested:		¥—		8			
Sufficient Volume:				9			
Correct Containers Used:	K			10. 			
-Pace Containers Used:	<u> </u>	\vdash					
Containers Intact:				11.			
Orthophosphate field filtered	<u> </u>	<u> </u>	\vdash	12.			
Hex Cr Aqueous sample field filtered		+	-	13			
Organic Samples checked for dechlorination:	<u> </u>	<u> </u>	-	14			
Filtered volume received for Dissolved tests	<u> </u>		<u> </u>	15			
All containers have been checked for preservation.				16. DMCZ	-		
exceptions: VOA, coliform, TOC, O&G, Phenolics	, Rado	n, 					
Non-aqueous matnx		1	Τ	Initial when	Date/tin	ne of	
requirements.	Ĺ			completed /	picsol v		
				preservative			
				17			
Headspace in VOA viais (- oning,			7	18.			
Trip Blank Present		T		1			·
Trip Blank Custooy Seals Present Rad Samples Screened < 0.5 mrem/hr		-		Initial when completed:	C Date:	11-1379	
	1			<u></u>			
Client Notification/ Resolution:				-/ime:		-Contacted-By:	
Person-Gontacted:			_			· · ·	*
Comments/ Resolution:						······································	
A obeck in this hox indicates that at	Idition	nal inf	ormati	ion has been sto	ored in erepo	rts.	
			liance (emples a copy of th	is form will be se	nt to the North Carolina	DEHNR

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy Carolincation Office (I.e. out of hold, incorrect preservative, out of temp, Incorrect containers) *PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Menagement\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5April2019)

McCOY & McCOY LABORATORIES, Inc.

P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com
 Pikeville, KY
 Farmersburg, IN

 606.432.3104
 812.696.5076

Lexington, KY Paducah, KY 859.299.7775 270.444.6547

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Certificate of Analysis 9103069

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/06/2019 15:37

Project Name:	MW-104 Wilson 092-00004	Workorder:	9103069	
· · - J · · · · · · · · · · · · ·				

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/08/2019 15:35.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

This certificate of analysis may not be reproduced without the written consent of McCoy & McCoy Laboratories, Inc.



Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



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Lexington, KY 859.299.7775

Paducah, KY 270.444.6547

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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias		Matrix	Date Collected	Date Received	Sampled By
9103069-01	MW104/		Water	11/08/2019 10:50	11/08/2019 15:35	Travis Sneed
LabNumber	Measurement	Value				
9103069-01	Field Conductance	1870				
	Field pH	6.64				
	Field Temp (C)	14.65				

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ANALYTICAL RESULTS

Lab Sample ID: 9103069-01 Description: MW104

Sample Collection Date Time: 11/08/2019 10:50 Sample Received Date Time: 11/08/2019 15:35

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Arsenic	0.0027		mg/L	0.0010	0.0004	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Barium	0.064		mg/L	0.004	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Boron	ND	U, D2	mg/L	1.00	1.00	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:09	AKB
Cadmium	ND	U	mg/L	0.0010	0.0001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Calcium	257	D1	mg/L	40.0	13.0	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:13	AKB
Chromium	0.0037		mg/L	0.0020	0.0006	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Copper	0.001	J	mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Iron	9.29	D2	mg/L	1.00	0.500	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:09	AKB
Lead	0.002		mg/L	0.002	0.0005	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Lithium	0.03		mg/L	0.02	0.005	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Magnesium	68.9	D2	mg/L	2.00	0.900	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:09	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Molybdenum	ND	U	mg/L	0.01	0.002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Nickel	0.005		mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Potassium	4.17	D2, L1	mg/L	5.00	2.20	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:09	AKB
Selenium	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Sodium	77.7	D2	mg/L	2.60	1.00	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:09	AKB
Thallium	ND	U	mg/L	0.0020	0.0001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH
Zinc	ND	U	mg/L	0.02	0.02	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:06	DMH

Conventional Chemistry Analyses Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as	386		mg/L	4		2320 B-2011	11/18/2019 09:50	11/18/2019 09:50	HMF
CaCO3									
Carbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 09:50	11/18/2019 09:50	HMF
Total Alkalinity	386		mg/L	4		2320 B-2011	11/18/2019 09:50	11/18/2019 09:50	HMF
Chemical Oxygen Demand	41		mg/L	5	5	HACH 8000	11/27/2019 17:25	11/27/2019 17:25	HMF
Specific Conductance	1740		umhos/cm	1	1	2510 B-2011	11/22/2019 12:35	11/22/2019 12:35	DJK
(Lab)									
Hardness as CaCO3	880	D	mg/L	2	2	2340 C (as HACH	11/12/2019 11:08	11/12/2019 11:08	ALT
						8226)			
Total Dissolved Solids	1490		mg/L	50	50	2540 C-2011	11/12/2019 16:56	11/13/2019 16:26	MAG
Total Organic Carbon	0.8		mg/L	0.5		5310 C-2011	11/11/2019 16:27	11/13/2019 00:55	HMF

Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	0.029	_Sub	pCi/L			EPA 903.1	12/06/2019 13:37	12/06/2019 13:38	AND
Radium-228	1.21	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/06/2019 13:37	12/06/2019 13:38	AND
Radium	1.24	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/06/2019 13:37	12/06/2019 13:38	AND



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Ion Chromatography Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	13.2		mg/L	0.5	0.4	EPA 300.0 REV 2.1	11/15/2019 21:58	11/15/2019 21:58	CSC
Fluoride	ND	U	mg/L	0.20		EPA 300.0 REV 2.1	11/15/2019 21:58	11/15/2019 21:58	CSC
Sulfate	587	D, M1	mg/L	50.0	25.0	EPA 300.0 REV 2.1	11/15/2019 21:58	11/15/2019 21:58	CSC

Notes for work order 9103069

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.

- MMLI does not provide interpretation of these results unless otherwise stated.

- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.

- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.

- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.

- The Chain of Custody document is included as part of this report.

- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

_Sub See subcontractors report.

- D Results reported from dilution.
- D1 Sample required dilution due to high concentration of target analyte.

D2 Sample required dilution due to matrix interference.

- J Estimated value.
- L1 The associated blank spike recovery was above method acceptance limits.
- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).

Standard Quallifiers/Acronymns

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than
	Less than



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859.299.7775

Certified Analyses included in this Rep	ort	
Analyte	Certifications	
2320 B-2011 in Water		
Bicarbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Carbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Total Alkalinity	KY Drinking Water Mdv (00030)	
2340 C (as HACH 8226) in Water		
Hardness as CaCO3	KY Drinking Water Mdv (00030)	
2510 B-2011 in Water		
Specific Conductance (Lab)	KY Drinking Water Mdv (00030)	
2540 C-2011 in Water		
Total Dissolved Solids	KY Drinking Water Mdv (00030)	
5310 C-2011 in Water		
Total Organic Carbon	KY Drinking Water Mdv (00030)	
EPA 300.0 REV 2.1 in Water		
Chloride	KY Drinking Water Mdv (00030)	
Fluoride	KY Drinking Water Mdv (00030)	
Sulfate	KY Drinking Water Mdv (00030)	
HACH 8000 in Water		
Chemical Oxygen Demand	KY Wastewater Mdv (00030)	

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9103069
Shipped By: Client	Temperature: 1.60° Celcius
Condition	
Check if Custody Seals are Present/Intact	
Check if Custody Signatures are Present	
Check if Collector Signature Present	$\overline{\mathbf{V}}$
Check if bottles are intact	
Check if bottles are correct	$\overline{\mathbf{V}}$
Check if bottles have sufficient volume	
Check if samples received on ice	$\overline{\mathbf{v}}$
Check if VOA headspace is acceptable	
Check if samples received in holding time.	
Check if samples are preserved properly	

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory	Chair	Chain of Custody					
P.O. Box 907 Madisonville, KY 42431	Schedule	ed for	: <u>10/14/2019</u>	:			
Client: Big Rivers Electric Corporation Wilson Station Project: MW-104 Wilson 092-00004	Report To: Big Rivers El Station Mike Galbrait PO Box 24 Henderson, K	ectric Co h (Y 42419	rporation Wilson	Invoice To: Big Rivers & Brian Edwa PO Box 24 Henderson,	Electric Corporation Wilson Station		
	Phone: <u>(270)</u> PWS ID#:	844-600	<u>0</u> .	PO#: _2	52827-35		
Please Print Legibly	State:	кy		Quote#			
Collected by (Signature):*require	d information*		-	Compl	ance Monitoring? Yes No		
*For composite samples please indicate begin time	e, end time and temp(oC	C) at end	time below:	Sample	es Chlorinated? Yes No		
Influent: Start Date Start time	End Date	Er	nd Time	Temp (oC)	-		
Effluent: Start Date Start time	End Date	Er	nd Time	Temp (oC)			
MMLI USE ONLY *required information* Workorder # Date Collection 9103069 (mm/dd/yy): Time (24 hr): B Sample ID#	ottle and Preservative	Containers	Sample Description	Composite	Sample Analysis Requested		
9103069-01 A <u> -08-19</u> <u> 6:50</u> 9103069-01 B <u> 1-08-19</u> <u>(0:50</u>	Plastic 1L Plastic 500mL pH<2 w/HNO3	1	MW104 MW104	g / c	Alkalinity Total Chloride 300.0 Conductivity (Lab) Fluoride 300.0 Sulfate 300.0 Alkalinity Bicarbonate TDS Alkalinity Carbonate Arsenic Tot 6020 Antimony Tot 6020 Barium Tot 6020 Iron Tot 6010B Selenium Tot 6020 Hardness Titration Beryllium Tot 6020 Boron Tot 6010B Cadmium Tot 6020 Calcium Tot 6010B Chromium Tot 6020 Sodium Tot 6010B Lead Tot		
Pre 9103069-01 C <u> -08-19</u> <u> 0:50</u> Pre 9103069-01 D <u> -09-19</u> <u> 0:50</u> Pla	servation Check: pH : Plastic 500mL pH<2 w/H2SO4 servation Check: pH : Istic 1L pH<2 w/HNO3	<u></u> <u>1/</u> 1/	MW104 MW104	g/c g/c	6020 Lithium Tot 6020 Mercury Tot 6020 COD TOC Radium 226 (sub)		
Preservation Check Performed by:	Servation Check: pH : D D D Date (mm/dd/yy) Res Cl (mg/L) Static Water Level or (g/min)		<u>-/9</u> Time (24 hr) _/ Tot Cl (mg/L) DO (mg/L)	<u>0: 50</u> Fre Т	e CI (mg/L) urb. (NTU)		
Relinquished by: (Signature)	Received by: (Sign	ature) ////je	~	Date (mm/	dd/yy) Time (24 hr) 2 -19 1535		
MMLI - Check here if trip charge applied	to associated COC		rinted: 10)/31/2019 5:53	20AM Page 1 of 2 Page 6 of 18		

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory	Chain of Custody	
P.O. Box 907 Madisonville, KY 42431	Scheduled for: <u>10/14/20</u>	
Client: Big Rivers Electric Corporation Wilson Station	Report To: Big Rivers Electric Corporation Wilson	Invoice To: Big Rivers Electric Corporation Wilson Station
Project: MW-104 Wilson 092-00004	Mike Galbraith PO Box 24	Brian Edwards PO Box 24
	Henderson, KY 42419	Henderson, KY 42419
	Phone: <u>(270) 844-6000</u> PWS ID#:	PO#: <u>252827-35</u>
Please Print Legibly	, State: <u> </u>	Quote#
Collected by (Signature):	information*	. Compliance Monitoring? Yes No
*For composite samples please indicate begin time	end time and temp(oC) at end time below:	Samples Chlorinated? Yes No
Influent: Start Date Start time	End Date End Time	Temp (oC)
Effluent: Start Date Start time	End Date End Time	Temp (oC)
MMLI USE ONLY *required information* Workorder # Date Collection 9103069 (mm/dd/yy): Time (24 hr): Bo Sample ID#	د وتع التو ttle and Preservative و O O	ption Composite Sample Analysis Requested
9103069-01 E <u>11-08-19</u> <u>10:50</u> Pla Pres	stic 1L pH<2 w/HNO3 1 MW104 Rad 228 (Sub) servation Check: pH :	g / c Radium 228 (sub)
9103069-01 F <u>11-08-19</u> <u>10:50</u> Pla	stic 1L pH<2 w/HNO3 1 MW104 Rad 228 (Sub)	g / c Radium 228 (sub)
9103069-01 G <u> 1 - 08 - (9 10:50</u> Pla Pres	stic 1L pH<2 w/HNO3 1 / MW104 (Sub) servation Check: pH :	g / c Radium Total (sub)
	,	
		,
Preservation Check Performed by:	Ý	
Field data collected by: <u>Travis Snuc</u>	Date (mm/dd/yy) <u>11-2819</u> Time (24)	hr) <u>10:50</u>
pH 6.69 Cond (umho) 1.870	Res CI (mg/L) Tot CI (mg	p/L) Free CI (mg/L)
Temp (oC) <u>14.65</u> or (oF)	Static Water Level DO (mg/	L) Turb. (NTU)
Flow (MGD) or (CFS)	or (g/min)	
Relinquished by: (Signature)	Received by: (Signature)	Date (mm/dd/yy) Time (24 hr) 11-08-19 1535
MMLI - Check here if trip charge applied	to associated COC *rinte	ed: 10/31/2019 5:53:20AM



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 06, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9103069 Pace Project No.: 30335306

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 13, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9103069

 Pace Project No.:
 30335306

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS

Pac	ne	20	£11
Page	9	of	18



SAMPLE SUMMARY

30335306001	9103069-01	Water	11/08/19 10:50	11/13/19 10:10
Lab ID	Sample ID	Matrix	Date Collected	Date Received
Pace Project No	.: 30335306			
Project:	9103069			

REPORT OF LABORATORY ANALYSIS



SAMPLE ANALYTE COUNT

 Project:
 9103069

 Pace Project No.:
 30335306

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30335306001	9103069-01	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9103069

335306

Sample: 9103069-01	Lab ID: 30335306	6001 Collected: 11/08/19 10:50	Received:	11/13/19 10:10	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Comments: • Sample collect	tion dates and times were not pr	esent on the sample containers.				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0287 ± 0.494 (0.888) C:NA T:94%	pCi/L	12/06/19 11:18	3 13982-63-3	
Radium-228	EPA 904.0	1.21 ± 0.519 (0.832) C:76% T:77%	pCi/L	12/04/19 14:17	7 15262-20-1	
Total Radium	Total Radium Calculation	1.24 ± 1.01 (1.72)	pCi/L	12/06/19 13:24	1 7440-14-4	

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103069						
Pace Project No.:	30335306						
QC Batch:	371026		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description:	903.1 Radium-226			
Associated Lab Sar	mples: 30335306	001					
METHOD BLANK:	1800179		Matrix: Water				
Associated Lab Sar	mples: 30335306	001					
Parar	meter	Act :	LUnc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.139 ± 0.459	(0.772) C:NA T:92%	pCi/L	12/06/19 10:57		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103069						
Pace Project No.:	30335306						
QC Batch:	371027		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 228			
Associated Lab Sar	mples: 30335306	6001					
METHOD BLANK:	1800180		Matrix: Water				
Associated Lab Sar	mples: 30335306	6001					
Parar	meter	Act :	LUnc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.969 ± 0.446	(0.738) C:81% T:74%	pCi/L	12/04/19 11:10		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALIFIERS

Project: 9103069 Pace Project No.: 30335306

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

Chain of Custody									Pace Analyti	Cal*	5 ¹⁰ 5
Workorder: 9103069	Wo	rkorder Nam	-WM -	104 Wilson (000-260	0 Owner Recei	ived Date:	11/8/2019	Results Requested By	2	Г
Report To:		Subco	ntract To:					Re	squested Analysis		
McCoy & McCoy Labs		Pace A	Analytical	Services LLC	Greenst	ourg P <i>t</i>					
P.O. Box 907		1638 F Green	Rosey Tow shurg PA	vn Rd Suite 2 15601	,3,4					******± =***	
Mausonville, NT 42403 270-821-7375		(724)	850-5615								
angela@mccoylabs.com						Preserve	d Containers	0. T. 0.			
Item Sample ID	Type Type	Collect Date/Time	Lab I	D	Mat	trix		206 A 206 A			;
								Eb Eb			∠ך
2 9103069-01		11/08/19 10	0:50	IR44-McCoy	Ма	ter		× × ×		2	<u> </u>
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Cooler Temperature on Receipt	ک (°C Cu	stody Sea	Y or (N)		Rec	ceived on	ceY /or N	Sample Intac	CT V OF N	٦
***In order to maintain clien This chain of custody is consi	t confidentia dered compl	ality, locatior lete as is sinc	ካ/name of ce this info	f the samplin ormation is a	ıg site, si ıvailable	ampler's nam in the owner	e and sign laborator	ature may no /-	t be provided on this U	2	
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upe 16 of 18

SUBCONTRACT ORDER

McCoy & McCoy Laboratories, Inc.

9103069

SENDING	LABORATORY:

, А

McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal

RECEIVING LABORATORY:

Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 Phone :(724) 850-5615 Fax:

Please return shipping cooler to return address on shipping label.

Analysis		Expires	Laboratory ID	Comments
C	Water	Sampled:11/08/2019 10:50	Specific Method	
Radium Total (sub) Radium 228 (sub) Radium 226 (sub)		05/06/2020 10:50 05/06/2020 10:50 05/06/2020 10:50	EPA 903.0 EPA 904.0 EPA 903.1	

#-30335306

MMMM/

10-10 11-1379 Date

<u>//·//·/9</u> Date

Received By

Received By

Pittsburgh Lab Sample Condition	n Up	on F	Rece	pt	M 70335	30
Bana Analytical' Client Name:	M	Caz	1 Q N	Mary F	Project ##	-
	/	ti			iabel M]
	⊡ton	nerc	ial [Pace Other		1
Tracking #: 1107 3385 5389					<u>,</u>	-
Custody Seal on Cooler/Box Present; yes	<u> Z</u> n0	5	Seals in	act. Ljyes Lj		
Thermometer Used	Type of	ice:	Wel	Blue None		
Cooler Temperature Observed Temp 5.1		· C	Соггес	ion Factor:		
Temp should be above freezing to 6°C			ត	H paper Lot#	Date and initials of person examining $\rho_{\mathcal{L}} = \frac{1}{2} 1$	
F	Veel	No	N/A	1000391	contents.	4
Comments:	Yes		1411 (_
Chain of Custody Present:				, ,		
Chain of Custody Filled Out:	\leq					_
Chain of Custody Relinquished:	\leq		-	<u> </u>		_
Sampler Name & Signature on COC:	┞1	$\overline{}$	┼──┤	5	(lito Dia privales	
Sample Labels match COC:		<u> </u>	1	· NOTIME	raure on sumplies	
-Includes date/time/ID Matrix: 1/	1	1	T	~		
Samples Arrived within Hold Time:	\vdash	+->		o		
Short Hold Time Analysis (<72hr remaining):	<u> </u>	K	<u>-</u>	7		
Rush Turn Around Time Requested:	\vdash	\vdash		8		
Sufficient Volume:	¥			9		
Correct Containers Used:	K		/	10.		
-Pace Containers Used:	<u> </u>	K				
Containers Intact:	\downarrow			11.		
Orthonhosphate field filtered	<u> </u>		+	12		
Hex Cr Aqueous sample field filtered			4	13		
Organic Samples checked for dechlorination:	_ <u>`</u>		4			
Filtered volume received for Dissolved tests			-¥	15		
All containers have been checked for preservation.		1_		16. OMUZ		
exceptions: VOA, collform, TOC, O&G, Phenolics	s, Rado	л ,				
Non-aqueous matrix	∇			Initial when AIC	Date/time of	
All containers meet method preservation				completed	preservation	
				Lot # of added preservative		
	<u> </u>	T		17.	······	
Headspace in VOA Vials (>6mm):	+-	一	/	18.		
Trip Blank Present:		Ť	\neg			
Trip Blank Custody Seals Present		7		Initial when put	Date: (1-13-09	
Rad Samples Screeneu < 0.5 months				Completour /		
Client Notification/ Resolution:				to/⊡ma≏	Gontacted By:	
Person-Gontacted:					· · · · · · · · · · · · · · · · · · ·	
Comments/ Resolution:						
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Note: Whenever there is a discrepancy effecting North Carolina compliance samples, a copy Cartification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers) *PM review is documented electronically in LIMS. When the Project Menager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screan. J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5April2019)

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McCOY & McCOY LABORATORIES, Inc.

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 Farmersburg, IN

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 812.696.5076

Lexington, KY 859.299.7775

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Certificate of Analysis 9103070

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/04/2019 16:56

Project Name:	MW-105 Wilson 092-00004	Workorder:	9103070
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Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/07/2019 15:20.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

This certificate of analysis may not be reproduced without the written consent of McCoy & McCoy Laboratories, Inc.



Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias	5	Matrix	Date Collected	Date Received	Sampled By
9103070-01	MW105/		Water	11/07/2019 10:45	11/07/2019 15:20	Travis Sneed
LabNumber	Measurement	Value				
9103070-01	Field Conductance	948				
	Field pH	7.51				
	Field Temp (C)	16.35				

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ANALYTICAL RESULTS

Lab Sample ID: 9103070-01 Description: MW105

Sample Collection Date Time: 11/07/2019 10:45 Sample Received Date Time: 11/07/2019 15:20

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Arsenic	ND	U	mg/L	0.0010	0.0004	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Barium	0.326		mg/L	0.004	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Boron	ND	D2, M4, U	mg/L	1.00	1.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:28	AKB
Cadmium	ND	U	mg/L	0.0010	0.0001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Calcium	72.0	D2, M1	mg/L	4.00	1.30	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:28	AKB
Chromium	ND	U	mg/L	0.0020	0.0006	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Copper	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Iron	2.26	D2, M1	mg/L	1.00	0.500	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:28	AKB
Lead	ND	U	mg/L	0.002	0.0005	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Lithium	0.03	M1	mg/L	0.02	0.005	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Magnesium	22.4	D2, M1	mg/L	2.00	0.900	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:28	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Molybdenum	0.002	J	mg/L	0.01	0.002	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Nickel	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Potassium	3.62	D2, M4	mg/L	5.00	2.20	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:28	AKB
Selenium	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Sodium	126	D1, M1	mg/L	26.0	10.0	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:31	AKB
Thallium	ND	U	mg/L	0.0020	0.0001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP
Zinc	ND	M2, U	mg/L	0.02	0.02	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:12	DBP

Conventional Chemistry Analyses Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as CaCO3	423		mg/L	4		2320 B-2011	11/18/2019 09:56	11/18/2019 09:56	HMF
Carbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 09:56	11/18/2019 09:56	HMF
Total Alkalinity	423		mg/L	4		2320 B-2011	11/18/2019 09:56	11/18/2019 09:56	HMF
Chemical Oxygen Demand	8		mg/L	5	5	HACH 8000	11/27/2019 16:46	11/27/2019 16:46	HMF
Specific Conductance (Lab)	954		umhos/cm	1	1	2510 B-2011	11/22/2019 12:36	11/22/2019 12:36	DJK
Hardness as CaCO3	294		mg/L	1	1	2340 C (as HACH 8226)	11/12/2019 11:10	11/12/2019 11:10	ALT
Total Dissolved Solids	612		mg/L	50	50	2540 C-2011	11/12/2019 17:00	11/13/2019 16:26	MAG
Total Organic Carbon	1.0		mg/L	0.5		5310 C-2011	11/07/2019 13:50	11/12/2019 14:51	HMF
Total Organic Carbon	1.1		mg/L	0.5		5310 C-2011	11/07/2019 13:50	11/10/2019 13:23	HMF
Subcontracted Analyses									
Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	0.332	_Sub	pCi/L			EPA 903.1	12/04/2019 10:56	12/04/2019 10:58	AND



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Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-228	0.497	_Sub	pCi/L			EPA 904.0 Radium	12/04/2019 10:56	12/04/2019 10:58	AND
Radium	0.829	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND

Ion Chromatography Madisonville

Analyte	Result	Flag U	iits MRI	. MDL	Method	Prepared	Analyzed	Analyst
Chloride	10.1	m	g/L 0.5	5 0.4	EPA 300.0 REV 2.1	11/15/2019 22:31	11/15/2019 22:31	CSC
Fluoride	0.55	m	g/L 0.20)	EPA 300.0 REV 2.1	11/15/2019 22:31	11/15/2019 22:31	CSC
Sulfate	73.7	D m	g/L 50.0) 25.0	EPA 300.0 REV 2.1	11/15/2019 22:31	11/15/2019 22:31	CSC



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Notes for work order 9103070

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.
- MMLI does not provide interpretation of these results unless otherwise stated.
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

- _Sub See subcontractors report.
- D Results reported from dilution.
- D1 Sample required dilution due to high concentration of target analyte.
- D2 Sample required dilution due to matrix interference.
- J Estimated value.
- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).
- Y1 Sample RPD exceeded the method control limit.

Standard Quallifiers/Acronymns

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than
	Less than



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Certifications
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Drinking Water Mdv (00030)
KY Wastewater Mdv (00030)

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9103070		
Shipped By: Client	Temperature: 1.90° Celcius		
Condition			
Check if Custody Seals are Present/Intact			
Check if Custody Signatures are Present			
Check if Collector Signature Present			
Check if bottles are intact			
Check if bottles are correct			
Check if bottles have sufficient volume			
Check if samples received on ice			
Check if VOA headspace is acceptable			
Check if samples received in holding time.			
Check if samples are preserved properly			

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory		Chain of Custody				
P.O. Box 907 Madisonville, KY 42431		Schedule	d for:	<u>10/14/2019</u>		
Client: Big Rivers Electric Corporation Station Project: MW-105 Wilson 092-00004	n Wilson	Report To: Big Rivers Ele Station Mike Galbrait PO Box 24 Henderson, K	ectric Cor h TY 42419	poration Wilson	Invoice To: Big Rivers E Brian Edwar PO Box 24 Henderson,	Electric Corporation Wilson Station
Please Print Legibly	,	Phone: <u>(270)</u> PWS ID#: State:	844-6000 [4y	2	PO#: <u>,2</u> Quote#	52827-37
Collected by (Signature):	*regulied info	mation*	1	· .	Compli	iance Monitoring? Yes No
*For composite samples please indicate	begin time, end f	ime and temp(oC) at end	time below:	Sample	es Chlorinated? Yes No
Influent: Start Date Start tin	ne	End Date	En	d Time	Temp (oC)	
Effluent: Start Date Start tir	ne	End Date	Er	nd Time	Temp (oC)	
MMLI USE ONLY *required information Workorder # Date Collect 9103070 (mm/dd/yy): Time (24) Sample ID# 9103070-01 A $1 - o 7 - 1 2$ $1 o 1 4 + 1 0$ 9103070-01 B $1 - o 7 - 1 2$ $1 o 1 4 + 1 0$ 9103070-01 B $1 - o 7 - 1 2$ $1 o 1 4 + 1 0$ 9103070-01 C $1 - o 7 - 1 2$ $1 o 1 + 1 2$ 9103070-01 D $1 - o 7 - 1 2$ $1 o 1 + 1 2$ 9103070-01 D $1 - o 7 - 1 2$ $1 o 1 + 1 2$	on* ion hr): Bottle ar <u>15</u> P <u>5</u> Plastic V Preservat Plastic 11 Rac Preservat	tion Check: pH : 500mL pH<2 v/HNO3 500mL pH<2 v/HNO3 500mL pH<2 v/H2SO4 tion Check: pH : L pH<2 w/HNO3 1226 (Sub) tion Check: pH :	$\begin{array}{c c} 1 \\ \hline \\ 2 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0$	Sample Description MW105 MW105 MW105 MW105	Composite g / c g / c g / c g / c g / c	Sample Analysis Requested Alkalinity Total Chloride 300.0 Conductivity (Lab) Fluoride 300.0 Sulfate 300.0 Alkalinity Bicarbonate TDS Alkalinity Carbonate Arsenic Tot 6020 Antimony Tot 6020 Barium Tot 6020 Iron Tot 6010B Selenium Tot 6020 Hardness Titration Beryllium Tot 6020 Boron Tot 6010B Cadmium Tot 6020 Calcium Tot 6010B Chromium Tot 6020 Sodium Tot 6010B Lead Tot 6020 COD TOC Radium 226 (sub)
Preservation Check Performed by:	NOY					
Field data collected by: Irac:S 5 pH 7, 5 / Cond (umho Temp (oC) 16,35 or (oF) Flow (MGD) or (CFS)	<u>948</u> s	Date (mm/dd/yy Res Cl (mg/L tatic Water Level (g/min)) <u>11-07 -</u>)	- / 9 Time (24 hr) _ Tot Cl (mg/L) _ DO (mg/L) _ 	<u>10; 45</u> Fr	ee Cl (mg/L) Furb. (NTU)
Relinquished by: (Signature)	R	eceived by: (Sign	hature)		Date (mm.	/dd/yy) Time (24 hr) 7 - / 9 / 522)
MMLI - Check here if trip charg	ge applied to as	, sociated COC		·rinted: 1	0/31/2019 5:53	:40AM Page 7 of 19

McCoy & McCoy Laborator A PACE Analytical Labo P.O. Box 907	atories, Inc. aboratory Chain of Custody Scheduled for: 10/14/2019					
Madisonville, KY 42431		Scheduled	101. <u>10/14/2019</u>			
Client: Big Rivers Electric Station	c Corporation Wilson	Report To: Big Rivers Electri Station	c Corporation Wilson	Invoice To: Big Rivers E	Electric Corporation Wilson Station	
Project: MW-105 Wilson	092-00004	Mike Galbraith		Brian Edwar	rds Č	
•		PO Box 24 Henderson KY 4	2419	PO Box 24 Henderson	KY 42419	
		Phone: (270) 844 PWS ID#	<u>-6000</u>	РО#: <u>2</u>	52827-37	
Please Print Legibly		State: 16	<u>v </u>	Quote#		
Collected by (Signature):	Ina ha		· · · · · · · · · ·	Compli	ance Monitoring? Yes No	
Collected by (Signature): *required information*						
*For composite samples ple	ease indicate begin time, er	nd time and temp(oC) at	end time below:	Samples Chlorinated? Yes No		
Influent: Start Date	Start time	_ End Date	_ End Time T	Гетр (oC)		
Effluent: Start Date	Start time	End Date	End Time1	Гетр (оС)		
MMLI USE ONLY *requir Workorder # Date 9103070 (mm/dd/y Sample ID#	ed information* Collection yy): Time (24 hr): Bottle	and Preservative	Sample Description	Composite	, Sample Analysis Requested	
9103070-01 E	9 <u>10:45</u> Plastic F Presen	: 1L pH<2 w/HNO3 1 Rad 228 (Sub) vation Check: pH :	/ MW105	g / c	Radium 228 (sub)	
9103070-01 F <u>(-0]- (</u>	<u>10:45</u> Plastic R Presen	: 1L pH<2 w/HNO3 1 Rad 228 (Sub) vation Check: pH :	/ MW105	g / c	Radium 228 (sub)	
9103070-01 G <u> -07- </u>	<u>9 10:45</u> Plastic Presen	: 1L pH<2 w/HNO3 1 (Sub) vation Check: pH : <u></u>	MW105	g / c	Radium Total (sub)	
Preservation Check Perfo	ormed by:				· · · · · · · · · · · · · · · · · · ·	
	Travis Samed	Date (mm/dd/w) t		10:45	-	
Field data collected by:	nino mind	_ Date (mm/dd/yy) <u>m</u>	<u>- 07 7-7</u> Time (24 fil)	<u></u>		
рН <u>7,5</u>	Cond (umho) 998	Res CI (mg/L)	Tot CI (mg/L)	Fr	ee CI (mg/L)	
Temp (oC) _16.35	or (oF)	Static Water Level	DO (mġ/L)	ד	Гurb. (NTU)	
Flow (MGD)	or (CFS)	or (g/min)				
Relinguished by: (Signature	e)	Received by: (Signatu	re)	Date (mm)	/dd/yy) Time (24 hr)	
Gran - Ja	nd	May 4	agn		2-19 1520	
		· · · ·				
·					·	

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Page 8 of 19



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 04, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9103070 Pace Project No.: 30334704

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 09, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9103070

 Pace Project No.:
 30334704

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS



SAMPLE SUMMARY

30334704001	9103070-01		11/07/19 10:45	11/09/19 10:00	
Lab ID	Sample ID	Matrix	Date Collected	Date Received	
Pace Project No	.: 30334704				
Project:	9103070				

REPORT OF LABORATORY ANALYSIS


SAMPLE ANALYTE COUNT

 Project:
 9103070

 Pace Project No.:
 30334704

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30334704001	9103070-01	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9103070

Pace Project No.: 3	0334704
---------------------	---------

Sample: 9103070-01 PWS:	Lab ID: 30334 Site ID:	704001 Collected: 11/07/19 10:45 Sample Type:	Received:	11/09/19 10:00	Matrix: Water						
comments: • Sample collection dates and times were not present on the sample containers.											
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual					
Radium-226	EPA 903.1	0.332 ± 0.377 (0.595) C:NA T:91%	pCi/L	12/03/19 11:28	13982-63-3						
Radium-228	EPA 904.0	0.497 ± 0.362 (0.708) C:80% T:87%	pCi/L	12/02/19 16:17	15262-20-1						
Total Radium	Total Radium Calculation	0.829 ± 0.739 (1.30)	pCi/L	12/04/19 09:28	7440-14-4						

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103070						
Pace Project No.:	30334704						
QC Batch:	370987		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 228			
Associated Lab Sar	mples: 30334704	001					
METHOD BLANK:	1800103		Matrix: Water				
Associated Lab Sar	mples: 30334704	001					
Parar	meter	Act	LUnc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.353 ± 0.347	(0.714) C:83% T:78%	pCi/L	12/02/19 16:13		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103070						
Pace Project No.:	30334704						
QC Batch:	370988		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description:	903.1 Radium-226			
Associated Lab Sar	mples: 30334704	001					
METHOD BLANK:	1800104		Matrix: Water				
Associated Lab Sar	mples: 30334704	001					
Parar	neter	Act ±	Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.0385 ± 0.251	(0.505) C:NA T:92%	pCi/L	12/03/19 11:06		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALIFIERS

 Project:
 9103070

 Pace Project No.:
 30334704

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

AcCoy & McCoy Labs AcCoy & McCoy Labs C. Box 907 (0. Box 907 (124) 850-5615 Addisonville, KY 42409 70-821-7375 70-821-7375 70-821-7375 70-821-7375 70-821-7375 70-821-7375 70-821-7375 70-821-7375 70-821-7375 70-821-7375 70-821-7375 7124) 850-5615 7724) 850-5615 772400 7724) 850-5615 7724000 772400 7724000 772400 7724000 7724000 7724000 77240000 77240000000000	C Greensburg P/
VicCoy & McCoy Labs Pace Analytical Services LLC 0.0. Box 907 1638 Rosey Town Rd Suite 2 0.0. Box 907 1638 Rosey Town Rd Suite 2 vladisonville, KY 42409 Greensburg, PA 15601 V10-821-7375 (724) 850-5615 nngela@mccoylabs.com 724) 850-5615 nngela@mccoylabs.com 724) 850-5615 nngela@mccoylabs.com 770-8110 1 1007/19 10:45 1 11/07/19 10:45 1 11/07/19 10:45 1 11/07/19 10:45	C Greensburg P/ 2,3,4 2,3,4 Preserved Containers Matrix Matrix Vater Vater
Collect Sample Collect Rem Sample Interview Parte/Time Lab ID Parte/Time 11/07/19 10:45 Parte/Time Interview Parte/Time 11/07/19 10:45 Parte/Time Interview Parte/Time Parte/Time Parte/Time 11/07/19 10:45 Parte/Time Parte/Time Parte/Tim Parte/Time <td>Mater Matrix Water Matrix EPA 903.0 X EPA 903.0 X EPA 903.0 X EPA 903.0</td>	Mater Matrix Water Matrix EPA 903.0 X EPA 903.0 X EPA 903.0 X EPA 903.0
9103070-01 11/07/19 10:45 IR44-McCoy 11/07/19 10:45 11/07/19 10:45 11/07/19 10:45 11/07/19 10:45	Water X X X
ransfers Released By a substance of the second state of the second second second second second second second se	ved By we see the Date/Time and the Comments
apr 1/2-11	11441cm
ooler I emperature on Receipt روحین C Custody Seal/Y for N **In order to maintain client confidentiality, location/name of the sampling his chain of custody is considered complete as is since this information is av	Received on loc Y & N Sample Intact g site, sampler's name and signature may not be provided on this COC vailable in the owner laboratory.
riday, June 17, 2016 11:01:34 AM	FMT-ALL-C-002rev.00 24March2009

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<u>f 11</u> 19

SUBCONTRACT ORDER

McCoy & McCoy Laboratories, Inc.

9103070

SENDING LABORATORY:

4

.

McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal

RECEIVING LABORATORY:

Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 Phone :(724) 850-5615 Fax:

Please return shipping cooler to return address on shipping label.

Analysis		Expires	Laboratory ID	Comments	
Sample ID: 9103070-01	Water	Sampled:11/07/2019 10:45	Specific Method		
Radium Total (sub)		05/05/2020 10:45	EPA 903.0		
Radium 228 (sub)		05/05/2020 10:45	EPA 904.0		
Radium 226 (sub)		05/05/2020 10:45	EPA 903.1		

#_30334704

1 L -9-14 10.m 11-8-19 Date Date Received By

Released By

Date

Received By



Pittsburgh La	ab Sample Condit	ion l	Jpon	Red	ceipt	
Pace Analytical	Client Name:	_/	100	14 &	McCay	Project # 4
Courier: Fed Ex Tracking #: 1107]UPS []USPS []Client 3 <i>385 5275</i>		ommei	rcial	Pace Other	Label //// LIMS Login
Custody Seal on Coole Thermometer Used	er/Box Present: Øyes	Type	o of Ice:	Seals	intact: Øyes D Blue None]no
Cooler Temperature Temp should be above free	Observed Temp ezing to 6°C	6	•C	Corre	pH paper Lot#	_ °C Final Temp: <u> </u>
Comments:		Yes	No	N/A	10,00391	contents: pro in in or
Chain of Custody Preser	nt:				1.	
Chain of Custody Filled	Out:				2.	
Chain of Custody Reling	uished:		ſ		3.	
Sampler Name & Signat	ure on COC:	1		[4	
Sample Labels match C	OC:				5. NO fin D/	fate on samples
-Includes date/time/IE	D Matrix:	WI		_	1001 101 4 0	
Samples Arrived within I	Hold Time:				6.	
Short Hold Time Analy	sis (<72hr remaining):				7.	
Rush Turn Around Tim	e Requested:	-			8.	
Sufficient Volume:			1		9.	
Correct Containers Used	d:	-			10.	
-Pace Containers Us	ed:					
Containers Intact:			[11.	
Orthophosphate field filte	ered				12.	
Hex Cr Aqueous sample	field filtered				13.	
Organic Samples che	cked for dechlorination:				14.	
Filtered volume received All containers have been ch	for Dissolved tests necked for preservation.		-	Ľ	15.	
exceptions: VOA, colifo Non-aqueous matrix	, prm, TOC, O&G, Phenolics, I	Radon,	۱ <u>ــــــــــــــــــــــــــــــــــــ</u>]	pHLZ	
All containers meet meth requirements.	nod preservation	\square			Initial when pll	Date/time of preservation
		T	I		Lot # of added preservative	
Headspace in VOA Vials	s (>6mm):	ļ			17.	
Trip Blank Present:			\leq		18.	
Trip Blank Custody Seal	s Present			Ľ	Initial when	
Rad Samples Screened	1 < U.5 mrem/nr				completed:	Date: // // //
Client Notification/ Res	olution:					
Person-Contacted				-Date/	Fime:	Contacted By:
Comments/ Resolution	1:					
□ A check in this	box indicates that addi	tional	infor	natior	n has been stored in	ereports.

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5April2019)

McCOY & McCOY LABORATORIES, Inc.

P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com
 Pikeville, KY
 Farmersburg, IN

 606.432.3104
 812.696.5076

Lexington, KY 859.299.7775

Paducah, KY 270.444.6547

"Providing Tomorrow's Analytical Capabilities Today"

Certificate of Analysis 9103072

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/04/2019 16:55

Project Name:	MW-110 Wilson 092-00004	Workorder:	9103072
-			

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/07/2019 15:20.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

This certificate of analysis may not be reproduced without the written consent of McCoy & McCoy Laboratories, Inc.



Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com

Pikeville, KY Farmersburg, IN 812.696.5076 606.432.3104

Lexington, KY 859.299.7775

Paducah, KY 270.444.6547

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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias		Matrix	Date Collected	Date Received	Sampled By
9103072-01	MW110/		Water	11/07/2019 12:25	11/07/2019 15:20	Travis Sneed
LabNumber	Measurement	Value				
9103072-01	Field Conductance	483				
	Field pH	6.83				
	Field Temp (C)	16.02				

McCOY & McCOY LABORATORIES, Inc. A Pace Analytical Laboratory

P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com

Pikeville, KY Farmersburg, IN 606.432.3104

812.696.5076

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ANALYTICAL RESULTS

Lab Sample ID: 9103072-01 Description: MW110

Sample Collection Date Time: 11/07/2019 12:25 Sample Received Date Time: 11/07/2019 15:20

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Arsenic	ND	U	mg/L	0.0010	0.0004	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Barium	0.051		mg/L	0.004	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Boron	ND	U, D2	mg/L	1.00	1.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:34	AKB
Cadmium	ND	U	mg/L	0.0010	0.0001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Calcium	47.6	D2	mg/L	4.00	1.30	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:34	AKB
Chromium	ND	U	mg/L	0.0020	0.0006	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Copper	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Iron	2.97	D2	mg/L	1.00	0.500	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:34	AKB
Lead	ND	U	mg/L	0.002	0.0005	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Lithium	0.006	J	mg/L	0.02	0.005	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Magnesium	19.4	D2	mg/L	2.00	0.900	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:34	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Molybdenum	ND	U	mg/L	0.01	0.002	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Nickel	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Potassium	ND	D2, U	mg/L	5.00	2.20	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:34	AKB
Selenium	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Sodium	28.4	D2	mg/L	2.60	1.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:34	AKB
Thallium	ND	U	mg/L	0.0020	0.0001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP
Zinc	ND	U	mg/L	0.02	0.02	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:20	DBP

Conventional Chemistry Analyses Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as CaCO3	162		mg/L	4		2320 B-2011	11/18/2019 10:02	11/18/2019 10:02	HMF
Carbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 10:02	11/18/2019 10:02	HMF
Total Alkalinity	162		mg/L	4		2320 B-2011	11/18/2019 10:02	11/18/2019 10:02	HMF
Chemical Oxygen Demand	ND	U	mg/L	5	5	HACH 8000	11/27/2019 16:46	11/27/2019 16:46	HMF
Specific Conductance (Lab)	531		umhos/cm	1	1	2510 B-2011	11/22/2019 12:05	11/22/2019 12:05	DJK
Hardness as CaCO3	210		mg/L	1	1	2340 C (as HACH 8226)	11/12/2019 11:12	11/12/2019 11:12	ALT
Total Dissolved Solids	348		mg/L	50	50	2540 C-2011	11/12/2019 17:04	11/13/2019 16:26	MAG
Total Organic Carbon	0.7		mg/L	0.5		5310 C-2011	11/07/2019 13:50	11/12/2019 08:32	HMF
Total Organic Carbon	1.0		mg/L	0.5		5310 C-2011	11/07/2019 13:50	11/26/2019 23:07	HMF

Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	0.515	_Sub	pCi/L			EPA 903.1	12/04/2019 10:56	12/04/2019 10:58	AND
Radium-228	0.586	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND
Radium	1.10	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND



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Ion Chromatography Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	10.0		mg/L	0.5	0.4	EPA 300.0 REV 2.1	11/15/2019 23:03	11/15/2019 23:03	CSC
Fluoride	0.23		mg/L	0.20		EPA 300.0 REV 2.1	11/15/2019 23:03	11/15/2019 23:03	CSC
Sulfate	61.2	D	mg/L	50.0	25.0	EPA 300.0 REV 2.1	11/15/2019 23:03	11/15/2019 23:03	CSC

Notes for work order 9103072

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.

- MMLI does not provide interpretation of these results unless otherwise stated.

- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.

- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.

- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.

- The Chain of Custody document is included as part of this report.

- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

_Sub	See subcontractors report.
------	----------------------------

- D Results reported from dilution.
- D2 Sample required dilution due to matrix interference.

J Estimated value.

- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).
- Y1 Sample RPD exceeded the method control limit.

Standard Quallifiers/Acronymns

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than
	Less than



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812.696.5076

Paducah, KY 270.444.6547

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Lexington, KY

859.299.7775

Certified Analyses included in this Rep	port	
Analyte	Certifications	
2320 B-2011 in Water		
Bicarbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Carbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Total Alkalinity	KY Drinking Water Mdv (00030)	
2340 C (as HACH 8226) in Water		
Hardness as CaCO3	KY Drinking Water Mdv (00030)	
2510 B-2011 in Water		
Specific Conductance (Lab)	KY Drinking Water Mdv (00030)	
2540 C-2011 in Water		
Total Dissolved Solids	KY Drinking Water Mdv (00030)	
5310 C-2011 in Water		
Total Organic Carbon	KY Drinking Water Mdv (00030)	
EPA 300.0 REV 2.1 in Water		
Chloride	KY Drinking Water Mdv (00030)	
Fluoride	KY Drinking Water Mdv (00030)	
Sulfate	KY Drinking Water Mdv (00030)	
HACH 8000 in Water		
Chemical Oxygen Demand	KY Wastewater Mdv (00030)	

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9103072
Shipped By: Client	Temperature: 1.90° Celcius
Condition	
Check if Custody Seals are Present/Intact	
Check if Custody Signatures are Present	
Check if Collector Signature Present	
Check if bottles are intact	
Check if bottles are correct	
Check if bottles have sufficient volume	
Check if samples received on ice	
Check if VOA headspace is acceptable	
Check if samples received in holding time.	
Check if samples are preserved properly	

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory	Chain	of Custody		
P.O. Box 907 Madisonville, KY 42431	Scheduled	for: <u>10/14/2019</u>		
Client: Big Rivers Electric Corporation Wilso Station Project: MW-110 Wilson 092-00004	n Report To: Big Rivers Elect Station Mike Galbraith PO Box 24 Henderson, KY	ric Corporation Wilson	Invoice To: Big Rivers E Brian Edwar PO Box 24 Henderson,	Electric Corporation Wilson Station ds KY 42419
Please Print Legibly	Phone: <u>(270) 84</u> PWS ID#: State:	4-6000	PO#: <u>2</u>	52827-37
Collected by (Signature):	han a	<u></u>	Compli	ance Monitoring? Yes No
requi	red information		Sample	es Chlorinated? Yes No
-For composite samples please indicate begin tir	Find Data	at end time below:		
Effluent: Start Date Start time	End Date		Temp (0C)	· · · · · · · · · · · · · · · · · · ·
			Temp (0C)	······································
MMLI USE ONLY *required information* Workorder # Date Collection 9103072 (mm/dd/yy): Time (24 hr): Sample ID#	Bottle and Preservative	ខ ម្មា ច្រុ ក្រុ Sample Description	Composite	Sample Analysis Requested
9103072-01 A 11-07-19 12:25	Plastic 1L	I MW110	g/c	Alkalinity Total Chloride 300.0 Conductivity (Lab) Fluoride 300.0
9103072-01 B <u>11-07-19</u> 12:25	Plastic 500mL pH<2 1 w/HNO3	I MW110	g / c	Sulfate 300.0 Alkalinity Bicarbonate TDS Alkalinity Carbonate Arsenic Tot 6020 Antimony Tot 6020 Barium Tot 6020 Iron Tot 6010B Selenium Tot 6020 Hardness Titration Beryllium Tot 6020 Boron Tot 6010B Cadmium Tot 6020 Calcium Tot 6010B Chromium Tot 6020 Sodium Tot 6010B Lead Tot
P	reservation Check: pH :			6020 Lithium Tot 6020 Mercury Tot 6020
9103072-01 C <u>11 07 (77 </u> 17 (72)	w/H2SO4 reservation Check: pH : 1		g, c	
9103072-01 D <u>(1-07-19</u> (2:25)	Plastic 1L pH<2 w/HNO3 1 Rad 226 (Sub) reservation Check: pH : _\	MW110	g / c	Radium 226 (sub)
Preservation Check Performed by:	/			
Field data collected by:	Date (mm/dd/yy)	//	12:25	
pH <u>6.83</u> Cond (umho) <u>48</u>	<u>/ 3</u> Res CI (mg/L) _	Tot CI (mg/L)	Fr	ee CI (mg/L)
Temp (oC) <u>/ 6, 02</u> or (oF) Flow (MGD) or (CFS)	Static Water Level or (g/min)	DO (mg/L)	Т	⁻ urb. (NTU)
Relinguished by: (Signature)	Received by: (Signat	ure)	Date (mm/	/dd/yy) Time (24 hr)
Ira bal	- Ang G	lager	7	1520
MMI L. Check here if trin charge appli	ed to associated COC	Printed: 1	0/31/2019 5:55	

A PACE Analytical Laboratory P.O. Box 907 Madisonville, KY 42431	Chain of Scheduled fo	Custody or: 10/14/2019	1	
Client: Big Rivers Electric Corporation Wiles			J	······································
Station	Report To: Big Rivers Electric (Station Mike Colbroith	Corporation Wilson	Invoice To Big Rivers	: Electric Corporation Wilson Station
-roject: www-110 wilson 092-00004	PO Box 24 Henderson, KY 424	19	Brian Edwa PO Box 24 Henderson,	rds (
Please Print Legibly	Phone: <u>(270) 844-6(</u> PWS ID#:	000	PO#: 🤰	
Collected by (Signature):			Quote#	
required in	iformation		Compl	iance Monitoring? Yes No
*For composite samples please indicate begin time, e	nd time and temp(oC) at en	d time below:	Sample	es Chlorinated? Yes No
Influent: Start Date Start time	End Date E	End Time T	「emp (oC)	
Effluent: Start Date Start time	End Date I	End Time 1	Гетр (oC)	
MMLI USE ONLY *required information* Workorder # Date Collection 9103072 (mm/dd/yy): Time (24 hr): Bottle Sample ID#	와 and Preservative 법 이 인	Sample Description	Composite	Sample Analysis Requested
103072-01 E <u>II-07-19 12:25</u> Plastic F Preser	c 1L pH<2 w/HNO3 1 Rad 228 (Sub) vation Check: pH :	MW110	g/c	Radium 228 (sub)
103072-01 F <u>//-07-19 /z:25</u> Plastic F Preser	ation Check: pH = 1	MW110	g / c	Radium 228 (sub)
103072-01 G <u>11-07-19 12:25</u> Plastic Presen	: 1L pH<2 w/HNO3 1 (Sub) vation Check: pH :	MW110	g / c	Radium Total (sub)
,				
reservation Check Performed by:				-
ield data collected by: <u>Tracis Speed</u>	_ Date (mm/dd/yy) _11-0	?-/9 _Time (24 hr)	12:25	
H <u>6.83</u> Cond (umho) <u>483</u>	Res CI (mg/L)	Tot CI (mg/L)	Fre	e CI (mg/Ľ)
emp (oC) <u>/6.02</u> or (oF)	Static Water Level	DO (mg/L)	Τι	urb. (NTU)
low (MGD) or (CFS)	or (g/min)			
elinquished by: (Signature)	Received by: (Signature)		Date (mm/c	id/yy) Time (24 hr) - 1 og J 520
MMLI - Check here if trip charge applied to	associated COC	rinted: 10/	31/2019 5:55:	00AM 0000 7 of 19



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 04, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9103072 Pace Project No.: 30334703

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 09, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9103072

 Pace Project No.:
 30334703

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS



SAMPLE SUMMARY

30334703001	9103072-01	Water	11/07/19 12:25	11/09/19 10:00
Lab ID	Sample ID	Matrix	Date Collected	Date Received
Pace Project No	o.: 30334703			
Project:	9103072			

REPORT OF LABORATORY ANALYSIS



SAMPLE ANALYTE COUNT

 Project:
 9103072

 Pace Project No.:
 30334703

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30334703001	9103072-01	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9103072

Pace Project No.: 30334703

Sample: 9103072-01 PWS:	Lab ID: 30334703 Site ID:	3001 Collected: 11/07/19 12:25 Sample Type:	Received:	11/09/19 10:00 I	Matrix: Water	
Comments: • Sample collection	n dates and times were not pr	esent on the sample containers.				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.515 ± 0.497 (0.779) C:NA T:96%	pCi/L	12/03/19 11:06	13982-63-3	
Radium-228	EPA 904.0	0.586 ± 0.354 (0.665) C:79% T:97%	pCi/L	12/02/19 16:17	15262-20-1	
Total Radium	Total Radium Calculation	1.10 ± 0.851 (1.44)	pCi/L	12/04/19 09:28	5 7440-14-4	

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103072						
Pace Project No.:	30334703						
QC Batch:	370987		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description: 904.0 Radium 228				
Associated Lab Sar	mples: 30334703	001					
METHOD BLANK: 1800103			Matrix: Water				
Associated Lab Sar	mples: 30334703	001					
Parar	meter	Act :	± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228 0.353 ±			(0.714) C:83% T:78%	pCi/L	12/02/19 16:13		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103072						
Pace Project No.:	30334703						
QC Batch:	QC Batch: 370988		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description: 903.1 Radium-226				
Associated Lab Sar	mples: 30334703	001					
METHOD BLANK: 1800104			Matrix: Water				
Associated Lab Sar	mples: 30334703	001					
Parar	neter	Act ±	Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226 0.0385			(0.505) C:NA T:92%	pCi/L	12/03/19 11:06		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALIFIERS

Project: 9103072 Pace Project No.: 30334703

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

Workorder: 9103072 Report To:	Workorder Name: MW-110 Wils. Subcontract To:	on 092-0000. Owner Rece	ved Date: 11/7/2019 Re	sults Requested By: sted Analvsis	
McCoy & McCoy Labs	Pace Analytical Services I	.LC Greensburg P¢			
P.O. Box 907	1638 Rosey Town Rd Suit	te 2,3,4			
Madisonville, KY 42409	Greensburg, PA 15601				
270-821-7375	(724) 850-5615		******		
angela@mccoylabs.com		Preserve	Containers 0 1		
Item Sample ID	nple Collect /pe Date/Time Lab ID	Matrix), 400 / 2, 509 / 0, 400 /		
1			493 494		AB USE ONLY
2 9103072-01	11/07/19 12:25 IR44-McC	oy Water		· · ·	001
3				-	-
4					
5					
6			り つ つ つ つ つ つ つ つ つ つ つ つ つ		
7					
8					
6					the street
10					
Transfers Released By	Date/Time Rev	eived By	Date/Time	Comments	
1	11.8.19 Neo 1		11-4-4 100		
2	Jør.				
3					
				- Minimum	
Cooler Temperature on Receipt	Custody Seal Y/or N	Rece	ived on Ice Y or N	Sample Intact Vor	N
This chain of custody is considered co	entiality, location/name of the sampl omplete as is since this information is	ling site, sampler's name available in the owner la	and signature may not be p boratory.	rovided on this COC	
B Eriday Time 17 2016 11-01-24 AM					
Page 9		FMI1-ALL-C-L	uzrev.uu 24March2009		Page 1 of 1
of 11 of 18					

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SUBCONTRACT ORDER

McCoy & McCoy Laboratories, Inc.

9103072

SENDING LABORATORY:

¢

McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal

RECEIVING LABORATORY:

Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 Phone :(724) 850-5615 Fax:

Please return shipping cooler to return address on shipping label.

Analysis		Expires	Laboratory ID	Comments	······
Sample ID: 9103072-01	Water	Sampled:11/07/2019 12:25	Specific Method		
Radium Total (sub)		05/05/2020 12:25	EPA 903.0		
Radium 228 (sub)		05/05/2020 12:25	EPA 904.0		
Radium 226 (sub)		05/05/2020 12:25	EPA 903.1		

#-30334703

V Reseased By

<u>//-8-19</u> Date

Received By

1-9-14 (0-00 Date

Released By

Date

Received By

Pittsburgh Lab Sample Condi	tion (Upor	ו Re	ceipt	
Pace Analytical' Client Name:	_/	McC	ny s	McCsy 1	#-3033470
Courier: Fed Ex UPS USPS Clien		Comme	ercial	/ Pace Other	
Custody Seal on Cooler/Box Present: Vyes	r	- 10	Seal	s intact: 🛛 ves 🗖	
Thermometer Used 1/	Type	of ice	: We	Blue None	
Cooler Temperature Observed Temp 9	Ŷ	۰c	Corr	ection Factor:	°C Final Temp: 9.8 °C
Temp should be above freezing to 6°C	<u>~</u>	-			
				pH paper Lot#	Date and Initials of person examining contents: $0^{1/4}$ $ll^{-1/2/4}$
Comments:	Yes	No	N/A	10.0039	
Chain of Custody Present:	\mid	-	ļ	1.	
Chain of Custody Filled Out:	[]	[2.	
Chain of Custody Relinquished:	\mid	1		3.	
Sampler Name & Signature on COC:			_	4.	
Sample Labels match COC:			<u> </u>	5. Motmer	date an samples
-Includes date/time/ID Matrix:	WY I	1.	T		
Samples Arrived within Hold Time:				6.	
Short Hold Time Analysis (<72hr remaining):		Ľ,		7.	
Rush Turn Around Time Requested:	ļ			8.	
Sufficient Volume:				9.	
Correct Containers Used:				10.	
-Pace Containers Used:	ļ				
Containers Intact:	\mid	ļ		11.	
Orthophosphate field filtered		<u> </u>		12.	
lex Cr Aqueous sample field filtered				13.	
Organic Samples checked for dechlorination:				14.	
-Iltered volume received for Dissolved tests				15.	
exceptions: VOA, coliform, TOC, O&G, Phenolics, Non-aqueous matrix	Radon,		<u> </u>	16. pMcc	
All containers meet method preservation equirements.				Initial when NUC completed	Date/Ume of preservation
				Lot # of added preservative	
leadspace in VOA Vials (>6mm):				17.	
rip Blank Present:				18.	· · ·
rip Blank Custody Seals Present					
Rad Samples Screened < 0.5 mrem/hr				Initial when MC completed:	Date: [[-[]-Um
Client Notification/ Resolution:					
Person-Gontacted:			Date/F	fime:	Contacted By:
Comments/ Resolution:			·····		· · · · · · · · · · · · · · · · · · ·
				·····	

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5Apr/l2019)

McCOY & McCOY LABORATORIES, Inc.

P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com
 Pikeville, KY
 Farmersburg, IN

 606.432.3104
 812.696.5076

Lexington, KY 859.299.7775

Paducah, KY 270.444.6547

"Providing Tomorrow's Analytical Capabilities Today"

Certificate of Analysis 9103073

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/06/2019 15:37

Project Name:	MW-2 Wilson 092-00004	Workorder:	9103073	
-				

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/08/2019 15:35.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

This certificate of analysis may not be reproduced without the written consent of McCoy & McCoy Laboratories, Inc.



Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com

Pikeville, KY Farmersburg, IN 812.696.5076 606.432.3104

Lexington, KY 859.299.7775

Paducah, KY 270.444.6547

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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias		Matrix	Date Collected	Date Received	Sampled By
9103073-01	MW2/		Water	11/08/2019 08:15	11/08/2019 15:35	Travis Sneed
LabNumber	Measurement	Value				
9103073-01	Field Conductance	808				
	Field pH	6.27				
	Field Temp (C)	15.09				

McCOY & McCOY LABORATORIES, Inc. A Pace Analytical Laboratory

P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com

Pikeville, KY Farmersburg, IN 606.432.3104

812.696.5076

Lexington, KY Paducah, KY 859.299.7775 270.444.6547

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ANALYTICAL RESULTS

Lab Sample ID: 9103073-01 Description: MW2

Sample Collection Date Time: 11/08/2019 08:15 Sample Received Date Time: 11/08/2019 15:35

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Arsenic	0.0186		mg/L	0.0010	0.0004	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Barium	0.139		mg/L	0.004	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Boron	ND	U, D2	mg/L	1.00	1.00	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:16	AKB
Cadmium	ND	U	mg/L	0.0010	0.0001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Calcium	59.8	D2	mg/L	4.00	1.30	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:16	AKB
Chromium	ND	U	mg/L	0.0020	0.0006	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Copper	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Iron	26.0	D2	mg/L	1.00	0.500	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:16	AKB
Lead	ND	U	mg/L	0.002	0.0005	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Lithium	ND	U	mg/L	0.02	0.005	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Magnesium	31.9	D2	mg/L	2.00	0.900	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:16	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Molybdenum	0.002	J	mg/L	0.01	0.002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Nickel	0.004		mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Potassium	ND	D2, L1,	mg/L	5.00	2.20	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:16	AKB
		U							
Selenium	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Sodium	55.8	D2	mg/L	2.60	1.00	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:16	AKB
Thallium	ND	U	mg/L	0.0020	0.0001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH
Zinc	ND	U	mg/L	0.02	0.02	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:09	DMH

Conventional Chemistry Analyses Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as CaCO3	298		mg/L	4		2320 B-2011	11/18/2019 10:06	11/18/2019 10:06	HMF
Carbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 10:06	11/18/2019 10:06	HMF
Total Alkalinity	298		mg/L	4		2320 B-2011	11/18/2019 10:06	11/18/2019 10:06	HMF
Chemical Oxygen Demand	49		mg/L	5	5	HACH 8000	11/27/2019 17:25	11/27/2019 17:25	HMF
Specific Conductance (Lab)	733		umhos/cm	1	1	2510 B-2011	11/22/2019 12:37	11/22/2019 12:37	DJK
Hardness as CaCO3	530		mg/L	1	1	2340 C (as HACH 8226)	11/12/2019 11:14	11/12/2019 11:14	ALT
Total Dissolved Solids	330		mg/L	50	50	2540 C-2011	11/12/2019 17:08	11/13/2019 16:26	MAG
Total Organic Carbon	7.1		mg/L	0.5		5310 C-2011	11/11/2019 16:27	11/13/2019 01:17	HMF

Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	0.628	_Sub	pCi/L			EPA 903.1	12/06/2019 13:37	12/06/2019 13:38	AND
Radium-228	0.757	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/06/2019 13:37	12/06/2019 13:38	AND
Radium	1.39	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/06/2019 13:37	12/06/2019 13:38	AND



P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com

Lexington, KY Pa 859.299.7775 27

Paducah, KY 270.444.6547

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Ion Chromatography Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	15.0		mg/L	0.5	0.4	EPA 300.0 REV 2.1	11/15/2019 23:36	11/15/2019 23:36	CSC
Fluoride	0.27		mg/L	0.20		EPA 300.0 REV 2.1	11/15/2019 23:36	11/15/2019 23:36	CSC
Sulfate	61.6	D	mg/L	50.0	25.0	EPA 300.0 REV 2.1	11/15/2019 23:36	11/15/2019 23:36	CSC

Notes for work order 9103073

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.

- MMLI does not provide interpretation of these results unless otherwise stated.

- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.

- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.

- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.

- The Chain of Custody document is included as part of this report.

- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

_Sub See subcontractors report.

- D Results reported from dilution.
- D2 Sample required dilution due to matrix interference.

J Estimated value.

- L1 The associated blank spike recovery was above method acceptance limits.
- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).

Standard Quallifiers/Acronymns

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than
	Less than



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Pikeville, KY Farmersburg, IN 606.432.3104

812.696.5076

Paducah, KY 270.444.6547

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Lexington, KY

859.299.7775

Certified Analyses included in this Rep	port	
Analyte	Certifications	
2320 B-2011 in Water		
Bicarbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Carbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Total Alkalinity	KY Drinking Water Mdv (00030)	
2340 C (as HACH 8226) in Water		
Hardness as CaCO3	KY Drinking Water Mdv (00030)	
2510 B-2011 in Water		
Specific Conductance (Lab)	KY Drinking Water Mdv (00030)	
2540 C-2011 in Water		
Total Dissolved Solids	KY Drinking Water Mdv (00030)	
5310 C-2011 in Water		
Total Organic Carbon	KY Drinking Water Mdv (00030)	
EPA 300.0 REV 2.1 in Water		
Chloride	KY Drinking Water Mdv (00030)	
Fluoride	KY Drinking Water Mdv (00030)	
Sulfate	KY Drinking Water Mdv (00030)	
HACH 8000 in Water		
Chemical Oxygen Demand	KY Wastewater Mdv (00030)	

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9103073
Shipped By: Client	Temperature: 1.60° Celcius
Condition	
Check if Custody Seals are Present/Intact	
Check if Custody Signatures are Present	
Check if Collector Signature Present	
Check if bottles are intact	
Check if bottles are correct	
Check if bottles have sufficient volume	
Check if samples received on ice	
Check if VOA headspace is acceptable	
Check if samples received in holding time.	
Check if samples are preserved properly	

			-		
McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory	Chair	of Custody			
P.O. Box 907 Madisonville, KY 42431	Schedule	ed for: <u>10/14/2019</u>			
Client: Big Rivers Electric Corporation V Station Project: MW-2 Wilson 092-00004	Wilson Report To: Big Rivers Ele Station Mike Galbrait PO Box 24	ectric Corporation Wilson	Invoice To: Big Rivers E Brian Edwar PO Box 24	Electric Corpor	ration Wilson Station
	Henderson, K	Y 42419	Henderson,	KY 42419	-
	Phone: <u>(270)</u> PWS ID#:	844-6000	PO#: 🥕	<u> 52827-</u>	35
Please Print Legibly	State:	<u>167</u>	Quote#		-
Collected by (Signature):	required information*		Compli	ance Monitori	ing? Yes No
*For composite samples please indicate be	gin time, end time and temp(oC	c) at end time below:	Sample	es Chlorinated	1? Yes No
Influent: Start Date Start time	End Date	End Time	Temp (oC)		
Effluent: Start Date Start time	End Date	End Time	Temp (oC)		
MMLIUSE ONLY *required information	#	S			
Workorder # Date Collection 9103073 (mm/dd/yy): Time (24 h Sample ID#	r): Bottle and Preservative	Sample Description	Composite	Sample	Analysis Requested
9103073-01 A 11-08-19 8:15	Plastic 1L	. <u>0</u> 1 MW2	g/c	Alkalinity To	tal Chloride 300.0
9103073-01 B <u>11-08-19</u> <u>8:15</u>	Plastic 500mL pH<2	1 MW2	g/c	Conductivity Sulfate 300. TDS Alkalin Arsenic Tot	(Lab) Fluoride 300.0 0 Alkalinity Bicarbonate ity Carbonate 6020 Antimony Tot 6020
	w/HNO3			Barium Tot (Selenium To	6020 Iron Tot 6010B ot 6020 Hardness
· ·		(.		Titration Ber Tot 6010B C Calcium Tot 6020 Sodiur 6020 Lithiun 6020	yllium Tot 6020 Boron Cadmium Tot 6020 6010B Chromium Tot n Tot 6010B Lead Tot n Tot 6020 Mercury Tot
	Preservation Check: pH :	<u></u>			
9103073-01 C <u>11-08-19</u> <u>8:13</u>	Plastic 500mL pH<2 w/H2SO4 Preservation Check: pH :	1 MW2	g / c	COD TOC	
9103073-01 D <u>11.08-19</u> 8:15	Plastic 1L pH<2 w/HNO3 Rad 226 (Sub) Preservation Check: pH :	1 MW2	g / c	Radium 226	i (sub)
Preservation Check Performed by:	N DY	- <u></u>			
Field data collected by: <u>Jenus</u> S	need Date (mm/dd/yy) _ <i> -c & ~ 9</i> Time (24 hr) _	8:15		
pH <u>6.27</u> Cond (umho) _	808 Res CI (mg/L) Tot CI (mg/L) _	Fr	ee Cl (mg/L) _	
Temp (oC) <u>15.09</u> or (oF) _	Static Water Level	DO (mg/L)	1	urb. (NTU)	
Flow (MGD) or (CFS)	or (g/min)				
Relinquished by: (Signature)	Received by: (Sigr	nature)	Date (mm	/dd/yy)	Time (24 hr)
line: Land	Marl	Kan	11-0	8-19	1535
		1-7-			
<u> </u>	/				· · · ·
	<u> </u>				<u> </u>
MMLI - Check here if trip charge	applied to associated COC	·rinted: 1		:39AM	Page 6 of 18
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McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory P.O. Box 907 Mediconville, KY, 42421	Chain of Custody Scheduled for: 10/14/2019	
Client: Big Rivers Electric Corporation Wilso	on Report To:	Invoice To:
Station	Big Rivers Electric Corporation Wilson Station	Big Rivers Electric Corporation Wilson Station
Project: MW-2 Wilson 092-00004	Mike Galbraith	Brian Edwards
	Henderson, KY 42419	Henderson, KY 42419
	Phone: <u>(270) 844-6000</u> PWS ID# [.]	PO#: 252827-35
Please Print Legibly	State: <u>Ky</u>	Quote#
Collected by (Signature):	red information*	Compliance Monitoring? Yes No
*For composite samples please indicate begin tir	me, end time and temp(oC) at end time below:	Samples Chlorinated? Yes No
Influent: Start Date Start time	End Date End Time	_Temp (oC)
Effluent: Start Date Start time	End Date End Time	_ Temp (oC)
MMILLISE ONLY *required information*	<i>м</i>	
Workorder # Date Collection 9103073 (mm/dd/yy): Time (24 hr): Sample ID#	Bottle and Preservative Sample Description	n Composite Sample Analysis Requested
9103073-01 E <u>11-08-19</u> <u>8:15</u>	Plastic 1L pH<2 w/HNO3 1 MW2 Rad 228 (Sub) Preservation Check: pH :	g / c Radium 228 (sub)
9103073-01 F <u>11-05-19</u> <u>8:15</u> P	Plastic 1L pH<2 w/HNO3 1 MW2 Rad 228 (Sub) Preservation Check: pH :	g / c Radium 228 (sub)
9103073-01 G <u>11<i>-0K-1</i>9</u> <u>8:15</u> P	Plastic 1L pH<2 w/HNO3 1 MW2 (Sub) Preservation Check: pH :	g / c Radium Total (sub)
		· · ·
,		•
Preservation Check Performed by	(DV	
	/	
Field data collected by: <u>Travis Source</u>	<u>→ Date (mm/dd/yy) 11-σ€-r9</u> Time (24 hr)	<u>-8;15</u>
pH <u>6.27</u> Cond (umho) <u>60</u>	B Res Cl (mg/L) Tot Cl (mg/L)	Free CI (mg/L)
Temp (oC) <u>15.09</u> or (oF)	Static Water Level BO (mg/L) _	Turb. (NTU)
Flow (MGD) or (CFS)	or (g/min)	
Relinquished by: (Signature)	Received by: (Signature)	Date (mm/dd/yy) Time (24 hr)
Toren brack	- Van Jean	11-08-19 1535
	·	
MMLI - Check here if trip charge appli	ied to associated COC Printed:	10/31/2019 5:55:39AM Page 7 of 18

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Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 06, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9103073 Pace Project No.: 30335313

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 13, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9103073

 Pace Project No.:
 30335313

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS



SAMPLE SUMMARY

Lab ID	Sample ID	Matrix	Date Collected	Date Received	
		Matar	44/00/40 00:45	11/12/10 10:10	

REPORT OF LABORATORY ANALYSIS


SAMPLE ANALYTE COUNT

 Project:
 9103073

 Pace Project No.:
 30335313

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30335313001	9103073-01	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9103073

Pace Project No	.: 30335313
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Sample: 9103073-01	Lab ID: 30335313	001 Collected: 11/08/19 08:15	Received:	11/13/19 10:10	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Comments: • Sample collection	on dates and times were not pre	esent on the sample containers.				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.628 ± 0.552 (0.752) C:NA T:90%	pCi/L	12/06/19 11:34	13982-63-3	
Radium-228	EPA 904.0	0.757 ± 0.403 (0.705) C:80% T:80%	pCi/L	12/04/19 14:17	7 15262-20-1	
Total Radium	Total Radium Calculation	1.39 ± 0.955 (1.46)	pCi/L	12/06/19 13:24	1 7440-14-4	

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103073						
Pace Project No.:	30335313						
QC Batch:	371026		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description:	903.1 Radium-226			
Associated Lab Sar	mples: 30335313	001					
METHOD BLANK:	1800179		Matrix: Water				
Associated Lab Sar	mples: 30335313	001					
Parar	meter	Act :	LUnc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.139 ± 0.459	(0.772) C:NA T:92%	pCi/L	12/06/19 10:57		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103073						
Pace Project No.:	30335313						
QC Batch:	371027		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 228			
Associated Lab Sar	nples: 30335313	001					
METHOD BLANK:	1800180		Matrix: Water				
Associated Lab Sar	nples: 30335313	001					
Parar	neter	Act :	L Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.969 ± 0.446	(0.738) C:81% T:74%	pCi/L	12/04/19 11:10		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALIFIERS

 Project:
 9103073

 Pace Project No.:
 30335313

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

Chain of	Custody								Face Analytical	÷ f v
Ň	orkorder: 9103073	Mo	orkorder Nar	me: MW-2	Wilson 092-C	0004 Owr	er Received Date:	11/8/2019	Results Requested By:	
Report ⁻	To:		Subco	ontract To:				Rec	uested Analysis	
McCoy .	& McCoy Labs		Pace	Analytical S	ervices LLC Gr	eensburg P/				
P.O. Bo;	× 907		1638	Rosey Town	n Rd Suite 2,3,	4				
Madiso	nville, KY 42409		Greel	nsburg, PA 1	15601					
270-82	1-7375		(724)	850-5615						
angela	amccoylabs.com						Preserved Containers	0. Ľ.		
ltem Sa	mple ID	Sample Type	Collect Date/Time	Lab ID		Matrix		£06 ∀ ₽06 ∀		
1								Eb' Eb' Eb'		LAB USE ONLY
2 91	.03073-01		11/08/19 0	8:15 IR	(44-McCoy	Water		× × ×		Cel
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Cooler 1	emperature on Receipt	0 1	°C	stody Seal	Y or W)		Received on	ice V or N	Sample Intact	or N
sul **	order to maintain client	confidentia	lity, locatio	n/name of t	he sampling s	ite, sampler	's name and sign	lature may not	be provided on this COC	
	ain of custody is conside	erea compi	ete as is sin	ce unis inior	inauno di nomeni	וו חווב		۷.		
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SUBCONTRACT ORDER

McCoy & McCoy Laboratories, Inc.

9103073

#-30335313

SENDING LABORATORY:

McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal

RECEIVING LABORATORY:

Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 Phone :(724) 850-5615 Fax:

Please return shipping cooler to return address on shipping label.

Analysis		Expires	Laboratory ID	Comments	
Sample ID: 9103073-01	Water	Sampled: 11/08/2019 08: 15	Specific Method		
Radium Total (sub)		05/06/2020 08:15	EPA 903.0		
Radium 228 (sub)		05/06/2020 08:15	EPA 904.0		
Radium 226 (sub)		05/06/2020 08:15	EPA 903.1		

yhuren -13-19 $p: \bigcirc$.19 Date Received By Date

Pittsburgh Lab Sample Condit	on L	lpon	Rec	ceipt
Pace Analytical Client Name:	Л	1cCa	16	<u>Micry</u> Project $\# \# - 30335313$
Courier: P Fed Ex UPS USPS Client Tracking #: 1107 3385 5389		ommer	cial	Pace Other LabelLIMS Login
Custody Seal on Cooler/Box Present: Uyes	Zno	c	Seals	intact: 🔲 yes 🛄 no
Thermometer Used	Туре	of Ice:	Wel	Blue None
Cooler Temperature Observed Temp 2	<u>0</u>	°C	Corre	ection Factor: C Final Temp: A()
Temp should be above freezing to 6°C				Date and Initials of person examining
	Vaa	No	ΝΙΛ	$\left[\mathcal{O}\mathcal{O}\mathcal{O}\mathcal{G}\mathcal{G}\mathcal{G}\mathcal{G}\mathcal{G}\mathcal{G}\mathcal{G}\mathcal{G}\mathcal{G}G$
Comments:	Tes			4
Chain of Custody Present:	\vdash			2
Chain of Custody Filled Out:	\leftarrow			2
Chain of Custody Relinquished:	<u> </u>			A.
Sampler Name & Signature on COC:				
Sample Labels match COC:	NT	<u> </u>	L	". M the date on sample
-includes date/time/ID Matrix:		1	<u> </u>	0
Samples Arrived within Hold Time:	-			7
Short Hold Time Analysis (<72hr remaining):		r >		
Rush Turn Around Time Requested:		Ķ		8.
Sufficient Volume:		, 22		9.
Correct Containers Used:	\vdash			10.
-Pace Containers Used:		\vdash		
Containers Intact:	\vdash			11.
Orthophosphate field filtered		·	\vdash	12.
Hex Cr Aqueous sample field filtered			\vdash	
Organic Samples checked for dechlorination:	-			14.
Filtered volume received for Dissolved tests		_	<u> </u>	15.
				16. NTICZ
Non-aqueous matrix	Rauvi	•		
All containers meet method preservation	\square			Initial when M Date/time of
requirements.	Ĺ	1		completed 10 C [preservation
				preservative
Headspace in VOA Vials (>6mm):				17.
Trip Blank Present:				18.
Trip Blank Custody Seals Present				
Rad Samples Screened < 0.5 mrem/hr			1	completed: DA Date: 1 - 13-16
Client Notification/ Resolution:		•		
Person-Contacted:			Date	Hime:Contacted By:
Comments/ Resolution:				
🗌 🗌 A check in this box indicates that add	itional	infor	matio	n has been stored in ereports.

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

;

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5April2019)

McCOY & McCOY LABORATORIES, Inc.

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 Pikeville, KY
 Farmersburg, IN

 606.432.3104
 812.696.5076

Lexington, KY 859.299.7775 Paducah, KY 270.444.6547

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Certificate of Analysis 9103074

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/04/2019 16:55

Project Name:	MW-3 Wilson 092-00004	Workorder:	9103074	
,				

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/07/2019 15:20.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

This certificate of analysis may not be reproduced without the written consent of McCoy & McCoy Laboratories, Inc.



Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias		Matrix	Date Collected	Date Received	Sampled By
9103074-01	MW3/		Water	11/07/2019 09:20	11/07/2019 15:20	Travis Sneed
LabNumber	Measurement	Value				
9103074-01	Field Conductance	1520				
	Field pH	6.67				
	Field Temp (C)	16.27				

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ANALYTICAL RESULTS

Lab Sample ID: 9103074-01 Description: MW3

Sample Collection Date Time: 11/07/2019 09:20 Sample Received Date Time: 11/07/2019 15:20

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Arsenic	0.0010		mg/L	0.0010	0.0004	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Barium	0.014		mg/L	0.004	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Boron	ND	U, D2	mg/L	1.00	1.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:41	AKB
Cadmium	ND	U	mg/L	0.0010	0.0001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Calcium	229	D1	mg/L	40.0	13.0	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:44	AKB
Chromium	ND	U	mg/L	0.0020	0.0006	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Copper	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Iron	3.40	D2	mg/L	1.00	0.500	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:41	AKB
Lead	ND	U	mg/L	0.002	0.0005	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Lithium	0.03		mg/L	0.02	0.005	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Magnesium	58.1	D2	mg/L	2.00	0.900	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:41	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Molybdenum	0.003	J	mg/L	0.01	0.002	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Nickel	0.007		mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Potassium	5.38	D2	mg/L	5.00	2.20	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:41	AKB
Selenium	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Sodium	28.6	D2	mg/L	2.60	1.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:41	AKB
Thallium	ND	U	mg/L	0.0020	0.0001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP
Zinc	ND	U	mg/L	0.02	0.02	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:27	DBP

Conventional Chemistry Analyses Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as	265		mg/L	4		2320 B-2011	11/18/2019 10:11	11/18/2019 10:11	HMF
CaCO3									
Carbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 10:11	11/18/2019 10:11	HMF
Total Alkalinity	265		mg/L	4		2320 B-2011	11/18/2019 10:11	11/18/2019 10:11	HMF
Chemical Oxygen Demand	ND	U	mg/L	5	5	HACH 8000	11/27/2019 16:46	11/27/2019 16:46	HMF
Specific Conductance (Lab)	1420		umhos/cm	1	1	2510 B-2011	11/22/2019 12:38	11/22/2019 12:38	DJK
Hardness as CaCO3	800	D	mg/L	2	2	2340 C (as HACH 8226)	11/12/2019 11:16	11/12/2019 11:16	ALT
Total Dissolved Solids	1040		mg/L	50	50	2540 C-2011	11/12/2019 17:12	11/13/2019 16:26	MAG
Total Organic Carbon	1.3		mg/L	0.5		5310 C-2011	11/07/2019 13:50	11/10/2019 14:08	HMF
Total Organic Carbon	0.5		mg/L	0.5		5310 C-2011	11/07/2019 13:50	11/12/2019 15:34	HMF

Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	0.196	_Sub	pCi/L			EPA 903.1	12/04/2019 10:56	12/04/2019 10:58	AND
Radium-228	0.880	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND
Radium	1.08	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND



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Ion Chromatography Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	29.7		mg/L	0.5	0.4	EPA 300.0 REV 2.1	11/16/2019 00:42	11/16/2019 00:42	CSC
Fluoride	0.23		mg/L	0.20		EPA 300.0 REV 2.1	11/16/2019 00:42	11/16/2019 00:42	CSC
Sulfate	463	D	mg/L	50.0	25.0	EPA 300.0 REV 2.1	11/16/2019 00:42	11/16/2019 00:42	CSC

Notes for work order 9103074

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.

- MMLI does not provide interpretation of these results unless otherwise stated.

- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.

- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.

- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.

- The Chain of Custody document is included as part of this report.

- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

_Sub	See subcontractors report.
------	----------------------------

- D Results reported from dilution.
- D1 Sample required dilution due to high concentration of target analyte.

D2 Sample required dilution due to matrix interference.

- J Estimated value.
- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).
- Y1 Sample RPD exceeded the method control limit.

Standard Quallifiers/Acronymns

IVIDL	Method Delection Linit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than
	Less than

Mathed Datastian Limit



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Certified Analyses included in this Rep	port	
Analyte	Certifications	
2320 B-2011 in Water		
Bicarbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Carbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Total Alkalinity	KY Drinking Water Mdv (00030)	
2340 C (as HACH 8226) in Water		
Hardness as CaCO3	KY Drinking Water Mdv (00030)	
2510 B-2011 in Water		
Specific Conductance (Lab)	KY Drinking Water Mdv (00030)	
2540 C-2011 in Water		
Total Dissolved Solids	KY Drinking Water Mdv (00030)	
5310 C-2011 in Water		
Total Organic Carbon	KY Drinking Water Mdv (00030)	
EPA 300.0 REV 2.1 in Water		
Chloride	KY Drinking Water Mdv (00030)	
Fluoride	KY Drinking Water Mdv (00030)	
Sulfate	KY Drinking Water Mdv (00030)	
HACH 8000 in Water		
Chemical Oxygen Demand	KY Wastewater Mdv (00030)	

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9103074
Shipped By: Client	Temperature: 1.90° Celcius
Condition	
Check if Custody Seals are Present/Intact	
Check if Custody Signatures are Present	
Check if Collector Signature Present	
Check if bottles are intact	
Check if bottles are correct	
Check if bottles have sufficient volume	
Check if samples received on ice	
Check if VOA headspace is acceptable	
Check if samples received in holding time.	
Check if samples are preserved properly	

McCoy & McCoy Laboratories, In A PACE Analytical Laborator	пс. У	Chain	of C	ustody		
P.O. Box 907 Madisonville, KY 42431		Schedule	d for:	<u>10/14/2019</u>		
Client: Big Rivers Electric Co Station Project: MW-3 Wilson 092-000	rporation Wilson 104	Report To: Big Rivers Ele Station Mike Galbraith PO Box 24 Henderson, K ^v	ctric Corj 1 Y 42419	poration Wilson	Invoice To: Big Rivers E Brian Edwar PO Box 24 Henderson,	Electric Corporation Wilson Station ds KY 42419
Please Print Legibly		Phone: <u>(270) 8</u> PWS ID#:	<u>344-6000</u> Ку	-	PO#: <u>_</u>	<u>5282)-</u> 37
Collected by (Signature):	1 men require	d information*			Compli	ance Monitoring? Yes No
*For composite samples please	indicate begin tim	e, end time and temp(oC)) at end t	ime below:	Sample	es Chlorinated? Yes No
Influent: Start Date	Start time	End Date	En	d Time 1	Гетр (oC)	
Effluent: Start Date	Start time	End Date	En	d Time	Temp (oC)	<u>. </u>
MMLI USE ONLY *required in Workorder # Date 9103074 (mm/dd/yy): Sample ID# 9103074-01 A <u>-1-c 7-19</u>	formation* Collection Time (24 hr): 9 <u>;</u> 2 0	Bottle and Preservative Plastic 1L	L Containers	Sample Description MW3	Composite g / c	Sample Analysis Requested Alkalinity Total Chloride 300.0 Conductivity (Lab) Fluoride 300.0 Sulfate 300.0 Alkalinity Bicarbonate TDS Alkalinity Carbonate
9103074-01 B <u>11-67-14</u>	<u>9:20</u>	Plastic 500mL pH<2 w/HNO3 eservation Check: pH : \	1	MW3	g / c	Arsenic Tot 6020 Antimony Tot 6020 Barium Tot 6020 Iron Tot 6010B Selenium Tot 6020 Hardness Titration Beryllium Tot 6020 Boron Tot 6010B Cadmium Tot 6020 Calcium Tot 6010B Chromium Tot 6020 Sodium Tot 6010B Lead Tot 6020 Lithium Tot 6020 Mercury Tot 6020
9103074-01 C <u>11-07-19</u>	<u>91.20</u> Pr	Plastic 500mL pH<2 w/H2SO4 eservation Check: pH :	1/	MW3	g / c	COD TOC
9103074-01 D <u> ~0>-19</u>	<u>9:20</u> P	lastic 1L pH<2 w/HNO3 Rad 226 (Sub) eservation Check: pH : `	<u></u>	MW3	g / c	Radium 226 (sub)
Preservation Check Performed	а by: <u>NOI</u>					
Field data collected by: <u>700</u> pH <u>6.67</u> Con Temp (oC) <u>76.27</u> or Flow (MGD) or	d (umho) <u>1,52</u> (oF) (CFS)	Date (mm/dd/yy) Res Cl (mg/L) Static Water Level or (g/min)		<u>/9_</u> Time (24 hr) Tot Cl (mg/L) DO (mg/L) 	9:2 <i>0</i> Fr 1	ee CI (mg/L)
Relinquished by: (Signature)	4	Received by: (Signa	ature)	<i>j</i>	Date (mm. 7	/dd/yy) Time (24 hr) -/9]520
MMLI - Check here if t	rip charge applie	d to associated COC		Printed: 10	D/31/2019 5:56	:30AM Page 6 of 18

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory		Chain	of Custody				
P.O. Box 907 Madisonville, KY 42431		Scheduled	d for: <u>10/14/2019</u>]			
Client: Big Rivers Electric C Station	orporation Wils	on Report To: Big Rivers Elec	tric Corporation Wilson	Invoice To: Big Rivers E	Electric Corporation Wilson Station		
Project: MW-3 Wilson 092-0	0004	Mike Galbraith PO Box 24		Brian Edwards			
		Henderson, KY	′ 42419	Henderson,	KY 42419		
		Phone: <u>(270) 8</u> PWS ID#:	<u>44-6000</u>	PO#:			
Please Print Legibly	·······	State:	<u>'<y< u=""></y<></u>	Quote#			
Collected by (Signature):	June	lired information*	/	Compli	ance Monitoring? Yes No		
*For composite samples pleas	e indicate begin t	ime, end time and temp(oC)	at end time below:	Sample	es Chlorinated? Yes No		
Influent: Start Date	Start time	End Date	End Time	Temp (oC)			
Effluent: Start Date	Start time	End Date	End Time	Temp [`] (oC)			
MMLI USE ONLY *required Workorder # Date 9103074 (mm/dd/yy): Sample ID#	information* Collection Time (24 hr):	Bottle and Preservative	st entro to Sample Description	Composite	Sample Analysis Requested		
9103074-01 E	9:20	Plastic 1L pH<2 w/HNO3 Rad 228 (Sub) Preservation Check: pH : 3	1 MW3	g / c	Radium 228 (sub)		
9103074-01 F <u>[[-07-[9</u>	9:20	Plastic 1L pH<2 w/HNO3 Rad 228 (Sub) Preservation Check: pH : 1	1 / MW3	g / c	Radium 228 (sub)		
9103074-01 G <u>11-•7-19</u>	9:20	Plastic 1L pH<2 w/HNO3 (Sub) Preservation Check: pH : _	1 MW3	g / c	Radium Total (sub)		
					· · · ·		
					•		
Preservation Check Perform	ed by:)/`					
Field data collected by:	quis Some	Date (mm/dd/yy)	<u></u> Time (24 hr)	9:20	. •		
рн <u>6.67</u> С	ond (umho) <u> </u>	20 Res Ci (mg/L)	Tot Cl (mg/L) _	Fr	ee Cl (mg/L)		
Temp (oC) <u>16.27</u> or	· (oF)	Static Water Level	DO (mg/L) _	ד	⁻ urb. (NTU)		
Flow (MGD) or	(CFS)	or (g/min) _					
Relinquished by: (Signature)		Received by: (Signa	iture)	Date (mm	/dd/yy) Time (24 hr)		
Juni ha	4	_ 1/ay (fing		-rg 1520		
		/					
i MMLI - Check here i	r trip charge app	nied to associated COC	rinted: 1	013112019 2:20	Page 7 of 18		

Page 7 of 18



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 04, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9103074 Pace Project No.: 30334701

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 09, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9103074

 Pace Project No.:
 30334701

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS

Pac	ne.	20	f 11
Page	9	of	18



SAMPLE SUMMARY

Lab ID	Sample ID	Matrix	Date Collected	Date Received	
30334701001	9103074-01	Water	11/07/19 09:20	11/09/19 10:00	

REPORT OF LABORATORY ANALYSIS



SAMPLE ANALYTE COUNT

 Project:
 9103074

 Pace Project No.:
 30334701

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30334701001	9103074-01	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9103074

Sample: 9103074-01 PWS:	Lab ID: 30334701 Site ID:	001 Collected: 11/07/19 09:20 Sample Type:	Received:	11/09/19 10:00 I	Matrix: Water							
omments: • Sample collection dates and times were not present on the sample containers.												
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual						
Radium-226	EPA 903.1	0.196 ± 0.304 (0.527) C:NA T:96%	pCi/L	12/03/19 11:17	13982-63-3							
Radium-228	EPA 904.0	0.880 ± 0.384 (0.633) C:81% T:95%	pCi/L	12/02/19 16:17	15262-20-1							
Total Radium	Total Radium Calculation	1.08 ± 0.688 (1.16)	pCi/L	12/04/19 09:28	3 7440-14-4							

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103074						
Pace Project No.:	30334701						
QC Batch:	370987		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 228			
Associated Lab Sar	mples: 30334701	001					
METHOD BLANK:	1800103		Matrix: Water				
Associated Lab Sar	mples: 30334701	001					
Parar	meter	Act :	± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.353 ± 0.347	(0.714) C:83% T:78%	pCi/L	12/02/19 16:13		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103074						
Pace Project No.:	30334701						
QC Batch:	370988		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description:	903.1 Radium-226			
Associated Lab Sar	mples: 30334701	001					
METHOD BLANK:	1800104		Matrix: Water				
Associated Lab Sar	mples: 30334701	001					
Parar	meter	Act ±	Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.0385 ± 0.251	(0.505) C:NA T:92%	pCi/L	12/03/19 11:06		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALIFIERS

 Project:
 9103074

 Pace Project No.:
 30334701

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

Pace Analytical	s Requested By:	I Analysis			Sample Intact X for N ided on this COC	Page 1 of 1
	é ≥d Date: 11/7/2019 Result	Requested	Date/Time Statistics 0.400 × FPA 903.0 1.7% (# /6.2) × FPA 903.0 1.7% (# /6.2) × FPA 903.0		ved on Ice/Y or N nd signature may not be prov	ooratory.)2rev.00 24March2009
	Name: MW-3 Wilson 092-00004 Owner Receive	bcontract To:	ce Analytical Services LLC Greensburg PA 38 Rosey Town Rd Suite 2,3,4 eensburg, PA 15601 24) 850-5615 Area 24) 850-5615 Area 26) 700 Area 27) 700 Area 27) 700 Area 27) 700 Area 27) 700 Area 28) 700 Area 29) 700 Area 20) 70		Custody Seal // yr N Jon/name of the sampling site, sampler's name a	since this information is available in the owner lat FMT-ALL-C-00
Δ	9103074 Workorder N	Sub	v Labs Pac 163 Y 42409 Gre (72 labs.com <u>Sample Collect</u> 01 Type Date/Tin 01 ate/Tin ased By		ture on Receipt <u>M-7</u> °C C maintain client confidentiality, locati	istody is considered complete as is si , 2016 11:01:34 AM
Chain of Custo	Workorder	Report To:	McCoy & McC P.O. Box 907 Madisonville, I 270-821-7375 270-821-7375 angela@mcco angela@mcco 1 1 2 9 10 10 10 11 11 12 10 10	3	Cooler Temper: ***In order to	his chain of c babe babe babe babe babe babe babe bab

a.

SUBCONTRACT ORDER

McCoy & McCoy Laboratories, Inc.

9103074

SENDING LABORATORY:

McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal

RECEIVING LABORATORY:

Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 Phone :(724) 850-5615 Fax:

Please return shipping cooler to return address on shipping label.

Analysis		Expires	Laboratory ID	Comments	
Sample ID: 9103074-01	Water	Sampled: 11/07/2019 09:20	Specific Method		
Radium Total (sub)		05/05/2020 09:20	EPA 903.0		
Radium 228 (sub)		05/05/2020 09:20	EPA 904.0		
Radium 226 (sub)		05/05/2020 09:20	EPA 903.1		

#-30334701

'_V 11-8-19 Date Received By Date ed By

 $l U^{0} \cap$ -970

Released By



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Pittsburgh Lab	Sample Conditi	on L	Ipon	Rec	ceipt		
Pace Analytical' C	lient Name:	N	100	14 &	McCsy	Project # - 30334	701
Courier: \square Fed Ex \square UP Tracking #: $1/0733$	s ⊡usps ⊡Client 85 9276		ommer	cial	Pace Other	Label <u>NW</u> LIMS Login <u>NM</u>	
Custody Seal on Cooler/Bo Thermometer Used	1/	⊥ Туре∢	of Ice:	Wet	Blue None		
Cooler Temperature Ol	bserved Temp 9	:T	۰c	Corre	ection Factor: 🧷	°℃ Final Temp: <u> </u>	
Temp should be above freezing	to 6°C		-		nH naper i of#	Date and Initials of person examining	1
Commenter		Yes	No	N/A	1000391	contents: <u><u><u></u><u><u></u><u><u></u><u><u></u><u><u></u><u></u><u><u></u><u></u><u></u><u><u></u><u></u><u></u><u></u><u></u><u></u></u></u></u></u></u></u></u></u>	
Chain of Custody Proport					1.		1
Chain of Custody Filled Out:		1			2.	<u></u>	1
Chain of Custody Filled Out.		1			3.		
Chain of Custody Reinquisi		1			4		1
Sampler Name & Signature	, ,	1			5 Acardana	(dean)	
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Samples Arrived within Hold	- Time.	\vdash		-	7		1
Short Hold Time Analysis (2018 remaining).</td <td></td> <td>/</td> <td> </td> <td>8</td> <td></td> <td>1</td>		/	 	8		1
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Sumcient Volume:				1	10		1
Correct Containers Used:		F			10.		
-Pace Containers Used:		\vdash	{		11		1
Containers Intact:	·······	<u> </u>			10		1
Orthophosphate field filtered	()		┼──~	E	43		1
Hex Cr Aqueous sample fiel	d filtered		+		TI3.		1
Organic Samples checke	d for dechlorination:			\checkmark	15		1
Filtered volume received for All containers have been check	Dissolved lesis ed for preservation.	+			10.		
exceptions: VOA, collform, Non-aqueous matrix	TOC, O&G, Phenolics,	Radon	, , /		10. PACZ		
All containers meet method	preservation	\checkmark			Initial when M	Date/time of preservation	
requiremento.	×			<u></u>	Lot # of added	· · · · · · · · · · · · · · · · · · ·	
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Trip Blank Custody Seals Pr	resent		· .		-		
Rad Samples Screened < ().5 mrem/hr		1		Initial when pm completed:	Date: //-//-/9	
Client Notification/ Resolu	tion:				,		
Person-Contacted:	· · · · · · · · · · · · · · · · · · ·			Date/	-ጉ me;	Contacted By:	
Comments/ Resolution:							-
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🗀 A check in this box indicates that additional informa

Note: Whenaver there is e discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers) *PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5April2019) Page 11 of 11 McCOY & McCOY LABORATORIES, Inc.

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 Pikeville, KY
 Farmersburg, IN

 606.432.3104
 812.696.5076

Lexington, KY 859.299.7775

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Certificate of Analysis 9103076

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/06/2019 15:36

Project Name: MW-4D Wilson 092-00004 Workorder: 9103076

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/08/2019 15:35.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

This certificate of analysis may not be reproduced without the written consent of McCoy & McCoy Laboratories, Inc.



Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias		Matrix	Date Collected	Date Received	Sampled By
9103076-01	MW4D/		Water	11/08/2019 13:45	11/08/2019 15:35	Travis Sneed
LabNumber	Measurement	Value				
9103076-01	Field Conductance	4980				
	Field pH	6.34				
	Field Temp (C)	15.51				

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ANALYTICAL RESULTS

Lab Sample ID: 9103076-01 Description: MW4D

Sample Collection Date Time: 11/08/2019 13:45 Sample Received Date Time: 11/08/2019 15:35

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Arsenic	0.0032		mg/L	0.0010	0.0004	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Barium	0.016		mg/L	0.004	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Boron	9.11	D2	mg/L	1.00	1.00	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:32	AKB
Cadmium	ND	U	mg/L	0.0010	0.0001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Calcium	628	D1	mg/L	40.0	13.0	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:35	AKB
Chromium	ND	U	mg/L	0.0020	0.0006	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Copper	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Iron	12.3	D2	mg/L	1.00	0.500	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:32	AKB
Lead	ND	U	mg/L	0.002	0.0005	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Lithium	0.14		mg/L	0.02	0.005	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Magnesium	224	D1	mg/L	20.0	9.00	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:35	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Molybdenum	0.01		mg/L	0.01	0.002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Nickel	0.030		mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Potassium	48.9	D2, L1	mg/L	5.00	2.20	SW846 6010 B	11/11/2019 11:47	11/15/2019 14:49	AKB
Selenium	0.001	J	mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Sodium	206	D1	mg/L	26.0	10.0	SW846 6010 B	11/11/2019 11:47	11/14/2019 16:35	AKB
Thallium	ND	U	mg/L	0.0020	0.0001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH
Zinc	0.02		mg/L	0.02	0.02	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:13	DMH

Conventional Chemistry Analyses Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as	339		mg/L	4		2320 B-2011	11/18/2019 10:22	11/18/2019 10:22	HMF
CaCO3									
Carbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 10:22	11/18/2019 10:22	HMF
Total Alkalinity	339	M2	mg/L	4		2320 B-2011	11/18/2019 10:22	11/18/2019 10:22	HMF
Chemical Oxygen Demand	50		mg/L	5	5	HACH 8000	11/27/2019 18:50	11/27/2019 18:50	HMF
Specific Conductance	4480		umhos/cm	1	1	2510 B-2011	11/22/2019 12:40	11/22/2019 12:40	DJK
(Lab)									
Hardness as CaCO3	2250	D	mg/L	5	5	2340 C (as HACH	11/12/2019 11:20	11/12/2019 11:20	ALT
Total Dissolved Solids	3500		ma/L	50	50	8228) 2540 C-2011	11/12/2019 17:20	11/13/2019 16:26	MAG
Total Organia Carbon	0.5		ma/l	0.5		5210 C 2011	11/11/2010 16:27	11/12/2010 01:20	
Total Organic Carbon	0.5		mg/L	0.5		5510 0-2011	11/11/2019 10.27	11/13/2019 01.39	

Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	0.00	_Sub	pCi/L			EPA 903.1	12/06/2019 13:37	12/06/2019 13:38	AND
Radium-228	1.86	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/06/2019 13:37	12/06/2019 13:38	AND
Radium	1.86	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/06/2019 13:37	12/06/2019 13:38	AND



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Ion Chromatography Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	537	D	mg/L	25.0	18.0	EPA 300.0 REV 2.1	11/16/2019 02:04	11/16/2019 02:04	CSC
Fluoride	0.21		mg/L	0.20		EPA 300.0 REV 2.1	11/16/2019 01:48	11/16/2019 01:48	CSC
Sulfate	1100	D	mg/L	50.0	25.0	EPA 300.0 REV 2.1	11/16/2019 01:48	11/16/2019 01:48	CSC

Notes for work order 9103076

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.

- MMLI does not provide interpretation of these results unless otherwise stated.

- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.

- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.

- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.

- The Chain of Custody document is included as part of this report.

- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

_Sub	See subcontractors report.
------	----------------------------

- D Results reported from dilution.
- D1 Sample required dilution due to high concentration of target analyte.

D2 Sample required dilution due to matrix interference.

- J Estimated value.
- L1 The associated blank spike recovery was above method acceptance limits.
- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).

Standard Quallifiers/Acronymns

Method Detection Limit
Minimum Reporting Limit
Not Detected
Laboratory Control Sample
Matrix Spike
Matrix Spike Duplicate
Sample Duplicate
Percent Recovery
Relative Percent Difference
Greater than
Less than



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Certified Analyses included in this Rep	port	
Analyte	Certifications	
2320 B-2011 in Water		
Bicarbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Carbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Total Alkalinity	KY Drinking Water Mdv (00030)	
2340 C (as HACH 8226) in Water		
Hardness as CaCO3	KY Drinking Water Mdv (00030)	
2510 B-2011 in Water		
Specific Conductance (Lab)	KY Drinking Water Mdv (00030)	
2540 C-2011 in Water		
Total Dissolved Solids	KY Drinking Water Mdv (00030)	
5310 C-2011 in Water		
Total Organic Carbon	KY Drinking Water Mdv (00030)	
EPA 300.0 REV 2.1 in Water		
Chloride	KY Drinking Water Mdv (00030)	
Fluoride	KY Drinking Water Mdv (00030)	
Sulfate	KY Drinking Water Mdv (00030)	
HACH 8000 in Water		
Chemical Oxygen Demand	KY Wastewater Mdv (00030)	

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9103076	
Shipped By: Client	Temperature: 1.60° Celcius	
Condition		
Check if Custody Seals are Present/Intact		
Check if Custody Signatures are Present		
Check if Collector Signature Present		
Check if bottles are intact		
Check if bottles are correct		
Check if bottles have sufficient volume		
Check if samples received on ice		
Check if VOA headspace is acceptable		
Check if samples received in holding time.		
Check if samples are preserved properly		

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McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory	Chair	Chain of Custody				
P.O. Box 907 Madisonville, KY 42431	Schedule	ed for:	: <u>10/14/2019</u>		AL D'AQUELA LA LIANCALICA A DIA	
Client: Big Rivers Electric Corporation Wilson Station	Report To: Big Rivers Ele Station	ectric Co	rporation Wilson	Invoice To: Big Rivers E	Electric Corporation Wilson Station	
Project: MW-4D Wilson 092-00004	Mike Galbrait	h		Brian Edwar PO Box 24	rds <u>t</u>	
	Henderson, K	(Y 42419		Henderson,	KY 42419	
	Phone: <u>(270)</u> PWS ID#:	844-600	<u>0</u>	PO#: <u>2</u> .	52827-35	
Please Print Legibly	State:	Ky	<u>/</u>	Quote#		
Collected by (Signature):	nd.			Compli	ance Monitoring? Yes No	
*For composite samples please indicate begin time,	end time and temp(oC	C) at end	time below:	Sample	es Chlorinated? Yes No	
Influent: Start Date Start time	End Date	Er	nd Time	Гетр (oC)		
Effluent: Start Date Start time	End Date	£	nd Time	Temp (oC)		
MMLIUSE ONLY *required information* Workorder # Date Collection		ners				
9103076 (mm/dd/yy): Time (24 hr): Bol Sample ID#	ttle and Preservative	Contai	Sample Description	Composite	Sample Analysis Requested	
9103076-01 A <u>11-08-19 13:45</u>	Plastic 1L	1	MW4D	g/c.	Alkalinity Total Chloride 300.0 Conductivity (Lab) Fluoride 300.0 Sulfate 300.0 Alkalinity Bicarbonate	
9103076-01 B <u> -@8-[9 13:45</u> P	Plastic 500mL pH<2 w/HNO3	1	MW4D	g / c	Arsenic Tot 6020 Antimony Tot 6020 Barium Tot 6020 Iron Tot 6010B Selenium Tot 6020 Hardness Titration Beryllium Tot 6020 Boron Tot 6010B Cadmium Tot 6020 Calcium Tot 6010B Chromium Tot 6020 Sodium Tot 6010B Lead Tot 6020 Lithium Tot 6020 Mercury Tot 6020	
9103076-01 C <u>//-08-19</u> <u>13:45</u> P Pres	Plastic 500mL pH<2 w/H2SO4 servation Check: pH :		· MW4D	g / c	COD TOC	
9103076-01 D <u>11-08-19</u> <u>17:45</u> Plas Pres	stic 1L pH<2 w/HNO3 Rad 226 (Sub) servation Check: pH :		MW4D	g / c	Radium 226 (sub)	
Preservation Check Performed by:	/					
Field data collected by: <u>Trowis</u> Sourd	Date (mm/dd/yy	11-08	<u>3 ~/ 1</u> Time (24 hr) _	13:42		
pH <u>6.34</u> Cond (umho) <u>4980</u>	Res Cl (mg/L	.)	Tot CI (mg/L)	Fr	ee CI (mg/L)	
Temp (oC) <u>(5.5/</u> or (oF)	Static Water Level		DO (mg/L)	٦	Furb. (NTU)	
Flow (MGD) or (CFS)	or (g/min))				
Relinquished by: (Signature)	Received by: (Sign	nature)		Date (mm	/dd/yy) Time (24 hr)	
Ina Smed	Mayl	rege	<u> </u>		8-19 1535	
			· ·			
MMLI - Check here if trip charge applied	to associated COC		rinted: 1	0/31/2019 5:57	:52AM Page 6 of 18	

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Page 6 of 18

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory P.O. Box 907 Madisonville, KY 42431	Chain of Custody Scheduled for: <u>10/14/2019</u>		
Client: Big Rivers Electric Corporation Wilson Station Project: MW-4D Wilson 092-00004	Report To: Big Rivers Electric Corporation Wilson Station Mike Galbraith PO Box 24 Henderson, KY 42419	Invoice To: Big Rivers Electric Corporation Wilson Station Brian Edwards PO Box 24 Henderson, KY 42419	
	Phone: <u>(270) 844-6000</u> PWS ID#:	PO#: <u>252827-35</u>	
Collected by (Signature):			
required	a information	Samples Chlorinated 2 Ves No	
*For composite samples please indicate begin time	, end time and temp(oC) at end time below:		
Influent: Start Date Start time	End Date End Time T	emp (oC)	
Effluent: Start Date Start time	End Date End Time T	emp (oC)	
MMLI USE ONLY *required information* Workorder # Date Collection 9103076 (mm/dd/yy): Time (24 hr): Br Sample ID#	ottle and Preservative	Composite Sample Analysis Requested	
9103076-01 E <u>11-03-19</u> <u>13:45</u> Pla Pre	astic 1L pH<2 w/HNO3 1 MW4D Rad 228 (Sub) servation Check: pH :	g / c Radium 228 (sub)	
9103076-01 F <u>11-08-19</u> <u>13:45</u> Pla Pre	astic 1L pH<2 w/HNO3 1 MW4D Rad 228 (Sub) servation Check: pH :	g / c Radium 228 (sub)	
9103076-01 G <u>11-08-19</u> <u>13:45</u> Pla Pre	astic 1L pH<2 w/HNO3 1 (Sub) servation Check: pH :	g / c Radium Total (sub)	
		*	
Preservation Check Performed by:	/		
Field data collected by:	✓ Date (mm/dd/yy) <u></u> Time (24 hr)	<u>13: 43</u>	
PH <u>6.39</u> Cond (umho) <u>998</u>	2 Res CI (mg/L) Tot CI (mg/L)	Free CI (mg/L)	
Temp (oC) <u>15.57</u> or (oF) Flow (MGD) or (CFS)	Static Water Level DO (mg/L) or (g/min)	Turb. (NTU)	
Relinquished by: (Signature)	Received by: (Signature)	Date (mm/dd/yy) Time (24 hr) .	
free for the second			
		/31/2010 5:57:5200	
MMLI - Check here it trip charge applied	i to associated COC rinted: 10	Page 7 of 18	

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Page 7 of 18



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 06, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9103076 Pace Project No.: 30335307

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 13, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9103076

 Pace Project No.:
 30335307

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS



SAMPLE SUMMARY

Project: Pace Project No	9103076 .: 30335307			
Lab ID	Sample ID	Matrix	Date Collected	Date Received
30335307001	9103076-01	Water		11/13/19 10:10

REPORT OF LABORATORY ANALYSIS


SAMPLE ANALYTE COUNT

 Project:
 9103076

 Pace Project No.:
 30335307

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30335307001	9103076-01	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9103076

Pace Project No.: 30335307	7
----------------------------	---

Sample: 9103076-01 PWS:	Lab ID: 30335307 Site ID:	'001 Collected: 11/08/19 13:45 Sample Type:	Received:	11/13/19 10:10	Matrix: Water	
Comments: • Sample collecti	on dates and times were not pr	esent on the sample containers.				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.578 (1.04) C:NA T:88%	pCi/L	12/06/19 11:18	3 13982-63-3	
Radium-228	EPA 904.0	1.86 ± 0.571 (0.674) C:78% T:82%	pCi/L	12/04/19 14:17	7 15262-20-1	
Total Radium	Total Radium Calculation	1.86 ± 1.15 (1.71)	pCi/L	12/06/19 13:24	4 7440-14-4	

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103076						
Pace Project No.:	30335307						
QC Batch:	371026		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description:	903.1 Radium-226			
Associated Lab Sar	mples: 30335307	001					
METHOD BLANK:	1800179		Matrix: Water				
Associated Lab Sar	mples: 30335307	001					
Parar	meter	Act :	LUnc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.139 ± 0.459	(0.772) C:NA T:92%	pCi/L	12/06/19 10:57		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103076						
Pace Project No.:	30335307						
QC Batch:	371027		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 228			
Associated Lab Sar	mples: 30335307	001					
METHOD BLANK:	1800180		Matrix: Water				
Associated Lab Sar	mples: 30335307	001					
Parar	meter	Act :	LUnc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.969 ± 0.446	(0.738) C:81% T:74%	pCi/L	12/04/19 11:10		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALIFIERS

Project: 9103076 Pace Project No.: 30335307

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

Chain of Custody							Face Analytic	, , , , , , , , , , , , , , , , , , ,
Workorder: 9103076	Workord	er Name:	MW-4D Wilson 09	92-00004 Ov	ner Received D)ate: 11/8/2019	Results Requested By: Requested Analysis	
Report To:		Subconua	. 10.					
McCoy & McCoy Labs P O Roy 907		Pace Analy 1638 Rosev	tical Services LLC y Town Rd Suite 2	Greensburg ,3,4	<i>1</i> d			
Madisonville, KY 42409		Greensbury	g, PA 15601 5615					
270-821-7375 იიიქა როიიისahs იიm		-0C8 (477)	стос		Preserved Cont	ainers 0.1		
ltem Sample ID	Sample Colle Type Date	ect e/Time	Lab ID	Matrix		£06 Aq 206 Aq 206 Aq		LAB USE ONLY
				Water				CO1
2 9103076-01		68/19 13:45						
6						-/WO#: 3	0335307	
5								
6 7								
8								
10						0111/11m0	Comments	
Transfers Released By		Date	e/Time Reve	ved By		1-979 10:00		
2			<u>\</u>					
3						Ç		
Cooler Temperature on Receipt	<u>). 7</u>	Custod	ly Seal Y or N		Receive	ed on Ice Y or N	Sample Intac	CC N
***In order to maintain clien This chain of custody is consi	t confidentiality, dered complete a	location/na as is since th	ime of the samplii his information is	ng site, samp available in t	ler's name an he owner labo	d signature inay oratory.		
Pa					MT-AIL-C-003	rev.00.24March	2009	Page 1 of 1
G E-14-11 11 10 17 2016 11.01.3	34 AM			-	MI-ALL-U-VV2			

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SUBCONTRACT ORDER

McCoy & McCoy Laboratories, Inc.

9103076

SENDING LABORATORY:	RECEIVING LABORATORY:	
McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal	Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 Phone :(724) 850-5615 Fax:	

Please return shipping cooler to return address on shipping label.

Analysis		Expires	Laboratory ID	Comments	
Samula 1D: 9103076-01	Water	Sampled:11/08/2019 13:45	Specific Method		
Badium Total (sub)		05/06/2020 13:45	EPA 903.0		
Radium 228 (sub)		05/06/2020 13:45	EPA 904.0		
Radium 226 (sub)		05/06/2020 13:45	EPA 903.1		

#-30335301

11-13-74 Date 10=10 5 whakie 11/11/19 Received By Date Released By

Released By

Pittsburgh Lab Sample Condition	on Up	oon F	Rece	\sim zn33530
Pace Analytical Client Name:	M	<u>cCa</u> z	181	McCoy Project #
Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client Tracking #:		nmerci	al [Deace Other Label_//// LIMS Login ////
Custody Seal on Cooler/Box Present: Lyes	001 <u>مر</u> ت	- Flace		Blue None
Thermometer Used	iype o V	•C (Correc	ction Factor: C • · · · Final Temp: 1.9 · · ·
Cooler Temperature Observed Temp 17	<u> </u>	,		
Temp should be above treezing to o C			Ī	pH paper Lot# Date and Initials of person community L Q D Q 2Q contents: <u>P</u> ^(A) (1-13-14
o	Yes	No	N/A	101701391
Chain of Custody Present:	\square			1
Chain of Custody Filled Out:	\square			2
Chain of Custody Relinguished;	\lor			3
Sampler Name & Signature on COC:]			4
Sample Labels match COC:		\square		5. No time/dute on samples
-Includes date/time/ID Matrix:	MT	T	-	
Samples Arrived within Hold Time:		 		6
Short Hold Time Analysis (<72hr remaining):				7
Rush Turn Around Time Requested:		\swarrow	<u> </u>	8
Sufficient Volume:		<u></u>	ļ	9
Correct Containers Used:	\mathbf{k}	<u> </u>	<u> </u>	
-Pace Containers Used:		\downarrow		
Containers intact:	\perp			11
Orthophosphate field filtered			\leftarrow	12.
Hex Cr Aqueous sample field filtered			$\left\{ -\right\}$	13
Organic Samples checked for dechlorination:	<u></u>			14.
Filtered volume received for Dissolved tests			-	15.
All containers have been checked for preservation.	1			16. DMCZ
exceptions: VOA, coliform, TOC, O&G, Phenolic	s, Rado	,		<i>y</i>
All containers meet method preservation		1		Initial when DLC Date/time of preservation
requirements.	L			Lot # of added
		<u> </u>	<u> </u>	
Headspace in VOA Vials (>6mm):			+	18
Trip Blank Present:			+	
Trip Blank Custody Seals Present Rad Samples Screened < 0.5 mrem/hr	+_	-	-	Initial when Dic Date: 11-17-129
Client Notification/ Resolution: Person- C ontacted:			Đai	ite/Time:Contacted By:
Comments/ Resolution:				
	<u></u>			
A check in this box indicates that a	dditio	nal inf	oma	tion has been stored in ereports.
Whenever there is a discrepancy affecting Nor	th Caroli	ina com	pliance	e samples, a copy of this form will be sent to the North Carolina DEHNK
Certification Office (I.e. out of hold, incorrect preserv	ative, cu yen the F	it of tern Project M	p, incor fanapei	rect containers) or closes the SRF Review schedule in LIMS. The review is in the Status section
*PM review is documented electronically in LIMS. Wr of the Workorder Edit Screen.	jan ure (Unexcampet/Semple Mat/Sample Condition Upon Receipt Pittsburgh (C056-9 5

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J:\QAQC\Master\Document Menagement\Semple Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5April2019)

McCOY & McCOY LABORATORIES, Inc.

P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com
 Pikeville, KY
 Farmersburg, IN

 606.432.3104
 812.696.5076

Lexington, KY Pade 859.299.7775 270.

Paducah, KY 270.444.6547

"Providing Tomorrow's Analytical Capabilities Today"

Certificate of Analysis 9103077

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/04/2019 16:54

Project Name:	MW-5 Wilson 092-00004	Workorder:	9103077
-			

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/07/2019 15:20.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

This certificate of analysis may not be reproduced without the written consent of McCoy & McCoy Laboratories, Inc.



Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



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Lexington, KY 859.299.7775

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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias		Matrix	Date Collected	Date Received	Sampled By
9103077-01	MW5/		Water	11/06/2019 08:50	11/07/2019 15:20	Travis Sneed
LabNumber	Measurement	Value				
9103077-01	Field Conductance	3920				
	Field pH	6.44				
	Field Temp (C)	16.14				

McCOY & McCOY LABORATORIES, Inc. A Pace Analytical Laboratory

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812.696.5076

Lexington, KY Paducah, KY 859.299.7775 270.444.6547

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ANALYTICAL RESULTS

Lab Sample ID: 9103077-01 Description: MW5

Sample Collection Date Time: 11/06/2019 08:50 Sample Received Date Time: 11/07/2019 15:20

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Arsenic	0.0023		mg/L	0.0010	0.0004	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Barium	0.010		mg/L	0.004	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Boron	ND	U, D2	mg/L	1.00	1.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:53	AKB
Cadmium	ND	U	mg/L	0.0010	0.0001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Calcium	541	D1	mg/L	40.0	13.0	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:06	AKB
Chromium	ND	U	mg/L	0.0020	0.0006	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Copper	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Iron	6.34	D2	mg/L	1.00	0.500	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:53	AKB
Lead	ND	U	mg/L	0.002	0.0005	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Lithium	0.03		mg/L	0.02	0.005	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Magnesium	233	D1	mg/L	20.0	9.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:06	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Molybdenum	0.004	J	mg/L	0.01	0.002	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Nickel	0.005		mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Potassium	10.7	D2	mg/L	5.00	2.20	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:53	AKB
Selenium	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Sodium	73.8	D2	mg/L	2.60	1.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 14:53	AKB
Thallium	ND	U	mg/L	0.0020	0.0001	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP
Zinc	ND	U	mg/L	0.02	0.02	SW846-6020 A	11/08/2019 12:26	11/12/2019 13:58	DBP

Conventional Chemistry Analyses Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as	476		mg/L	4		2320 B-2011	11/18/2019 11:01	11/18/2019 11:01	HMF
Carbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 11:01	11/18/2019 11:01	HMF
Total Alkalinity	476		mg/L	4		2320 B-2011	11/18/2019 11:01	11/18/2019 11:01	HMF
Chemical Oxygen Demand	16		mg/L	5	5	HACH 8000	11/27/2019 16:47	11/27/2019 16:47	HMF
Specific Conductance (Lab)	3380		umhos/cm	1	1	2510 B-2011	11/22/2019 12:41	11/22/2019 12:41	DJK
Hardness as CaCO3	2300	D	mg/L	5	5	2340 C (as HACH 8226)	11/12/2019 11:22	11/12/2019 11:22	ALT
Total Dissolved Solids	3290		mg/L	50	50	2540 C-2011	11/12/2019 17:24	11/13/2019 16:26	MAG
Total Organic Carbon	1.6		mg/L	0.5		5310 C-2011	11/07/2019 13:50	11/10/2019 14:53	HMF
Total Organic Carbon	1.4		mg/L	0.5		5310 C-2011	11/07/2019 13:50	11/12/2019 16:17	HMF

Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	0.498	_Sub	pCi/L			EPA 903.1	12/04/2019 10:56	12/04/2019 10:58	AND
Radium-228	0.384	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND
Radium	0.434	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND



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Ion Chromatography Madisonville

Analyte	Result	Flag	Units	MRI	MDI	Method	Prenared	Analyzed	Analyst
, analyto	rtoodit	Tiug	onito	ivii (E	MIDE	mounou	Tiopalou	, indiy200	7 analyst
Chloride	98.2	D	mg/L	25.0	18.0	EPA 300.0 REV 2.1	11/16/2019 02:21	11/16/2019 02:21	CSC
Fluoride	ND	U	mg/L	0.20		EPA 300.0 REV 2.1	11/16/2019 02:21	11/16/2019 02:21	CSC
Sulfate	1490	D	mg/L	50.0	25.0	EPA 300.0 REV 2.1	11/16/2019 02:21	11/16/2019 02:21	CSC

Notes for work order 9103077

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.

- MMLI does not provide interpretation of these results unless otherwise stated.

- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.

- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.

- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.

- The Chain of Custody document is included as part of this report.

- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

_Sub See subcontractors report.

- D Results reported from dilution.
- D1 Sample required dilution due to high concentration of target analyte.

D2 Sample required dilution due to matrix interference.

J Estimated value.

- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).
- Y1 Sample RPD exceeded the method control limit.

Standard Quallifiers/Acronymns

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than
	Less than



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Paducah, KY 270.444.6547

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859.299.7775

Certified Analyses included in this Rep	port	
Analyte	Certifications	
2320 B-2011 in Water		
Bicarbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Carbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Total Alkalinity	KY Drinking Water Mdv (00030)	
2340 C (as HACH 8226) in Water		
Hardness as CaCO3	KY Drinking Water Mdv (00030)	
2510 B-2011 in Water		
Specific Conductance (Lab)	KY Drinking Water Mdv (00030)	
2540 C-2011 in Water		
Total Dissolved Solids	KY Drinking Water Mdv (00030)	
5310 C-2011 in Water		
Total Organic Carbon	KY Drinking Water Mdv (00030)	
EPA 300.0 REV 2.1 in Water		
Chloride	KY Drinking Water Mdv (00030)	
Fluoride	KY Drinking Water Mdv (00030)	
Sulfate	KY Drinking Water Mdv (00030)	
HACH 8000 in Water		
Chemical Oxygen Demand	KY Wastewater Mdv (00030)	

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9103077
Shipped By: Client	Temperature: 1.90° Celcius
Condition	
Check if Custody Seals are Present/Intact	
Check if Custody Signatures are Present	
Check if Collector Signature Present	
Check if bottles are intact	
Check if bottles are correct	
Check if bottles have sufficient volume	
Check if samples received on ice	
Check if VOA headspace is acceptable	
Check if samples received in holding time.	
Check if samples are preserved properly	

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory	Chain	ı of C	ustody				
P.O. Box 907 Madisonville, KY 42431	Schedule	d for:	<u>10/14/2019</u>				
Client: Big Rivers Electric Corporation Wilson Station Project: MW-5 Wilson 092-00004	Report To: Big Rivers Ele Station Mike Galbraith PO Box 24 Henderson, K	ectric Cor h XY 42419	poration Wilson	Invoice To: Big Rivers Electric Corporation Wilson Station Brian Edwards PO Box 24 Henderson, KY 42419			
	Phone: <u>(270)</u> PWS ID#: State:	<u>844-6000</u> 16. c	2	PO#: <u>2</u>	PO#: <u>252827-3</u> 2		
Collected by (Signature):		<u>-17</u>	-		ance Monitoring? Yes No		
required	finformation*			Sample	es Chlorinated? Yes No		
*For composite samples please indicate begin time,	, end time and temp(oC) at end 1	time below:	Campic			
Influent: Start Date Start time	End Date	En	d Time	Temp (oC)			
Effluent: Start Date Start time	End Date	En	id Time	Temp (oC)			
MMLI USE ONLY *required information* Workorder # Date Collection 9103077 (mm/dd/yy): Time (24 hr): Bo Sample ID#	ttle and Preservative	Containers	Sample Description	Composite	Sample Analysis Requested		
9103077-01 A <u> -6-19</u> <u>&:50</u> F	Plastic 1L Plastic 500mL pH<2 w/HNO3	1	MW5	g / c	Aikalinity Total Chloride 300.0 Conductivity (Lab) Fluoride 300.0 Sulfate 300.0 Alkalinity Bicarbonate TDS Alkalinity Carbonate Arsenic Tot 6020 Antimony Tot 6020 Barium Tot 6020 Iron Tot 6010B Selenium Tot 6020 Hardness Titration Beryllium Tot 6020 Boron Tot 6010B Cadmium Tot 6020 Calcium Tot 6010B Chromium Tot 6020 Sodium Tot 6010B Lead Tot 6020 Lithium Tot 6020 Mercury Tot 6020		
9103077-01 C <u> -6 9 8 : 5 0</u> F	Plastic 500mL pH<2 w/H2SO4 servation Check: pH :	1	MW5	g/c	СОД ТОС		
9103077-01 D <u>11 • 6 - 19 8:50</u> Pla Pres	stic 1L pH<2 w/HNO3 Rad 226 (Sub) servation Check: pH :	<u>1</u>	MW5	g / c	Radium 226 (sub)		
Preservation Check Performed by:					·		
Field data collected by: <u>Aravis</u> Sme	Date (mm/dd/yy))_ -6 -	• <u>19</u> Time (24 hr) _	8:50			
pH <u>6,44</u> Cond (umho) <u>3920</u>	Res CI (mg/L))	Tot CI (mg/L)	Fro	ee CI (mg/L)		
Temp (oC) <u>16.14</u> or (oF)	Static Water Level	. ,	DO (mg/L)	т	urb. (NTU)		
Flow (MGD) or (CFS)	or (g/min)	<u> </u>					
Relinquished by: (Signature)	Received by: (Sign	iature) Yaa	j~	Date (mm/	/dd/yy) Time (24 hr) ~1 9 うろうひ		
MMLI - Check here if trip charge applied	to associated COC		· · · · · · · · · · · · · · · · · · ·)/31/2019 5:58	:04AM Page 6 of 18		

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory P.O. Box 907 Madisonville, KY 42431	Chain Schedule	of Custody d for: <u>10/14/2019</u>]			
Client: Big Rivers Electric Corporation Wils Station	on Report To: Big Rivers Ele Station	ectric Corporation Wilson	Invoice To: Big Rivers Electric Corporation Wilson Station			
Project: MW-5 Wilson 092-00004	Mike Galbraith PO Box 24 Henderson, K	י Y 42419	Brian Edwards PO Box 24 Henderson, KY 42419			
Please Print Legibly	Phone: <u>(270)</u> PWS ID#:	<u>844-6000</u> КV	PO#: <u>2</u> . Quote#	<u>52827-</u> 37		
Collected by (Signature):	Sund		Compli	ance Monitoring? Yes	; No	
*For composite samples please indicate begin	time, end time and temp(oC) at end time below:	Sample	es Chlorinated? Yes	No	
Influent: Start Date Start time	End Date	End Time	Temp (oC)	·		
Effluent: Start Date Start time	End Date	End Time	Temp (oC)			
MMLI USE ONLY *required information* Workorder # Date Collection 9103077 (mm/dd/yy): Time (24 hr): Sample ID#	Bottle and Preservative	န မျှ Sample Description	Composite	Sample Analysis	s Requested	
9103077-01 E <u>11 - 6 - 19</u> 8:50	Plastic 1L pH<2 w/HNO3 Rad 228 (Sub) Preservation Check: pH :	<u> </u>	g / c	Radium 228 (sub)	<u> </u>	
9103077-01 F <u>11-06-19 8:50</u>	Plastic 1L pH<2 w/HNO3 Rad 228 (Sub) Preservation Check: pH :	1/ MW5	g / c	Radium 228 (sub)		
9103077-01 G <u>11-06-19</u> 8:50	Plastic 1L pH<2 w/HNO3 (Sub) Preservation Check: pH :	1 MW5 [*] ·	g / c	Radium Total (sub)		
Preservation Check Performed by:	Оу					
Field data collected by:	Date (mm/dd/yy)) <u>/(-06•/9</u> Time (24 hr) _	8:50			
pH <u>6.44</u> Cond (umho) <u>39</u>	20 Res CI (mg/L)	Tot CI (mg/L)	Fre	ee Cl (mg/L)		
Temp (oC) <u>16,14</u> or (oF)	Static Water Level	DO (mg/L) _	т	'urb. (NTU)	_	
Flow (MGD) or (CFS)	or (g/min)					
Relinquished by: (Signature)	Received by: (Sign	ature)	Date (mm/	(dd/yy) Time (2 2-19 15	24 hr) 入り	
				<u> </u>		
MMLI - Check here if trip charge app	lied to associated COC	rinted: 1	0/31/2019 5:58	:04AM P	age 7 of 18	



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 04, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9103077 Pace Project No.: 30334690

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 09, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9103077

 Pace Project No.:
 30334690

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS



SAMPLE SUMMARY

30334690001	9103077-01	Water	11/06/19 08:50	11/09/19 10:00	
Lab ID	Sample ID	Matrix	Date Collected	Date Received	
Pace Project No	.: 30334690				
Project:	9103077				

REPORT OF LABORATORY ANALYSIS



SAMPLE ANALYTE COUNT

 Project:
 9103077

 Pace Project No.:
 30334690

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory	
30334690001	9103077-01	EPA 903.1	MK1	1	PASI-PA	
		EPA 904.0	VAL	1	PASI-PA	
		Total Radium Calculation	CMC	1	PASI-PA	

REPORT OF LABORATORY ANALYSIS



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9103077

Pace Project No.: 30334690

Sample: 9103077-01 PWS:	Lab ID: 30334 Site ID:	690001 Collected: 11/06/19 08:50 Sample Type:	Received:	11/09/19 10:00	Matrix: Water	
Comments: • Sample collect	ion dates and times were no	t present on the sample containers.				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0498 ± 0.259 (0.537) C:NA T:94%	pCi/L	12/02/19 11:26	3 13982-63-3	
Radium-228	EPA 904.0	0.384 ± 0.263 (0.501) C:89% T:99%	pCi/L	11/27/19 11:17	15262-20-1	
Total Radium	Total Radium Calculation	0.434 ± 0.522 (1.04)	pCi/L	12/04/19 09:28	3 7440-14-4	

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103077						
Pace Project No.:	30334690						
QC Batch:	370980		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 228			
Associated Lab San	nples: 30334690	001					
METHOD BLANK:	1800091		Matrix: Water				
Associated Lab San	nples: 30334690	001					
Paran	neter	Act ±	Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.0321 ± 0.281	(0.648) C:85% T:88%	pCi/L	11/27/19 11:14		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103077						
Pace Project No.:	30334690						
QC Batch:	370981		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description:	903.1 Radium-226			
Associated Lab San	nples: 30334690	001					
METHOD BLANK:	1800092		Matrix: Water				
Associated Lab San	nples: 30334690	001					
Paran	neter	Act ±	Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.0408 ± 0.330	(0.647) C:NA T:94%	pCi/L	12/02/19 10:59		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALIFIERS

 Project:
 9103077

 Pace Project No.:
 30334690

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

Chain of Custody Workorder: 9103077	Workor	der Name:	MW-5 Wilso	on 092-000	04 Owner R	eceived Dati	e: 11/7/.	2019	Pace Analyti Results Requested By	ical *
Report To: Asses		Subcontra	ict To:					Req	uested Analysis	
McCoy & McCoy Labs P.O. Box 907 Madisonville, KY 42409 270-821-7375		Pace Analy 1638 Rose Greensbur (724) 850-	ytical Service ₂ y Town Rd S rg, PA 15601 5615	es LLC Gree Suite 2,3,4	nsburg P.€					
angelaemintuoyiaus.com Item Sample ID	Sample Coll Type Dat	ect e/Time	Lab ID		Matrix		۳ <u>508 معا</u> 2.509 معا 2.509 معا	0.409 Aq3		LAB USE ONL
2 9103077-01	11,	/06/19 08:50	IR44-M	lcCoy	Water		××	×		Col
3 4 5 6								- ?: -	0334690	
8							76606 	+ + + 200		
9 10										
Iransters Keleased By		Date //- <i>&-</i> ,	11111111111111111111111111111111111111			3U 0-01	16/11me		and the comments	
2 3 3								·		
Contar Temperature on Perceint	(/ 2 °r	Clietody	, Saal/V		а Эр-үг).	Paraiwad or			Samla Internet	+ V or N
This chain of custody is consider	confidentiality, I red complete a	l custor location/nar s is since thi	ne of the sar s informatio	mpling site n is availat	, sampler's na ile in the own	ime and sig er laborato	nature m iry.	lay not b	he provided on this CO	
6 4 11:01:34 / 8	AM				ÊMT-ALL	C-002rev.	00 24Ma	rch2009		Page 1 of
<u>ne 9</u> .										

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of 11 If 18

SUBCONTRACT ORDER

McCoy & McCoy Laboratories, Inc.

9103077

SENDING LABORATORY:

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McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal

RECEIVING LABORATORY:

Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 Phone :(724) 850-5615 Fax:

Please return shipping cooler to return address on shipping label.

Analysis		Expires	Laboratory ID	Comments	
Sample ID: 9103077-01	Water	Sampled:11/06/2019 08:50	Specific Method		
Radium Total (sub)		05/04/2020 08:50	EPA 903.0		
Radium 228 (sub)		05/04/2020 08:50	EPA 904.0		
Radium 226 (sub)		05/04/2020 08:50	EPA 903.1		

4-3033469

10:00 -0Date

Refeased By

Date

11-8-19

Received By

Paper 17 of 18

Released By

Received By

Pittsburgh Lab Sample Condi	tion l	Jpor	ו Re	ceipt	<u></u>
Pace Analytical Client Name:	Λ	McC	ny 8	<u>McCny</u> Project # 3 0 3 3 4 6	9 (
Courier: Fed Ex UPS USPS Clien Tracking #: 1107 3385 5275	t 🗅	Comme	rcial	Deace Other Lims Login	
Custody Seal on Cooler/Box Present: Ves		 10	Seals		
Thermometer Used 1/	Туре	of ice:	: Wei	Blue None	
Cooler Temperature Observed Temp	- 3	۰c	Corr	ection Factor: \mathcal{O} °C Final Temp: $S \mathcal{S}$ °C	
Temp should be above freezing to 6°C		-			
				pH paper Lot# Date and Initials of person examining	
Comments:	Yes	No	N/A	WWW	
Chain of Custody Present:				1. • •	
Chain of Custody Filled Out:				2.	
Chain of Custody Relinquished:				3.	
Sampler Name & Signature on COC:				4.	
Sample Labels match COC:				5. Mature date no complex	
-Includes date/time/ID Matrix:	MT			I COMPANIA CONCENT JOUGHICT	
Samples Arrived within Hold Time:				6.	
Short Hold Time Analysis (<72hr remaining):				7	
Rush Turn Around Time Requested:				8.	
Sufficient Volume:		-		9.	
Correct Containers Used:		\vdash		10.	
-Pace Containers Used:			ſ		
Containers Intact:	\square	1		11.	
Orthophosphate field filtered				12.	
lex Cr Aqueous sample field filtered		<u> </u>		13.	
Organic Samples checked for dechlorination:			~	14.	
Filtered volume received for Dissolved tests		1		15.	
Il containers have been checked for preservation.				16.	
exceptions: VOA, coliform, TOC, O&G, Phenolics, Non-aqueous matrix	Radon,		8	price	
All containers meet method preservation	1			Initial when Du Date/time of	
equirements.	4	<u>I</u>	l	completed // preservation	
	-			preservative	
leadspace in VOA Vials (>6mm):				17.	
rip Blank Present:			-	18.	
rip Blank Custody Seals Present		-	/		•.
Rad Samples Screened < 0.5 mrem/hr	\square			trilial when NC Date: 11-(1-7.9	
	<u>ن</u> ـــــــ				
Person-Contacted:			Date/	Fime: Contacted By:	
Comments/ Resolution:				<u> </u>	

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5April2019)

McCOY & McCOY LABORATORIES, Inc.

P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com
 Pikeville, KY
 Farmersburg, IN

 606.432.3104
 812.696.5076

Lexington, KY Paducah, KY 859.299.7775 270.444.6547

"Providing Tomorrow's Analytical Capabilities Today"

Certificate of Analysis 9103079

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/04/2019 16:52

Project Name:	MW-7 Wilson 092-00004	Workorder:	9103079
-			

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/07/2019 15:20.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

This certificate of analysis may not be reproduced without the written consent of McCoy & McCoy Laboratories, Inc.



Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager

McCOY & McCOY LABORATORIES, Inc.

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 Pikeville, KY
 Farmersburg, IN

 606.432.3104
 812.696.5076

Lexington, KY 859.299.7775

Paducah, KY 270.444.6547

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Certificate of Analysis 9103078

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/04/2019 16:53

Project Name:	MW-6 Wilson 092-00004	Workorder:	9103078

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/07/2019 15:20.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

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Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



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Lexington, KY 859.299.7775

Paducah, KY 270.444.6547

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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alia	IS	Matrix	Date Collected	Date Received	Sampled By
9103078-01	MW6/		Water	11/06/2019 11:20	11/07/2019 15:20	Travis Sneed
LabNumber	Measurement	Value				
9103078-01	Field Conductance	3410				
	Field pH	6.29				
	Field Temp (C)	16.38				

McCOY & McCOY LABORATORIES, Inc. A Pace Analytical Laboratory

P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com

Pikeville, KY Farmersburg, IN 606.432.3104

812.696.5076

Lexington, KY Paducah, KY 859.299.7775 270.444.6547

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ANALYTICAL RESULTS

Lab Sample ID: 9103078-01 Description: MW6

Sample Collection Date Time: 11/06/2019 11:20 Sample Received Date Time: 11/07/2019 15:20

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Arsenic	0.0060		mg/L	0.0010	0.0004	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Barium	0.012		mg/L	0.004	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Boron	ND	D2, U	mg/L	1.00	1.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:09	AKB
Cadmium	ND	U	mg/L	0.0010	0.0001	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Calcium	482	D1	mg/L	40.0	13.0	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:12	AKB
Chromium	ND	U	mg/L	0.0020	0.0006	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Copper	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Iron	6.25	D2	mg/L	1.00	0.500	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:09	AKB
Lead	0.0005	J	mg/L	0.002	0.0005	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Lithium	0.04		mg/L	0.02	0.005	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Magnesium	222	D1	mg/L	20.0	9.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:12	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Molybdenum	0.007	J	mg/L	0.01	0.002	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Nickel	0.017		mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Potassium	10.2	D2	mg/L	5.00	2.20	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:09	AKB
Selenium	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Sodium	41.2	D2	mg/L	2.60	1.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:09	AKB
Thallium	ND	U	mg/L	0.0020	0.0001	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP
Zinc	ND	U	mg/L	0.02	0.02	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:06	DBP

Conventional Chemistry Analyses Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as	498		mg/L	4		2320 B-2011	11/18/2019 11:08	11/18/2019 11:08	HMF
CaCO3									
Carbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 11:08	11/18/2019 11:08	HMF
Total Alkalinity	498		mg/L	4		2320 B-2011	11/18/2019 11:08	11/18/2019 11:08	HMF
Chemical Oxygen Demand	15		mg/L	5	5	HACH 8000	11/27/2019 16:47	11/27/2019 16:47	HMF
Specific Conductance (Lab)	3220		umhos/cm	1	1	2510 B-2011	11/22/2019 12:06	11/22/2019 12:06	DJK
Hardness as CaCO3	2030	D	mg/L	5	5	2340 C (as HACH 8226)	11/12/2019 11:24	11/12/2019 11:24	ALT
Total Dissolved Solids	3170		mg/L	50	50	2540 [°] C-2011	11/12/2019 17:28	11/13/2019 16:26	MAG
Total Organic Carbon	1.3		mg/L	0.5		5310 C-2011	11/07/2019 13:50	11/10/2019 15:16	HMF
Total Organic Carbon	1.4		mg/L	0.5		5310 C-2011	11/07/2019 13:50	11/12/2019 16:38	HMF

Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	0.255	_Sub	pCi/L			EPA 903.1	12/04/2019 10:56	12/04/2019 10:58	AND
Radium-228	1.16	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND
Radium	1.42	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND



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Paducah, KY 270.444.6547

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Ion Chromatography Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	16.3		mg/L	0.5	0.4	EPA 300.0 REV 2.1	11/16/2019 02:54	11/16/2019 02:54	CSC
Fluoride	ND	U	mg/L	0.20		EPA 300.0 REV 2.1	11/16/2019 02:54	11/16/2019 02:54	CSC
Sulfate	1280	D	mg/L	50.0	25.0	EPA 300.0 REV 2.1	11/16/2019 02:54	11/16/2019 02:54	CSC

Notes for work order 9103078

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.

- MMLI does not provide interpretation of these results unless otherwise stated.

- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.

- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.

- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.

- The Chain of Custody document is included as part of this report.

- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

_Sub	See subcontractors report.
------	----------------------------

- D Results reported from dilution.
- D1 Sample required dilution due to high concentration of target analyte.

D2 Sample required dilution due to matrix interference.

- J Estimated value.
- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).
- Y1 Sample RPD exceeded the method control limit.

Standard Quallifiers/Acronymns

IVIDL	Method Delection Linit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than
	Less than

Mathed Datastian Limit



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812.696.5076

Paducah, KY 270.444.6547

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Lexington, KY

859.299.7775

Certified Analyses included in this Rep	port	
Analyte	Certifications	
2320 B-2011 in Water		
Bicarbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Carbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Total Alkalinity	KY Drinking Water Mdv (00030)	
2340 C (as HACH 8226) in Water		
Hardness as CaCO3	KY Drinking Water Mdv (00030)	
2510 B-2011 in Water		
Specific Conductance (Lab)	KY Drinking Water Mdv (00030)	
2540 C-2011 in Water		
Total Dissolved Solids	KY Drinking Water Mdv (00030)	
5310 C-2011 in Water		
Total Organic Carbon	KY Drinking Water Mdv (00030)	
EPA 300.0 REV 2.1 in Water		
Chloride	KY Drinking Water Mdv (00030)	
Fluoride	KY Drinking Water Mdv (00030)	
Sulfate	KY Drinking Water Mdv (00030)	
HACH 8000 in Water		
Chemical Oxygen Demand	KY Wastewater Mdv (00030)	

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9103078		
Shipped By: Client	Temperature: 1.90° Celcius		
Condition			
Check if Custody Seals are Present/Intact			
Check if Custody Signatures are Present			
Check if Collector Signature Present			
Check if bottles are intact			
Check if bottles are correct			
Check if bottles have sufficient volume			
Check if samples received on ice			
Check if VOA headspace is acceptable			
Check if samples received in holding time.			
Check if samples are preserved properly			

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory	Chair	Chain of Custody				
P.O. Box 907 Madisonville, KY 42431	Schedule	ed for	: <u>10/14/2019</u>			
Client: Big Rivers Electric Corporation Wils Station Project: MW-6 Wilson 092-00004	on Report To: Big Rivers Ele Station Mike Galbrait PO Box 24 Henderson, K	Report To: Big Rivers Electric Corporation Wilson Station Mike Galbraith PO Box 24 Henderson, KY 42419		Invoice To: Big Rivers Electric Corporation Wilson Station Brian Edwards PO Box 24 Henderson, KY 42419		
Blassa Brint Logibly	Phone: <u>(270)</u> PWS ID#: State:	Phone: <u>(270) 844-6000</u> PWS ID#:		PO#: <u>252827-3</u> 7		
Collected by (Signature)	Jiaie	-7			ance Monitorin	a? Yes No
Yequ	ired information*		— 	Sample	es Chlorinated?	YesNo
*For composite samples please indicate begin t	ime, end time and temp(ou) at end				
Influent: Start Date Start time	End Date	E	nd Time T	emp (oC)		
Effluent: Start Date Start time	End Date	E		1 emp (oC)		
MMLI USE ONLY *required information* Workorder # Date Collection 9103078 (mm/dd/yy): Time (24 hr): Sample ID#	Bottle and Preservative	Containers	Sample Description	Composite	Sample /	Analysis Requested
9103078-01 B <u>11-06-19</u> <u>11:20</u>	Plastic 500mL pH<2 w/HNO3 Preservation Check: pH :	1	MW6	g/c	Alkalinity Total Chloride 300.0 Conductivity (Lab) Fluoride 300.0 Sulfate 300.0 Alkalinity Bicarbonate TDS Alkalinity Carbonate Arsenic Tot 6020 Antimony Tot 6020 Barium Tot 6020 Iron Tot 6010B Selenium Tot 6020 Hardness Titration Beryllium Tot 6020 Boron Tot 6010B Cadmium Tot 6020 Calcium Tot 6010B Chromium Tot 6020 Sodium Tot 6010B Lead Tot 6020 Lithium Tot 6020 Mercury Tot 6020	
9103078-01 C 11-06-19 11:20	Plastic 500mL pH<2 w/H2SO4 Preservation Check: pH :	1	MW6	g / c	COD TOC	
9103078-01 D <u> 1-06-19 (1:20</u>	Plastic 1L pH<2 w/HNO3 Rad 226 (Sub) Preservation Check: pH :		MW6 .	g / c	Radium 226 (sub)
Preservation Check Performed by:/	<i>уру</i>			<u></u>		·····
Field data collected by: <u>ITavis</u> Sncc	Date (mm/dd/yy) 11-0	<u>6 - 1 9</u> Time (24 hr)	11:20		
pH <u>(a.29</u> Cond (umho) <u>34</u>	<u>10</u> Res Cl (mg/L)	Tot CI (mg/L)	Fre	ee CI (mg/L)	
Temp (oC) _1.4.38 or (oF) Flow (MGD) or (CFS)	Static Water Level or (g/min)		DO (mg/L)	Т	urb. (NTU)	
Relinquished by: (Signature)	Received by: (Sigr	nature)	· · · · · · · · · · · · · · · · · · ·	Date (mm/	/dd/yy)	Time (24 hr)
I'm hand	_ 1/7	pa	y		1-19	1520
MMI L. Check here if trin charge ann	lied to associated COC		Printed: 10			

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory P.O. Box 907 Madisonville, KY_42431	Chain of Custody Scheduled for: 10/14/2019			
Client: Big Rivers Electric Corporation Wi Station Project: MW-6 Wilson 092-00004	Ison Report To: Big Rivers Electric Corporation Wilson Station Mike Galbraith PO Box 24 Henderson, KY 42419 Phone: (270) 844 6000	Invoice To: Big Rivers Electric Corporation Wilson Station Brian Edwards PO Box 24 Henderson, KY 42419		
Please Print Legibly	PWS ID#: State: <u>Ky</u>	PO#: <u>252827-</u> 37 Quote#		
Collected by (Signature):	uired Information*	Compliance Monitoring? Yes No		
*For composite samples please indicate begin	time, end time and temp(oC) at end time below:	Samples Chlorinated? Yes No		
Influent: Start Date Start time	End Date End Time	Temp (oC)		
Effluent: Start Date Start time	End Date End Time	Temp (oC)		
MMLIUSE ONLY *required information* Date Collection Collection 9103078 (mm/dd/yy): Time (24 hr): Sample ID# 9103078-01 E 11-06-19 11:20 9103078-01 F 11-06-19 11:20 9103078-01 F 11-06-19 11:20 9103078-01 G 11-06-19 11:20	Bottle and Preservative Sample Description Plastic 1L pH<2 w/HNO3 Rad 228 (Sub) MW6 Preservation Check: pH : MW6 Plastic 1L pH<2 w/HNO3 Rad 228 (Sub) MW6 Preservation Check: pH : MW6 Plastic 1L pH<2 w/HNO3 Rad 228 (Sub) MW6 Preservation Check: pH : MW6 Plastic 1L pH<2 w/HNO3 (Sub) MW6 Preservation Check: pH : MW6	CompositeSample Analysis Requestedg / cRadium 228 (sub)g / cRadium 228 (sub)g / cRadium Total (sub)		
Preservation Check Performed by:	<u>/</u>			
Field data collected by: Irac: 5 SnC pH 6.29 Cond (umho) 3 4 Temp (oC) 16.38 or (oF) Flow (MGD) or (CFS) Relinquished by: (Signature) Image: Signature (Signature)	Date (mm/dd/yy) 11-06-19 Time (24 hr) 1 IO Res CI (mg/L) Tot CI (mg/L)	I: 20 Free CI (mg/L) Turb. (NTU) Date (mm/dd/yy) Time (24 hr)		
MMLI - Check here if trip charge appl	ed to associated COC 'rinted: 10/3	<u>11/2019 5:58:55AM</u>		

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Page 7 of 18



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 04, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9103078 Pace Project No.: 30334700

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 09, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9103078

 Pace Project No.:
 30334700

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS

Pac	ne.	20	f 11
Page	9	of	18


SAMPLE SUMMARY

30334700001	9103078-01	Water	11/06/19 11:20	11/09/19 10:00
Lab ID	Sample ID	Matrix	Date Collected	Date Received
Pace Project No.: 30334700				
Project:	9103078			

REPORT OF LABORATORY ANALYSIS



SAMPLE ANALYTE COUNT

 Project:
 9103078

 Pace Project No.:
 30334700

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30334700001	9103078-01	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9103078

Pace Project No	o.: 30334700
-----------------	--------------

Sample: 9103078-01 PWS:	Lab ID: 30334700 Site ID:	001 Collected: 11/06/19 11:20 Sample Type:	Received:	11/09/19 10:00	Matrix: Water						
Comments: • Sample collection dates and times were not present on the sample containers.											
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual					
Radium-226	EPA 903.1	0.255 ± 0.361 (0.612) C:NA T:96%	pCi/L	12/03/19 11:06	3 13982-63-3						
Radium-228	EPA 904.0	1.16 ± 0.465 (0.726) C:76% T:87%	pCi/L	12/02/19 16:17	7 15262-20-1						
Total Radium	Total Radium Calculation	1.42 ± 0.826 (1.34)	pCi/L	12/04/19 09:28	3 7440-14-4						

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103078						
Pace Project No.:	30334700						
QC Batch:	370987		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 228			
Associated Lab Sar	mples: 30334700	001					
METHOD BLANK:	1800103		Matrix: Water				
Associated Lab Sar	mples: 30334700	001					
Parar	meter	Act :	± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.353 ± 0.347	(0.714) C:83% T:78%	pCi/L	12/02/19 16:13		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103078						
Pace Project No.:	30334700						
QC Batch:	370988		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description: 903.1 Radium-226				
Associated Lab Sar	mples: 30334700	001					
METHOD BLANK:	1800104		Matrix: Water				
Associated Lab Sar	mples: 30334700	001					
Parar	neter	Act ±	Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.0385 ± 0.251	(0.505) C:NA T:92%	pCi/L	12/03/19 11:06		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALIFIERS

Project: 9103078 Pace Project No.: 30334700

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

Workorder: 9103078	Workorder Name: MW-6 Wilson 092-00004 Owner Receive	Date: 11/7/2019 Results Requested By:
Keport To:	Subcontract To: 22	Requested Analysis
McCoy & McCoy Labs P.O. Box 907 Madisonville, KY 42409 270-821-7375	Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 (724) 850-5615	
angela@mccoylabs.com Item Sample ID	Sample Collect Preserved C Type Date/Time Lab ID	1.506 A 0.400 A 0.400 A
2 9103078-01	11/06/19 11:20 R44-McCov Water	E E E LAB USE ONLY X X X
<u>е</u>		
5		-W0#:30334700
č 7		
8 6		
10		
Transfers Released By	the first strategiese Date/Time to a Reveived By the first strategies	Date/Time Comments
2	11.8.19 1400	1-9-14 (B-50)
3		
Cooler Temperature on Receipt	10.6 °C Custody Seal (Y o) N Receiv	d on Ice Mor N Sample Intact Mor N
***In order to maintain client cor This chain of custody is considered	ofidentiality, location/name of the sampling site, sampler's name ar d complete as is since this information is available in the owner lab	signature may not be provided on this COC atory.
ин 40:ТО:ТТ ото, //т алло тт:От 24 ми Рассо оf 11 аде 16 of 18	A FMT-ALL-C-00:	ev.00 24March2009 Page 1 of 1

e.

SUBCONTRACT ORDER

McCoy & McCoy Laboratories, Inc.

9103078

SENDING LABORATORY:

McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal

RECEIVING LABORATORY:

Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 Phone :(724) 850-5615 Fax:

Please return shipping cooler to return address on shipping label.

Analysis		Expires	Laboratory ID	Comments
Sample ID: 9103078-01	Water	Sampled:11/06/2019 11:20	Specific Method	
Radium Total (sub)		05/04/2020 11:20	EPA 903.0	
Radium 228 (sub)		05/04/2020 11:20	EPA 904.0	
Radium 226 (sub)		05/04/2020 11:20	EPA 903.1	

#_30334700

'l Released By

11-9-19 (1:00 Date

iceTeased By

11-8-19 Date

Received By

Date

Date

Date

Pittsburgh Lab Sample Condil	lon	Jbol	i Ke	eipt	
Pace Analytical' Client Name:	1	10	<u>17</u> &	McCm Project	303347 0
Courier: Fed Ex UPS USPS Client Tracking #: 1107 3385 5275		omme: -	rcial	Deace Other	Label MU IS Login M
Custody Seal on Cooler/Box Present: Øyes	□ n	0	Seals	intact: 🛛 yes 🔲 no	
Thermometer Used 1/	Туре	of Ice:	Wet	Blue None	
Cooler Temperature Observed Temp	. <u>G</u>	• C	Corre	ction Factor: <u> </u>	_{np:} [0,2] •c
Commonfoi	Vec	No		pH paper Lot# Date and Initi- Date and Initi- contents:	Als of person examining
Chain of Custody Drocarty	100		10/1		
	\vdash	-		۱	
Chain of Custody Filled Out:	F			2	
Chain of Custody Relinquished:	\vdash	\vdash		3.	
Sampler Name & Signature on COC:			<u> </u>	4.	
Sample Labels match COC:	Ļ	Ĺ		5. NA tune place on su	muples
-Includes date/time/ID Matrix:	ht	T.	.	· · / · · /	1
Samples Arrived within Hold Time:	\leq	ļ	ļ	6.	
Short Hold Time Analysis (<72hr remaining):			ļ	7	
Rush Turn Around Time Requested:				8.	
Sufficient Volume:				9.	
Correct Containers Used:				10.	
-Pace Containers Used:		/			
Containers Intact:		<u> </u>		11.	
			\square	12.	<u> </u>
Hex Cr Aqueous sample field filtered			\square	<u></u>	
Organic Samples checked for dechloringtion	 		$\mathbf{\dot{\mathbf{z}}}$	14	
Elitered volume machined for Discrimed tests				17) 1 E	······
All containers have been checked for preservation.			<u> </u>	15.	
exceptions: VOA, coliform, TOC, O&G, Phenolics, Non-aqueous matrix	Radon,			16. pHcz	
All containers meet method preservation		2		nitial when 0/1 Date/time of	
requirements.	\angle			completed preservation	
				.ot#ofadded preservative	
Headspace in VOA Vials (>6mm).				17.	
Trin Blank Present:			/	18.	
Trin Blank Custorly Seals Present					· .
Rad Samples Screened < 0.5 mrem/hr		\geq		nillal when $\mathcal{D}\mathcal{U}$ \mathcal{I} \mathcal{I}	-19
		ŀ		completed; p 2 Date: // //	
Client Notification/ Resolution:					_
Person Contacted:			⊎ate/1	me:Contacted	В <u>у:</u>
Comments/ Resolution:					•

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5April2019)

McCOY & McCOY LABORATORIES, Inc.

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 Pikeville, KY
 Farmersburg, IN

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Lexington, KY Paducah, KY 859.299.7775 270.444.6547

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Certificate of Analysis 9103079

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/04/2019 16:52

Project Name:	MW-7 Wilson 092-00004	Workorder:	9103079
-			

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/07/2019 15:20.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

This certificate of analysis may not be reproduced without the written consent of McCoy & McCoy Laboratories, Inc.



Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias		Matrix	Date Collected	Date Received	Sampled By
9103079-01	MW7/		Water	11/07/2019 08:00	11/07/2019 15:20	Travis Sneed
LabNumber	Measurement	Value				
9103079-01	Field Conductance	2220				
	Field pH	6.59				
	Field Temp (C)	15.27				

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ANALYTICAL RESULTS

Lab Sample ID: 9103079-01 Description: MW7

Sample Collection Date Time: 11/07/2019 08:00 Sample Received Date Time: 11/07/2019 15:20

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Arsenic	0.0034		mg/L	0.0010	0.0004	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Barium	0.013		mg/L	0.004	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Boron	1.41	D2	mg/L	1.00	1.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:15	AKB
Cadmium	ND	U	mg/L	0.0010	0.0001	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Calcium	331	D1	mg/L	40.0	13.0	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:19	AKB
Chromium	ND	U	mg/L	0.0020	0.0006	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Copper	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Iron	5.45	D2	mg/L	1.00	0.500	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:15	AKB
Lead	ND	U	mg/L	0.002	0.0005	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Lithium	0.02		mg/L	0.02	0.005	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Magnesium	91.5	D2	mg/L	2.00	0.900	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:15	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Molybdenum	0.006	J	mg/L	0.01	0.002	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Nickel	0.005		mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Potassium	6.40	D2	mg/L	5.00	2.20	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:15	AKB
Selenium	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Sodium	34.0	D2	mg/L	2.60	1.00	SW846 6010 B	11/08/2019 12:26	11/13/2019 15:15	AKB
Thallium	ND	U	mg/L	0.0020	0.0001	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP
Zinc	ND	U	mg/L	0.02	0.02	SW846-6020 A	11/08/2019 12:26	11/12/2019 14:13	DBP

Conventional Chemistry Analyses Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as CaCO3	311		mg/L	4		2320 B-2011	11/18/2019 11:18	11/18/2019 11:18	HMF
Carbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 11:18	11/18/2019 11:18	HMF
Total Alkalinity	311		mg/L	4		2320 B-2011	11/18/2019 11:18	11/18/2019 11:18	HMF
Chemical Oxygen Demand	9		mg/L	5	5	HACH 8000	11/27/2019 16:47	11/27/2019 16:47	HMF
Specific Conductance (Lab)	1980		umhos/cm	1	1	2510 B-2011	11/22/2019 12:45	11/22/2019 12:45	DJK
Hardness as CaCO3	1360	D	mg/L	5	5	2340 C (as HACH 8226)	11/12/2019 11:26	11/12/2019 11:26	ALT
Total Dissolved Solids	1890		mg/L	50	50	2540 C-2011	11/12/2019 17:32	11/13/2019 16:26	MAG
Total Organic Carbon	1.5		mg/L	0.5		5310 C-2011	11/07/2019 13:50	11/10/2019 15:39	HMF
Total Organic Carbon	1.1		mg/L	0.5		5310 C-2011	11/07/2019 13:50	11/12/2019 17:00	HMF

Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	0.374	_Sub	pCi/L			EPA 903.1	12/04/2019 10:56	12/04/2019 10:58	AND
Radium-228	0.490	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND
Radium	0.864	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND



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Ion Chromatography Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	30.1		mg/L	0.5	0.4	EPA 300.0 REV 2.1	11/16/2019 04:00	11/16/2019 04:00	CSC
Fluoride	0.21		mg/L	0.20		EPA 300.0 REV 2.1	11/16/2019 04:00	11/16/2019 04:00	CSC
Sulfate	809	D	mg/L	50.0	25.0	EPA 300.0 REV 2.1	11/16/2019 04:00	11/16/2019 04:00	CSC

Notes for work order 9103079

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.

- MMLI does not provide interpretation of these results unless otherwise stated.

- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.

- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.

- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.

- The Chain of Custody document is included as part of this report.

- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

_Sub See subcontractors report.

- D Results reported from dilution.
- D1 Sample required dilution due to high concentration of target analyte.

D2 Sample required dilution due to matrix interference.

J Estimated value.

- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).
- Y1 Sample RPD exceeded the method control limit.

Standard Quallifiers/Acronymns

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than
	Less than



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Certified Analyses included in this Rep	ort	
Analyte	Certifications	
2320 B-2011 in Water		
Bicarbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Carbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Total Alkalinity	KY Drinking Water Mdv (00030)	
2340 C (as HACH 8226) in Water		
Hardness as CaCO3	KY Drinking Water Mdv (00030)	
2510 B-2011 in Water		
Specific Conductance (Lab)	KY Drinking Water Mdv (00030)	
2540 C-2011 in Water		
Total Dissolved Solids	KY Drinking Water Mdv (00030)	
5310 C-2011 in Water		
Total Organic Carbon	KY Drinking Water Mdv (00030)	
EPA 300.0 REV 2.1 in Water		
Chloride	KY Drinking Water Mdv (00030)	
Fluoride	KY Drinking Water Mdv (00030)	
Sulfate	KY Drinking Water Mdv (00030)	
HACH 8000 in Water		
Chemical Oxygen Demand	KY Wastewater Mdv (00030)	

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9103079
Shipped By: Client	Temperature: 1.90° Celcius
Condition	
Check if Custody Seals are Present/Intact	
Check if Custody Signatures are Present	
Check if Collector Signature Present	
Check if bottles are intact	
Check if bottles are correct	
Check if bottles have sufficient volume	
Check if samples received on ice	
Check if VOA headspace is acceptable	
Check if samples received in holding time.	
Check if samples are preserved properly	

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory	Chain	of C	ustody				
P.O. Box 907 Madisonville, KY 42431	Schedule	d for:	<u>10/14/2019</u>				
Client: Big Rivers Electric Corporation Wilson Station Project: MW-7 Wilson 092-00004	Report To: Big Rivers Ele Station Mike Galbraith PO Box 24	ctric Coi	rporation Wilson	Invoice To: Big Rivers Electric Corporation Wilson Station			
	Henderson, K	Y 42419	n	Henderson,	KY 42419		
·	Phone: (270) (PWS ID#:	<u>544-6000</u>	<u>7</u>	РО#: <u>2</u>	<u>52827-</u> 37		
Please Print Legibly	State:	мY		Quote#			
Collected by (Signature): *require	d information*		-	Sample	ance Monitoring? Tes No		
*For composite samples please indicate begin time	e, end time and temp(oC) at end	time below:	Gampic			
Influent: Start Date Start time	End Date	Er	id Time T	「emp (oC)			
Effluent: Start Date Start time	End Date	Er		lemp (oC)			
MMLI USE ONLY *required information* Workorder # Date Collection 9103079 (mm/dd/yy): Time (24 hr): B Sample ID# B B B	ottle and Preservative	Containers	Sample Description	Composite	Sample Analysis Requested		
9103079-01 A 11-07-19 8:00	Plastic 1L	1	MW7	g / c	Alkalinity Total Chloride 300.0 Conductivity (Lab) Fluoride 300.0 Sulfate 300.0 Alkalinity Bicarbonate		
9103079-01 B <u>11-07-19</u> <u>8:00</u>	Plastic 500mL pH<2 w/HNO3	1	MW7	g / c	TDS Alkalinity Carbonate Arsenic Tot 6020 Antimony Tot 6020 Barium Tot 6020 Iron Tot 6010B Selenium Tot 6020 Hardness Titration Benvillium Tot 6020 Boron		
			· .		Tot 6010B Cadmium Tot 6020 Calcium Tot 6010B Chromium Tot 6020 Sodium Tot 6010B Lead Tot 6020 Lithium Tot 6020 Mercury Tot 6020		
Pre	servation Check: pH :	\checkmark			0020		
9103079-01 C <u>11-67-19 8:00</u> Pre	Plastic 500mL pH<2 w/H2SO4 servation Check: pH :	1	MW7	g/c	COD TOC		
9103079-01 D <u>11- パーク ターの</u> PL Pre	astic 1L pH<2 w/HNO3 Rad 226 (Sub) servation Check: pH :	1	MW7	·g/c	Radium 226 (sub)		
• Preservation Check Performed by:			1.9				
Field data collected by: 1 Courts Source	Date (mm/dd/vv)	11-07	5.16 Time (24 hr)	8:00			
pH 6,59 Cond (umbo) 2.220	2 Res CI (mg/L)		Tot CI (mg/L)	Fre	ee CI (mg/L)		
Temp (oC) <u>15.27</u> or (oF)	Static Water Level		DO (mg/L)	т	urb. (NTU)		
Flow (MGD) or (CFS)	or (g/min)						
Relinquished by: (Signature)	Received by: (Sign	ature)		Date (mm/	dd/yy) Time (24 hr)		
Bra Smal	May	Цe.	eg-		-19 1520		
MMLI - Check here if trip charge applied	to associated COC		·rinted: 10	/31/2019 5:59	42AMPage 1 of 2		
					Page 6 of 18		

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory		Chain	of Cus	stody				
P.O. Box 907 Madisonville, KY 42431		Schedule	d for: <u>1</u>	0/14/2019				
Client: Big Rivers Electric Corporation	on Wilson	Report To: Big Rivers Elec	ctric Corpora	tion Wilson	Invoice To: Big Rivers Electric Corporation Wilson Station			
Project: MW-7 Wilson 092-00004		Mike Galbraith PO Box 24 Henderson, Ki	(.42419		Brian Edwa PO Box 24 Henderson,	rds KY 42419	inter Line Line	
		Phone: <u>(270) 8</u> PWS ID#:	44-6000		РО#: <u>2</u>	52827-37	7	
Please Print Legibly		State:	¥		Quote#			
Collected by (Signature):	*required infor	mation*			Compl	iance Monitoring?	Yes <u>No</u>	
*For composite samples please indicate	begin time, end t	time and temp(oC)) at end time	below:	Sámhi	es Chionnateu ?		
Influent: Start Date Start ti	me	End Date	End Ti	me `	Temp (oC)			
Effluent: Start Date Start t	ime	End Date	End Ti	me	Temp (oC)			
MMLI USE ONLY *required informat Workorder # Date Collec 9103079 (mm/dd/yy): Time (2 Sample ID#	ion⁺ tion ^{(4 hr):} Bottle ar	nd Preservative	Containers Sau	nple Description	Composite	Sample Ana	lysis Requested	
9103079-01 E 11-07-19 9:0	Plastic 11 Rad Preservat	_ pH<2 w/HNO3 228 (Sub) ion Check: pH : _	$\frac{1}{1}$	MW7	g/c	Radium 228 (sub)	
9103079-01 F <u>11407-19</u> <u>8:0</u>	<i>o</i> Plastic 11 Rad Preservat	_ pH<2 w/HNO3 228 (Sub) ion Check: pH : _	1	MW7	g / c	Radium 228 (sub))	
9103079-01 G <u>[[-07-19 %:0</u>	Plastic 11 Preservat	_ pH<2 w/HNO3 (Sub) ion Check: pH : _		MW7	g / c	Radium Total (si	Jb)	
Preservation Check Performed by:	Νριγ							
Field data collected by: 1, a 5	Sneed	Date (mm/dd/yy)	11-07-19	Time (24 hr) _	8:00			
pH <u>6.59</u> Cond (umh) <u>2,220</u>	Res CI (mg/L)		Tot CI (mg/L) _	Fr	ee CI (mg/L)		
Temp (oC) <u>15.27</u> or (oF	.) St	atic Water Level	· · · · · · · · · · · · · · · · · · ·	DO (mg/L)	י	urb. (NTU)		
Flow (MGD) or (CFS)) or	(g/min) _	<u></u>					
Relinquished by: (Signature)	R	eceived by: (Signa			Date (mm. 7	/dd/yy) Tim	ne (24 hr) 1520	
		/						
MMLI - Check here if trip char	ge applied to as	sociated COC		Printed: 10	0/31/2019 5:59	:42AM	Page 7 of 18	

Page 7 of 18



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 04, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9103079 Pace Project No.: 30334698

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 09, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9103079

 Pace Project No.:
 30334698

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS

Pac	ne.	20	f 11
Page	9	of	18



SAMPLE SUMMARY

30334698001	9103079-01	Water	11/07/19 08:00	11/09/19 10:00
Lab ID	Sample ID	Matrix	Date Collected	Date Received
Pace Project No	.: 30334698			
Project:	9103079			

REPORT OF LABORATORY ANALYSIS





SAMPLE ANALYTE COUNT

 Project:
 9103079

 Pace Project No.:
 30334698

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30334698001	9103079-01	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9103079

Pace Project No.: 30334698

Sample: 9103079-01 PWS:	Lab ID: 303346 Site ID:	98001 Collected: 11/07/19 08:00 Sample Type:	Received:	11/09/19 10:00	Matrix: Water	
Comments: • Sample collection	n dates and times were not	present on the sample containers.				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.374 ± 0.317 (0.393) C:NA T:90%	pCi/L	12/03/19 11:06	13982-63-3	
Radium-228	EPA 904.0	0.490 ± 0.329 (0.627) C:82% T:92%	pCi/L	12/02/19 16:14	15262-20-1	
Total Radium	Total Radium Calculation	0.864 ± 0.646 (1.02)	pCi/L	12/04/19 09:28	3 7440-14-4	

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103079						
Pace Project No.:	30334698						
QC Batch:	370987		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 228			
Associated Lab San	nples: 30334698	001					
METHOD BLANK:	1800103		Matrix: Water				
Associated Lab San	nples: 30334698	001					
Paran	neter	Act :	L Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.353 ± 0.347	(0.714) C:83% T:78%	pCi/L	12/02/19 16:13		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9103079						
Pace Project No.:	30334698						
QC Batch:	370988		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description:	903.1 Radium-226			
Associated Lab Sar	nples: 30334698	001					
METHOD BLANK:	1800104		Matrix: Water				
Associated Lab Sar	nples: 30334698	001					
Parar	neter	Act ±	Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.0385 ± 0.251	(0.505) C:NA T:92%	pCi/L	12/03/19 11:06		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALIFIERS

 Project:
 9103079

 Pace Project No.:
 30334698

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

Dy & McCyr Jabs Pace Analytical Services LLG Greensburg PA E.ox.907 1638 Rosey Town Rd Suite 2.3.4 Genoralite, KY 42409 1638 Rosey Town Rd Suite 2.3.4 Genoralite, KY 42409 Greensburg PA 15601 1821-7375 7224 Sto.5615 Restrict RA 1500 7224 Sto.5615 Restrict RA 1500 Reat McCory Water Restrict RA 1500 100079-01 11/07/12 06:00 100079-01 11/07/12 06:00 100079-01 11/07/12 06:00 100079-01 11/07/12 06:00 100079-01 11/07/12 06:00 100079-01 10/07 100079-01 11/07/12 06:00 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 100079-01 10/07 <	Workorder: 9103079	Workorder Na	me: MW-7 Wils ontract To:	son 092-00004	Owner Received D)ate: 11/7/2019	Results Requested By:	a for a
relation control data control and contained in the owner aboratory.	Coy & McCoy Labs . Box 907 disonville, KY 42409 J-821-7375	Pace 1638 Gree (724)	Analytical Servic Rosey Town Rd nsburg, PA 1560 850-5615	es LLC Greensbur Suite 2,3,4 1	74 8			
9103079-01 11/07/19 08:00 IR44-MCCoy Water X X X X P103079-01 P107/19 08:00 IR44-MCCoy Water X X X P107 P107 P107 P107 P107 P107 P107 P107	gela@mccoylabs.com m Sample ID	Sample Collect Type Date/Time	c Fab ID	Matrix	Preserved Contra	EPA 904.0 0.502 493 0.502 493 0.643		LAB USE ONLY
Insters Released By Date/Time Reveived By Date/Time Comments Comments Insters Released By Date/Time Comments Comments Insters Released by Date/Time Comments Insters Released by Date/Time Comments Insters Released by Date/Time Reveived By Date/Time Comments Insters Released by Date/Time Comments Insters Released by Date/Time Comments Insters Released by Date/Time Comments Comments Insters Released by Date/Time Comments Insters Insters Released by Date/Time Reveived By Date/Time Comments Insters Released by Date/Time Reveived By Date/Time Comments Insters Released By Date/Time Reveived By Date/Time Reveived By Date/Time Comments Insters Insters Released By Date/Time Reveived By Date/Time Comments Insters Insters Released By Date/Time Reveived By Date/Time Reveived By Date/Time Reveived By Date/Time Comments Insters Insters Reveived By Date/Time Reveived By Date/Time Reveived By Reveived By Date/Time Reveived By Reveive	9103079-01	11/07/19 0	08:00 IR44-1	AcCoy Water		× ×		Ca
Insfers Released By Date/Time Reveived By Date/Time Comments Insfers Released By Date/Time Reveived By Date/Time Comments Insfers Insfers Insfers Insfers Insfers Insternation Insfers Insfers Insternation Insternation Insternation Insternation Insternation Insternation Insternation Insternation Insternation Insternation						2:#0M	0334698	
Insters Released By Date/Time Reveived By Date/Time Comments Comments III-S-II I/-S-II I/-S-III I/-S-II I/-S-III I/-S-II I/-S-II I/-S-III I/-S-II I/-S-III I/-S-III I/-S-II I/-S-II I/-S-III I/-S-II I/-S-II I/-S-II I								
oler Temperature on Receipt <u>C.C</u> °C <u>Custody Seal Y or N</u> Received on Ice Y or N Sample Intact Y or N *In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC is chain of custody is considered complete as is since this information is available in the owner laboratory.	Insters Released By		Date/Time //- <i>9-19 1900</i>	Reveived By		Date/Time	Comments	
	oler Temperature on Receipt *In order to maintain client co is chain of custody is considere	<u>C.6</u> °C Cu nfidentiality, locatio ed complete as is sin	istody Sea(<u>γ</u> or n/name of the se ce this informati	N ampling site, sam on is available in 1	Received	l on Ice (V or N signature may n atory.	Sample Intact ot be provided on this COC	Y or N

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1

SUBCONTRACT ORDER

McCoy & McCoy Laboratories, Inc.

9103079

SENDING LABORATORY:

• 7

Б

McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal

RECEIVING LABORATORY:

Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 Phone :(724) 850-5615 Fax:

Please return shipping cooler to return address on shipping label.

Analysis		Expires	Laboratory ID	Comments	
Sample ID: 9103079-01	Water	Sampled:11/07/2019 08:00	Specific Method		
Radium Total (sub)		05/05/2020 08:00	EPA 903.0		
Radium 228 (sub)		05/05/2020 08:00	EPA 904.0		
Radium 226 (sub)		05/05/2020 08:00	EPA 903.1		

30334698

1.0 10: 1-9-19 <u>11-8-</u>19 Released By Date Received By Date

Represeu Dy



Fillsburgh Lab Sample Condi	uon u	Jpor	i Re	ceipi	
Pace Analytical Client Name:	Λ	10	<u>14 8</u>	McCay	Project # # _ 3 0 3 3 4 6 9
Courier: Fed Ex UPS USPS Clien Tracking #: 1/07 3385 5275	t 🗀	omme	rcial	/	Label DN LIMS Login DN
Custody Seal on Cooler/Box Present: Ves	r	-	Seals	s intact: 🛛 ves 🗆]no
Thermometer Used 1/	Type	of ice:	Wet	Blue None	-
Cooler Temperature Observed Temp	6	۰c	Corr		• C Final Temp: & C • C
Temp should be above freezing to 6°C	.0	-			
				pH paper Lot#	Date and Initials of person examining
Comments:	Yes	No	N/A	102039	
Chain of Custody Present:				1.	
Chain of Custody Filled Out:		1		2.	
Chain of Custody Relinquished:		1		3.	
Sampler Name & Signature on COC:				4.	
Sample Labels match COC:		\checkmark		5. Notime.	date an samples
-Includes date/time/ID Matrix:	u †				
Samples Arrived within Hold Time:		1		6,	
Short Hold Time Analysis (<72hr remaining):				7.	
Rush Turn Around Time Requested:		\mathbf{r}		8.	
Sufficient Volume:				9.	
Correct Containers Used:				10,	
-Pace Containers Used:			Ĩ		
Containers Intact:		7		11.	
Orthophosphate field filtered				12.	
Hex Cr Aqueous sample field filtered				13.	
Organic Samples checked for dechlorination:			/	14.	
Filtered volume received for Dissolved tests			/	15.	
All containers have been checked for preservation.				16	
exceptions: VOA, coliform, TOC, O&G, Phenolics, Non-aqueous matrix	Radon	, ,	·	pm2	
All containers meet method preservation	\mathbf{V}			Initial when Dia	Date/time of
equienens.	L	<u> </u>		Lot # of added	preservation
Headspace in VOA Vials (>6mm):	1			17.	
Trip Blank Present:	1		F	18.	
Trip Blank Custody Seals Present				1	· .
Rad Samples Screened < 0.5 mrem/hr		-		Initial when n completed: n	Date: //-//-C9
Client Notification/ Resolution:					
Person-Contacted:			-Date/	71 me:	Contacted-By:
Comments/ Resolution:					-
			•••••	·	

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workordar Edit Screen.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5Aprli2019)

McCOY & McCOY LABORATORIES, Inc.

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 Farmersburg, IN

 606.432.3104
 812.696.5076

Lexington, KY 859.299.7775 Paducah, KY 270.444.6547

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Certificate of Analysis 9104081

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419

Report Printed:

Customer ID:

44-100168 12/06/2019 15:36

Project Name:	Field Blank Wilson 092-00004	Workorder:	9104081	
-				

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/08/2019 15:35.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

This certificate of analysis may not be reproduced without the written consent of McCoy & McCoy Laboratories, Inc.



Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias	Matrix	Date Collected	Date Received	Sampled By
9104081-01	Field Blank/	Water	11/08/2019 14:10	11/08/2019 15:35	Travis Sneed

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ANALYTICAL RESULTS

Lab Sample ID: 9104081-01 Description: Field Blank

Sample Collection Date Time: 11/08/2019 14:10 Sample Received Date Time: 11/08/2019 15:35

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Arsenic	ND	U	mg/L	0.0010	0.0004	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Barium	ND	U	mg/L	0.004	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Boron	ND	U	mg/L	0.10	0.10	SW846 6010 B	11/11/2019 11:47	11/15/2019 14:52	AKB
Cadmium	ND	U	mg/L	0.0010	0.0001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Calcium	ND	U	mg/L	0.40	0.13	SW846 6010 B	11/11/2019 11:47	11/15/2019 14:52	AKB
Chromium	ND	U	mg/L	0.0020	0.0006	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Copper	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Iron	ND	U	mg/L	0.100	0.050	SW846 6010 B	11/11/2019 11:47	11/15/2019 14:52	AKB
Lead	0.0006	J	mg/L	0.002	0.0005	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Lithium	ND	U	mg/L	0.02	0.005	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Magnesium	ND	U	mg/L	0.200	0.090	SW846 6010 B	11/11/2019 11:47	11/15/2019 14:52	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Molybdenum	ND	U	mg/L	0.01	0.002	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Nickel	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Potassium	ND	L1, U	mg/L	0.50	0.22	SW846 6010 B	11/11/2019 11:47	11/15/2019 14:52	AKB
Selenium	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Sodium	ND	U	mg/L	0.26	0.10	SW846 6010 B	11/11/2019 11:47	11/15/2019 14:52	AKB
Thallium	ND	U	mg/L	0.0020	0.0001	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH
Zinc	ND	U	mg/L	0.02	0.02	SW846-6020 A	11/11/2019 11:47	11/13/2019 15:17	DMH

Conventional Chemistry Analyses Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 11:24	11/18/2019 11:24	HMF
Carbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 11:24	11/18/2019 11:24	HMF
Total Alkalinity	ND	U	mg/L	4		2320 B-2011	11/18/2019 11:24	11/18/2019 11:24	HMF
Chemical Oxygen Demand	ND	U	mg/L	5	5	HACH 8000	11/27/2019 18:50	11/27/2019 18:50	HMF
Specific Conductance (Lab)	1		umhos/cm	1	1	2510 B-2011	11/22/2019 12:07	11/22/2019 12:07	DJK
Hardness as CaCO3	ND	U	mg/L	1	1	2340 C (as HACH 8226)	11/12/2019 11:28	11/12/2019 11:28	ALT
Total Dissolved Solids	372		mg/L	50	50	2540 C-2011	11/12/2019 17:36	11/13/2019 16:26	MAG
Total Organic Carbon	0.5		mg/L	0.5		5310 C-2011	11/11/2019 16:27	11/13/2019 02:00	HMF

Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	-0.093	_Sub	pCi/L			EPA 903.1	12/06/2019 13:37	12/06/2019 13:38	AND
Radium-228	0.102	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/06/2019 13:37	12/06/2019 13:38	AND
Radium	0.102	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/06/2019 13:37	12/06/2019 13:38	AND



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Ion Chromatography Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	ND	U	mg/L	0.5	0.4	EPA 300.0 REV 2.1	11/16/2019 04:33	11/16/2019 04:33	CSC
Fluoride	ND	U	mg/L	0.20		EPA 300.0 REV 2.1	11/16/2019 04:33	11/16/2019 04:33	CSC
Sulfate	ND	U	mg/L	1.0	0.5	EPA 300.0 REV 2.1	11/16/2019 04:33	11/16/2019 04:33	CSC

Notes for work order 9104081

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.

- MMLI does not provide interpretation of these results unless otherwise stated.

- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.

- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.

- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.

- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

- _Sub See subcontractors report.
- D2 Sample required dilution due to matrix interference.
- J Estimated value.
- L1 The associated blank spike recovery was above method acceptance limits.
- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).

Standard Quallifiers/Acronymns

MDL	Method Detection Limit			
MRL	Minimum Reporting Limit			
ND	Not Detected			
LCS	Laboratory Control Sample			
MS	Matrix Spike			
MSD	Matrix Spike Duplicate			
DUP	Sample Duplicate			
% Rec	Percent Recovery			
RPD	Relative Percent Difference			
>	Greater than			
	Less than			



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Lexington, KY

859.299.7775

Certified Analyses included in this Report			
Analyte	Certifications		
2320 B-2011 in Water			
Bicarbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)		
Carbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)		
Total Alkalinity	KY Drinking Water Mdv (00030)		
2340 C (as HACH 8226) in Water			
Hardness as CaCO3	KY Drinking Water Mdv (00030)		
2510 B-2011 in Water			
Specific Conductance (Lab)	KY Drinking Water Mdv (00030)		
2540 C-2011 in Water			
Total Dissolved Solids	KY Drinking Water Mdv (00030)		
5310 C-2011 in Water			
Total Organic Carbon	KY Drinking Water Mdv (00030)		
EPA 300.0 REV 2.1 in Water			
Chloride	KY Drinking Water Mdv (00030)		
Fluoride	KY Drinking Water Mdv (00030)		
Sulfate	KY Drinking Water Mdv (00030)		
HACH 8000 in Water			
Chemical Oxygen Demand	KY Wastewater Mdv (00030)		

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9104081			
Shipped By: Client	Temperature: 1.60° Celcius			
Condition				
Check if Custody Seals are Present/Intact				
Check if Custody Signatures are Present				
Check if Collector Signature Present				
Check if bottles are intact				
Check if bottles are correct				
Check if bottles have sufficient volume				
Check if samples received on ice				
Check if VOA headspace is acceptable				
Check if samples received in holding time.				
Check if samples are preserved properly				

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory	Chain of Custody						
P.O. Box 907 Madisonville, KY 42431	Scheduled	d for:	<u>10/14/2019</u>				
Client: Big Rivers Electric Corporation Wilson Station Project: Field Blank Wilson 092-00004	Report To: Big Rivers Electric Corporation Wilson Station Mike Galbraith PO Box 24 Henderson, KY 42419		Invoice To: Big Rivers Electric Corporation Wilson Station Brian Edwards PO Box 24 Henderson, KY 42419				
	Phone: <u>(270) 8</u> PWS ID#:	<u>44-6000</u>	<u>)</u>	PO#: <u>2</u>	52827-2	35	
Callested by (Scenture):			-		anao Masitari		
required infor	nation						
*For composite samples please indicate begin time, end t	ime and temp(oC)	nd temp(oC) at end time below:			Samples Chlorinated? Yes <u>No</u>		
Influent: Start Date Start time	End Date	En	d Time	Ţemp (oC)	· · ·		
Effluent: Start Date Start time	End Date	Er	ad Time	Temp (oC)			
MMLI USE ONLY *required information* Workorder # Date Collection 9104081 (mm/dd/yy): Time (24 hr): Bottle ar Sample ID#	nd Preservative	Containers	Sample Description	Composite	Sample	Analysis Requested	
9104081-01 A 11-08-19 14:10 P	lastic 1L	$\frac{0}{1}$	Field Blank	g/c	Alkalinity To	tal Chloride 300.0	
9104081-01 B <u>11-09-19 14:10</u> Plastic v Preserval	500mL pH<2 v/HNO3 tion Check: pH : _	1	Field Blank	g/c	Conductivity (Lab) Fluoride 300.0 Sulfate 300.0 Alkalinity Bicarbonate TDS Alkalinity Carbonate Arsenic Tot 6020 Antimony Tot 602 Barium Tot 6020 Iron Tot 6010B Selenium Tot 6020 Hardness Titration Beryllium Tot 6020 Boron Tot 6010B Cadmium Tot 6020 Calcium Tot 6010B Chromium Tot 6020 Sodium Tot 6010B Lead Tot 6020 Lithium Tot 6020 Mercury Tot 6020		
9104081-01 C <u>11-08-19 14:10</u> Plastic w Preservat	500mL pH<2 //H2SO4 iion Check: pH : _	1	Field Blank	g / c	COD TOC		
9104081-01 D <u>) I-0 & / 4 / / / </u> Plastic 1 Rad Preservat	L pH<2 w/HNO3 226 (Sub) tion Check: pH : _	1 	Field Blank	g / c	Radium 226	(sub)	
Preservation Check Performed by:					1.6		
Field data collected by: <u>Travis Sneed</u>	Date (mm/dd/yy)	11-08		14:10			
pH Cond (umho)	Res CI (mg/L)		Tot CI (mg/L)	Fr	ee Cl (mg/L) _		
Temp (oC) or (oF) SI	tatic Water Level		DO (mg/L)	т	urb. (NTU)		
Flow (MGD) or (CFS) or	(g/min) _						
Relinquished by: (Signature) R	eceived by: (Signa	ture)	ge	Date (mm/	/dd/yy) -/ 9	Time (24 hr) 1525	
MMLI - Check here if trip charge applied to as	sociated COC		Printed: 1		:49AM	Page 6 of 18	

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McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory	Chain	of Custody				
P.O. Box 907 Madisonville, KY 42431	Schedule	d for: <u>10/14/2019</u>				
Client: Big Rivers Electric Corporation Wilso Station	on Report To: Big Rivers Ele Station	ctric Corporation Wilson	Invoice To: Big Rivers Electric Corporation Wilson Station			
Project: Field Blank Wilson 092-00004	Mike Galbraith PO Box 24 Henderson, K`	Y 42419	Brian Edwards PO Box 24 Henderson, KY 42419			
Please Print Legibly	Phone: <u>(270) 8</u> PWS ID#: State:	344-6000 <u> </u>	PO#: <u></u>	52827-35		
Collected by (Signature):	red information*		Compli Sample	ance Monitoring? Yes No es Chlorinated? Yes No		
Influent: Start Date Start time	End Date	End Time	Temp (oC)			
MMLI USE ONLY *required information* Workorder # Date Collection 9104081 (mm/dd/yy): Time (24 hr): Sample ID#	Bottle and Preservative	င္ မြင္ Tec Sample Description ပ	Composite	Sample Analysis Requested		
9104081-01 E <u>11-08-19 14:10</u> F	Plastic 1L pH<2 w/HNO3 Rad 228 (Sub) Preservation Check: pH :	1 Field Blank √	g/c	Radium 228 (sub)		
9104081-01 F <u>11-08-19</u> <u>14:10</u> F	Plastic 1L pH<2 w/HNO3 Rad 228 (Sub) Preservation Check: pH :	1 Field Blank	g / c	Radium 228 (sub)		
9104081-01 G <u>11-08-19 14:10</u> F	Plastic 1L pH<2 w/HNO3 (Sub) Preservation Check: pH :	1 Field Blank	g / c	Radium Total (sub)		

Field data collected	by: Trovis Sne	<u>c</u> Date (mm/dd/yy) <u>11-0</u>	<u>४ -1 9</u> Time (24 hr)	<u>1:10</u>	
рН	Cond (umho)	Res Cl (mg/L)	Tot CI (mg/L)	Free CI (mg/L)
	or (oF)	Static Water Level	DO (mg/L)	Turb. (NTU)	i
Flow (MGD)	or (CFS)	or (g/min)			
Relinquished by: (S	Signature)	Received by: (Signature)	<i>y</i> ~	Date (mm/dd/yy)	Time (24 hr) 1535
MMLI - Ch	eck here if trip charge appli	ed to associated COC	·rinted: 10/3	1/2019 6:02:49AM	

· · ·



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 06, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9104081 Pace Project No.: 30335312

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 13, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9104081

 Pace Project No.:
 30335312

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS

Pac	ne.	20	f 11
Page	9	of	18


SAMPLE SUMMARY

30335312001	9104081-01	Water	11/08/19 14:10	11/13/19 10:10
Lab ID	Sample ID	Matrix	Date Collected	Date Received
Pace Project No	o.: 30335312			
Project:	9104081			

REPORT OF LABORATORY ANALYSIS



SAMPLE ANALYTE COUNT

 Project:
 9104081

 Pace Project No.:
 30335312

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30335312001	9104081-01	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9104081

Pace Project No.: 3033	35312
------------------------	-------

Sample: 9104081-01 PWS:	Lab ID: 30335312001 Site ID:	Collected: 11/08/19 14:10 Sample Type:	Received:	11/13/19 10:10	Matrix: Water	
Comments: • Sample collect	on dates and times were not presen	t on the sample containers.				
Parameters	Method A	ct ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1 -0.09 C:N	930 ± 0.605 (1.10) A T:90%	pCi/L	12/06/19 11:18	13982-63-3	
Radium-228	EPA 904.0 0.10 C:72	2 ± 0.330 (0.749) 2% T:79%	pCi/L	12/04/19 14:17	15262-20-1	
Total Radium	Total Radium 0.10 Calculation	2 ± 0.935 (1.85)	pCi/L	12/06/19 13:24	7440-14-4	

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL - RADIOCHEMISTRY

Project:	9104081						
Pace Project No.:	30335312						
QC Batch:	371026		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description:	903.1 Radium-226			
Associated Lab Sar	mples: 30335312	001					
METHOD BLANK:	1800179		Matrix: Water				
Associated Lab Sar	mples: 30335312	001					
Parar	meter	Act :	LUnc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.139 ± 0.459	(0.772) C:NA T:92%	pCi/L	12/06/19 10:57		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9104081						
Pace Project No.:	30335312						
QC Batch:	371027		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 228			
Associated Lab Sar	mples: 30335312	001					
METHOD BLANK:	1800180		Matrix: Water				
Associated Lab Sar	mples: 30335312	001					
Parar	meter	Act :	LUnc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.969 ± 0.446	(0.738) C:81% T:74%	pCi/L	12/04/19 11:10		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALIFIERS

 Project:
 9104081

 Pace Project No.:
 30335312

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS



alytical *	l Bv				CD -	[]			t <mark>V or N</mark> C Page 1 of 1
- Pace An	9 Results Requester	Requested Analysis				1#:303353		Comment	be provided on this CO
	eceived Date: 11/8/201			ed Containers EPA 904.0 EPA 903.1				Date/Time	ived on Ice () or N and signature may not boratory. 02rev.00 24March2009
	lson 092-00(Owner Re		LC Greensburg P <i>t</i> e 2,3,4	Matrix				ed By	Rece site, sampler's name ailable in the owner la FMT-ALL-C-0
	ame: Field Blank Wil contract To:		Analytical Services L Rosey Town Rd Suite nsburg, PA 15601 850-5615	Lab ID 4:10 IR44-MCCov				ate/Time Reveiv	dy Seal Y or (N) lame of the sampling this information is av
-	Workorder Na Subo		Pace 1638 Gree (724)	Sample Collect Type Date/Time 11/08/19 1/					د <mark>د ک د د د د د د د</mark> د د د د د د د د د د د
Workorder: 9104081	Report To:	McCov & McCov Labo	P.O. Box 907 Madisonville, KY 42409 270-821-7375 angela@mccoylabs.com	ttem Sample ID 2 9104081-01			0	ransfers Released By	oler Temperature on Receipt **In order to maintain client conf iis chain of custody is considered day, June 17, 2016 11:01:34 AM

am of custody

Page 9 of 11 Page 16 of 18



McCoy & McCoy Laboratories, Inc.

9104081

SENDING LABORATORY:

McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal

RECEIVING LABORATORY:

Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 Greensburg, PA 15601 Phone :(724) 850-5615 Fax:

Please return shipping cooler to return address on shipping label.

Analysis		Expires	Laboratory ID	Comments	
Sample ID: 9104081-01	Water	Sampled:11/08/2019 14:10	Specific Method		
Radium Total (sub)		05/06/2020 14:10	EPA 903.0	antonna, attanta attanta attanta	
Radium 228 (sub)		05/06/2020 14:10	EPA 904.0	A D	
Radium 226 (sub)		05/06/2020 14:10	EPA 903.1	35314	
			#_303) U ~	

abauhah	i 11.11.19	N	11-13-19 10:10
Released By	Date	Received By	Date

Released By

Received By

Pittsburgh Lab Sample Cond	ition l	Jbot	і Ке	ceipt	The man and a second
Pace Analytical' Client Name:		NcC	a_{1}	Milling	# _303 551; Project#
Courier: ∅ [°] Fed Ex □UPS □USPS □Clier Tracking #: 1107 3365 5389	nt 🗅	:omme	rcial	<pre>/ □Pace Other</pre>	Label $\mathcal{N}^{\mathcal{W}}$ LiMS Login \mathcal{M}
Custody Seal on Cooler/Box Present: Uyes	٦	0	Seal	s intact: 🗌 yes 🔲	no
Thermometer Used	Туре	of ice	: @	Blue None ,	-
Cooler Temperature Observed Temp	3	°C	Соп	ection Factor <u>:</u>	°C Final Temp: (.) °C
Temp should be above freezing to 6°C					
				- 10/0204	contents: <u><u><u><u></u></u><u><u><u><u></u></u><u><u></u><u><u></u><u></u><u><u></u><u></u><u></u><u><u></u><u></u><u></u><u></u><u></u></u></u></u></u></u></u></u></u>
Comments:	Yes		N/A	1017979	
Chain of Custody Present:				1.	
Chain of Custody Filled Out:		<u> </u>		2.	
Chain of Custody Relinquished:				3.	
Sampler Name & Signature on COC:	_	-	╂──	4.	
Sample Labels match COC:		<u> </u>		5. Minuelo	late on samples
-Includes date/time/ID Matrix:	1~	1	1		r
Samples Arrived within Hold Time:				6.	
Short Hold Time Analysis (<72hr remaining):		\vdash		7.	
Rush Turn Around Time Requested:		\vdash		8.	
Sufficient Volume:	$ \sim$			9.	
Correct Containers Used:		1		10.	
-Pace Containers Used:	_	<u> </u>			·
Containers Intact:		ļ		11.	
Orthophosphate field filtered		ļ		12.	
Hex Cr Aqueous sample field filtered			-	13.	·
Organic Samples checked for dechlorination:	<u> </u>			14.	
Filtered volume received for Dissolved tests			<u> </u>	15.	
exceptions: VOA, coliform, TOC, O&G, Phenolics Non-aqueous matrix	, Radon	 	<u> </u>	16. pH12	
All containers meet method preservation				Initial when <i>full</i>	Date/time of
equirements.	¥	L		Lot # of added	preservation
		1		preservative	
leadspace in VOA Vials (>6mm):	_			17.	····
Trip Blank Present:				18.	· · ·
rip Blank Custody Seals Present				Initial when	
ad Samples Screened < 0.5 mrem/hr				completed:	Date: //-/3-09
Slient Notification/ Resolution:			-Date/	Ame:	
Comments/ Resolution:			•		
					· · · · · · · · · · · · · · · · · · ·

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Cardification Offica (i.e. out of hold, incorrect preservative, out of tamp, incorrect containars)
*PM review is documented electronically in LIMS. When the Project Managar closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Managemant\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5April2019)

McCOY & McCOY LABORATORIES, Inc.

P.O. Box 907 Madisonville, KY 42431 270.821.7375 www.mccoylabs.com
 Pikeville, KY
 Farmersburg, IN

 606.432.3104
 812.696.5076

Lexington, KY 859.299.7775

Paducah, KY 270.444.6547

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Certificate of Analysis 9104082

Mike Galbraith Big Rivers Electric Corporation Wilson Station PO Box 24 Henderson KY, 42419 Customer ID: Report Printed: 44-100168 12/04/2019 16:52

Project Name:	Well Duplicate Wilson 092-00004	Workorder:	9104082

Dear Mike Galbraith

Enclosed are the analytical results for samples received at one of our laboratories on 11/04/2019 16:05.

McCoy & McCoy Laboratories, Inc. is a commercial laboratory accredited by various state and national authorities, including Indiana, Kentucky, Tennessee, and Virginia's National Environmental Laboratory Accreditation Program (NELAP). With the NELAP accreditation, applicable test results are certified to meet the requirements of the National Environmental Laboratory Accreditation Program.

If you have any questions concerning this report please contact the individual listed below.

Please visit our website at www.mccoylabs.com for a listing of the NELAP accreditations and Scope of Work, as well as, links to other scientific organizations.

This certificate of analysis may not be reproduced without the written consent of McCoy & McCoy Laboratories, Inc.



Ingle Deal

This page is included as part of the Analytical Report and must be retained as a permanent record thereof. Angela Deal, Project Manager



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Lexington, KY 859.299.7775

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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias		Matrix	Date Collected	Date Received	Sampled By
9104082-01	Well Duplicate/		Water	11/04/2019 13:22	11/04/2019 16:05	Travis Sneed
LabNumber	Measurement	Value				
9104082-01	Field Conductance	3660				
	Field pH	5.10				
	Field Temp (C)	16.77				

McCOY & McCOY LABORATORIES, Inc. A Pace Analytical Laboratory

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ANALYTICAL RESULTS

Lab Sample ID: 9104082-01 Description: Well Duplicate

Sample Collection Date Time: 11/04/2019 13:22 Sample Received Date Time: 11/04/2019 16:05

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	U	mg/L	0.005	0.002	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:49	DMH
Arsenic	0.0014		mg/L	0.0010	0.0004	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:49	DMH
Barium	0.005		mg/L	0.004	0.001	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:49	DMH
Beryllium	ND	U	mg/L	0.0020	0.0010	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:49	DMH
Boron	ND	U, D2	mg/L	1.00	1.00	SW846 6010 B	11/06/2019 09:00	11/07/2019 15:53	AKB
Cadmium	0.0078		mg/L	0.0010	0.0001	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:49	DMH
Calcium	479	D1	mg/L	40.0	13.0	SW846 6010 B	11/06/2019 09:00	11/07/2019 15:56	AKB
Chromium	ND	U	mg/L	0.0020	0.0006	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:49	DMH
Copper	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:49	DMH
Iron	72.9	D2	mg/L	1.00	0.500	SW846 6010 B	11/06/2019 09:00	11/07/2019 15:53	AKB
Lead	ND	U	mg/L	0.002	0.0005	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:49	DMH
Lithium	0.14		mg/L	0.02	0.005	SW846-6020 A	11/06/2019 09:00	11/07/2019 11:34	DBP
Magnesium	193	D1	mg/L	20.0	9.00	SW846 6010 B	11/06/2019 09:00	11/07/2019 15:56	AKB
Mercury	ND	U	mg/L	0.0005	0.0002	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:49	DMH
Molybdenum	0.002	J	mg/L	0.01	0.002	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:49	DMH
Nickel	0.823		mg/L	0.003	0.001	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:49	DMH
Potassium	11.9	D2	mg/L	5.00	2.20	SW846 6010 B	11/06/2019 09:00	11/07/2019 15:53	AKB
Selenium	ND	U	mg/L	0.003	0.001	SW846-6020 A	11/06/2019 09:00	11/07/2019 11:34	DBP
Sodium	107	D1	mg/L	26.0	10.0	SW846 6010 B	11/06/2019 09:00	11/07/2019 15:56	AKB
Thallium	0.0004	J	mg/L	0.0020	0.0001	SW846-6020 A	11/06/2019 09:00	11/06/2019 16:49	DMH
Zinc	1.42	D1	mg/L	0.20	0.20	SW846-6020 A	11/06/2019 09:00	11/07/2019 11:38	DBP

Conventional Chemistry Analyses Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bicarbonate Alkalinity as	32		mg/L	4		2320 B-2011	11/18/2019 11:26	11/18/2019 11:26	HMF
CaCO3									
Carbonate Alkalinity as CaCO3	ND	U	mg/L	4		2320 B-2011	11/18/2019 11:26	11/18/2019 11:26	HMF
Total Alkalinity	32		mg/L	4		2320 B-2011	11/18/2019 11:26	11/18/2019 11:26	HMF
Chemical Oxygen Demand	60		mg/L	5	5	HACH 8000	11/19/2019 16:22	11/19/2019 16:22	HMF
Specific Conductance	3520		umhos/cm	1	1	2510 B-2011	11/22/2019 12:08	11/22/2019 12:08	DJK
(Lab)									
Hardness as CaCO3	1960	D	mg/L	5	5	2340 C (as HACH	11/07/2019 09:22	11/07/2019 09:22	ALT
Total Dissolved Solids	43100		ma/l	50	50	0220) 2540 C-2011	11/05/2019 15:50	11/06/2019 16:31	MAG
	40100		iiig/E		00	2010 0 2011		11/00/2010 10:01	
Total Organic Carbon	1.1		mg/L	0.5		5310 C-2011	11/07/2019 13:33	11/08/2019 05:18	HMF

Subcontracted Analyses

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Radium-226	0.00	_Sub	pCi/L			EPA 903.1	12/04/2019 10:56	12/04/2019 10:58	AND
Radium-228	0.331	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND
Radium	0.331	_Sub	pCi/L			EPA 904.0 Radium Sum Calc	12/04/2019 10:56	12/04/2019 10:58	AND



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Ion Chromatography Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	90.2	D, M2	mg/L	25.0	18.0	EPA 300.0 REV 2.1	11/11/2019 15:07	11/11/2019 15:07	CSC
Fluoride	2.06	M2	mg/L	0.20		EPA 300.0 REV 2.1	11/11/2019 15:07	11/11/2019 15:07	CSC
Sulfate	257	D, M1	mg/L	100	50.0	EPA 300.0 REV 2.1	11/11/2019 15:07	11/11/2019 15:07	CSC



 Pikeville, KY
 Farmersburg, IN

 606.432.3104
 812.696.5076

Lexington, KY 859.299.7775

Paducah, KY 270.444.6547

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Notes for work order 9104082

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.

- Results contained in this report are only representative of the samples received.
- MMLI does not provide interpretation of these results unless otherwise stated.
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

- _Sub See subcontractors report.
- D Results reported from dilution.
- D1 Sample required dilution due to high concentration of target analyte.
- D2 Sample required dilution due to matrix interference.
- E Concentration exceeds calibration range
- J Estimated value.
- J5 Concentration estimated. Internal standard recoveries did not meet method acceptance criteria.
- M1 Matrix spike recovery was high; the method control sample recovery was acceptable.
- M2 Matrix spike recovery was low; the method control sample recovery was acceptable.
- M3 The accuracy of the spike recovery value is reduced since the analyte concentration in the sample is disproportionate to spike level. The method control sample recovery was acceptable.
- M4 The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.
- U Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).

Standard Quallifiers/Acronymns

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than
	Less than



Pikeville, KY Farmersburg, IN 606.432.3104

812.696.5076

Paducah, KY 270.444.6547

"Providing Tomorrow's Analytical Capabilities Today"

Lexington, KY

859.299.7775

Certified Analyses included in this Repo	rt	
Analyte	Certifications	
2320 B-2011 in Water		
Bicarbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Carbonate Alkalinity as CaCO3	KY Drinking Water Mdv (00030)	
Total Alkalinity	KY Drinking Water Mdv (00030)	
2340 C (as HACH 8226) in Water		
Hardness as CaCO3	KY Drinking Water Mdv (00030)	
2510 B-2011 in Water		
Specific Conductance (Lab)	KY Drinking Water Mdv (00030)	
2540 C-2011 in Water		
Total Dissolved Solids	KY Drinking Water Mdv (00030)	
5310 C-2011 in Water		
Total Organic Carbon	KY Drinking Water Mdv (00030)	
EPA 300.0 REV 2.1 in Water		
Chloride	KY Drinking Water Mdv (00030)	
Fluoride	KY Drinking Water Mdv (00030)	
Sulfate	KY Drinking Water Mdv (00030)	
HACH 8000 in Water		
Chemical Oxygen Demand	KY Wastewater Mdv (00030)	

SW846 6010 B in Water

	Sample Acceptance Checklist for Work Order 9104082
Shipped By: Client	Temperature: 1.20° Celcius
Condition	
Check if Custody Seals are Present/Intact	
Check if Custody Signatures are Present	
Check if Collector Signature Present	
Check if bottles are intact	
Check if bottles are correct	
Check if bottles have sufficient volume	
Check if samples received on ice	
Check if VOA headspace is acceptable	
Check if samples received in holding time.	
Check if samples are preserved properly	

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory P.O. Box 907 Madisonville, KY, 42431	Chain Schedule	of C	Custody 10/14/2019				
Client: Big Rivers Electric Corporation Wilson Station Project: Well Duplicate Wilson 092-00004	Report To: Big Rivers Elec Station Mike Galbraith	ctric Co	rporation Wilson	Invoice To: Big Rivers Electric Corporation Wilson Station Brian Edwards			
	PO Box 24 Henderson, KN Phone: (270) 8	Y 42419 344-600	N	Henderson,	KY 42419	·. 5/	
Please Print Legibly	PWS ID#: Ştate:	Ky	_	PO#: <u>よりスオスア</u> リモ Quote#			
Collected by (Signature):	rmation*		-	Compli	ance Monitorin	g? Yes No	
*For composite samples please indicate begin time, end	time and temp(oC)) at end	time below:	Sample	es Chlorinated?	Yes No	
Influent: Start Date Start time	End Date	Er	nd Time '	Гетр (oC)			
Effluent: Start Date Start time	End Date	Er	nd Time	Temp (oC)		·	
MMLI USE ONLY *required information* Workorder # Date Collection 9104082 (mm/dd/yy): Time (24 hr): Bottle a	nd Preservative	Itainers	Sample Description	Composito			
Sample ID#		Cor			Sample A	nalysis Requested	
9104082-01 A <u>11-04-19</u> <u>13:22</u> P 9104082-01 B <u>11-04-19</u> <u>13:22</u> Plastic	2astic 1L : 500mL pH<2 w/HNO3	1	Well Duplicate	g/c g/c	Alkalinity Tota Conductivity (Sulfate 300.0 TDS Alkalinity Arsenic Tot 6 Barium Tot 60 Selenium Tot	I Chloride 300.0 Lab) Fluoride 300.0 Alkalinity Bicarbonate (Carbonate D20 Antimony Tot 6020 D20 Iron Tot 6010B 6020 Hardness	
Preserva	tion Check: pH:	V			Titration Bery Tot 6010B Ca Calcium Tot 6 6020 Sodium 6020 Lithium 6020	lium Tot 6020 Boron dmium Tot 6020 010B Chromium Tot Tot 6010B Lead Tot Tot 6020 Mercury Tot	
9104082-01 C <u>11-04-19</u> <u>17:22</u> Plastic w Preserva	: 500mL pH<2 v/H2SO4 tion Check: pH : ₋		Well Duplicate	g / c	COD TOC		
9104082-01 D <u>II-04-19 13:22</u> Plastic 1 Rac Preserva	L pH<2 w/HNO3 d 226 (Sub) tion Check: pH :	$\overline{\mathcal{V}}$	Well Duplicate	g / c	Radium 226 (sub)	
Preservation Check Performed by:]	
Field data collected by: Travis Sneed	Date (mm/dd/yy)	11-04	-19_ Time (24 hr)	13:22			
pH <u>5.10</u> Cond (umho) <u>3660</u>	Res CI (mg/L)		Tot CI (mg/L)	Fre	ee CI (mg/L)		
Temp (oC) <u>16.7.7</u> or (oF) S	tatic Water Level		DO (mg/L)	Т	urb. (NTU)		
Flow (MGD) or (CFS) or	r (g/min) _						
Relinquished by: (Signature) R	teceivee by: (Signa	ature)		Date (mm/	/dd/yy)	Time (24 hr)	
Fires And	Vajl	<u> </u>	×	<u> </u>	-19	1605	
MMLI - Check here if trip charge applied to as	sociated COC		rinted: 10)/31/2019 6:03	:20AM	Page 7 of 19	

McCoy & McCoy Laboratories, Inc. A PACE Analytical Laboratory		Chain o	of Cu	istody				
P.O. Box 907 Madisonville, KY 42431		Scheduled	for:	<u>10/14/2019</u>				
Client: Big Rivers Electric Corpora	tion Wilson	Report To:			Invoice To:			
Station		Big Rivers Electri Station	c Corpo	oration Wilson	Big Rivers E	lectric Corporat	ion Wilson Station	
Project: Well Duplicate Wilson 092	-00004	Mike Galbraith			Brian Edwar	ds	1	
		PO Box 24	2410		PO Box 24	KV 42410	¥	
		Henderson, KT 4	2419		nenderson,	KT 42419	a (
		Phone: (270) 844	-6000		ро#: <u>2</u>	<u>52827~</u> ;	31	
Please Print Legibly		State: K	7		Quote#			
			7—				2 Vaa Na	
Collected by (Signature):	*required infor	mation*			Compil	ance wontoning	/ res No	
*For composite samples please indica	ate begin time, end ti	ime and temp(oC) at	end tin	ne below:	Sample	s Chlorinated?	Yes No	
Influent: Start Date Star	t time I	End Date	_ End	Time '	Temp (oC)			
Effluent: Start Date Star	t time	End Date	End	Time	Temp (oC)			
		· · · · · · · · · · · · · · · · · · ·						
MMLIUSE ONLY *required inform	ation*	S						
Workorder # Date Coll ododog2 (mm/dd/vy): Time	lection (24 hr): Dowle on							
Sample ID#	(= · ···/. Bottle an		S	Sample Description	Composite	Sample A	nalysis Requested	
9104082-01 E 11-04-19 13:	22 Plastic 1L	pH<2 w/HNO3 1	-,	Well Duplicate	g/c	Radium 228 (s	ub)	
1	Rad Preservat	228 (Sub) ion Check: pH :/						
9104082-01 E 11-04-19 13:	2 Plastic 11	DH<2 w/HNO3 1	/	Well Duplicate	a/c	Radium 228 (s	(du	
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	Preservat						<i>.</i>	
9104082-01 G <u>[[····4-[9]]</u>]	22 Plastic 1L	. pH<2 w/HNO3 1 (Sub)	/	Well Duplicate	g/c	Radium Total ((sub)	
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Preservation Check Performed by:	///_Y							
Field data collected by: 1 courd'S	Saud		~~~	9 Time (24 hr)	13'22			
			<u> </u>			01/		
pH <u>),10</u> Cond (un	nho) <u>3660</u>	Res CI (mg/L)			Fre	e CI (mg/L)		
Temp (oC) <u>16.77</u> or (oF) St	atic Water Level		DO (mg/L)	T	urb. (NTU)		
Flow (MGD) or (CF	S) or	(g/min)						
Relinguished by: (Signature)	R	eceived by: (Signatur	re)		Date (mm/	dd/vv) T] ime (24 hr)	
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MMLI - Check here if trip ch	narge applied to as	sociated COC		Printed: 10		20AM	Page 8 of 10	
							1 490 0 01 13	



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

December 04, 2019

Angela Deal Pace Analytical Madisonville 825 Industrial Rd Madisonville, KY 42431

RE: Project: 9104082 Pace Project No.: 30334695

Dear Angela Deal:

Enclosed are the analytical results for sample(s) received by the laboratory on November 09, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carino a. Ferris

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

Enclosures

cc: Doug Wolfe, Pace Analytical Madisonville



REPORT OF LABORATORY ANALYSIS



Pace Analytical Services, LLC 1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

CERTIFICATIONS

 Project:
 9104082

 Pace Project No.:
 30334695

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS



SAMPLE SUMMARY

30334695001	9104082-01	Water	11/04/19 13:22	11/09/19 10:00	
Lab ID	Sample ID	Matrix	Date Collected	Date Received	
Pace Project No	o.: 30334695				
Project:	9104082				

REPORT OF LABORATORY ANALYSIS





SAMPLE ANALYTE COUNT

 Project:
 9104082

 Pace Project No.:
 30334695

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30334695001	9104082-01	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 9104082

Pace Project N	lo.:	30334695
----------------	------	----------

Sample: 9104082-01 PWS:	Lab ID: 303346 Site ID:	95001 Collected: 11/04/19 13:22 Sample Type:	Received:	11/09/19 10:00	Matrix: Water	
Comments: • Sample collectio	n dates and times were not	present on the sample containers.				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.322 (0.681) C:NA T:91%	pCi/L	12/03/19 11:06	13982-63-3	
Radium-228	EPA 904.0	0.331 ± 0.306 (0.624) C:82% T:94%	pCi/L	12/02/19 16:14	15262-20-1	
Total Radium	Total Radium Calculation	0.331 ± 0.628 (1.31)	pCi/L	12/04/19 09:28	3 7440-14-4	

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL - RADIOCHEMISTRY

Project:	9104082						
Pace Project No.:	30334695						
QC Batch:	370987		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 228			
Associated Lab Sar	nples: 30334695	001					
METHOD BLANK: 1800103			Matrix: Water				
Associated Lab Sar	nples: 30334695	001					
Parar	neter	Act -	LUnc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.353 ± 0.347	(0.714) C:83% T:78%	pCi/L	12/02/19 16:13		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL - RADIOCHEMISTRY

Project:	9104082						
Pace Project No.:	30334695						
QC Batch:	370988		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description:				
Associated Lab San	nples: 30334695	001					
METHOD BLANK: 1800104			Matrix: Water				
Associated Lab San	nples: 30334695	001					
Paran	neter	Act ±	Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.0385 ± 0.251	(0.505) C:NA T:92%	pCi/L	12/03/19 11:06		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS





QUALIFIERS

Project:	9104082
Pace Proiect No.:	30334695

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

Chain of Custody Workorder: 9104082	Workorder Name: We	ll Duplicate Wilson 092 [.] Owne	r Received Date: 11/4/2019	Pace Analytical	
Report To:	Subcontract To	0. 2020 - 2020 - 2020		Requested Analysis	-
McCoy & McCoy Labs P.O. Box 907 Madisonville, KY 42409	Pace Analytica 1638 Rosey To Greensburg, P.	il Services LLC Greensburg P≜ own Rd Suite 2,3,4 A 15601			
270-821-7375 angela@mccoylabs.com	(724) 850-561	Ū	reserved Containers		
ttem Sample ID	Sample Collect Type Date/Time Lab	01D	EPA 903. EPA 903.		LAB USE ONLY
2 9104082-01	11/04/19 13:22	IR44-McCoy Water	× × ×		Cel
4					
6			#0M	30334695	
2 8					
9			30334695		
Transfers Released By	Logical and Angle of Date/Tin	ne gest Reveived By the second	Date/Time	Comments	
1 2 3	A-3-11	Nac Ole	1-9-14 10-00		
Cooler Temperature on Receipt	<u>کر کر Custody Sec</u>	ar Yor N	Received on Ice Y or N	Sample Intact D	or N
**************************************	confidentiality, location/name o cred complete as is since this inf	of the sampling site, sampler's formation is available in the o	iname and signature may i wner laboratory.	not be provided on this COC	
8 6riday, June 17, 2016 11:01:34	AM	FMT-	ALL-C-002rev.00 24March	2009	Page 1 of 1
<u>- 9 (</u> 7 0					

of 11 If 19

SUBCONTRACT ORDER

McCoy & McCoy Laboratories, Inc.

9104082

SENDING LABORATORY:	RECEIVING LABORATORY:
McCoy & McCoy Laboratories, Inc. PO BOX 907 Madisonville, KY 42431 Phone: (270) 821-7375 Fax: 844-270-7904 Project Manager: Angela Deal	Pace Analytical Services LLC Greensburg PA 1638 Rosey Town Rd Suite 2,3,4 OGreensburg, PA 15601 Phone :(724) 850-5615 Fax:

Please return shipping cooler to return address on shipping label.

Analysis	• •	Expires	Laboratory ID	Comments
Sample ID: 9104082-01	Water	Sampled:11/04/2019 13:22	Specific Method	
Radium Total (sub)		05/02/2020 13:22	EPA 903.0	
Radium 228 (sub)		05/02/2020 13:22	EPA 904.0	
Radium 226 (sub)		05/02/2020 13:22	EPA 903.1	

Released By

11-8-19 Date

1-979 Received By Date

10:00

Released By

. 5

Date

Received By

Date

Pittsburgh Lab Sample Cond	ition	Upoi	ו Re	eceipt
Pace Analytical' Client Name:		McC	ny l	<u>& McCry</u> Project # 30334695
	nt 🗖	Comme	rcial	Pace Other
Tracking #: 1107 3385 5275		_		LIMS Login
Custody Seal on Cooler/Box Present: Zyes	Ē	- 10	Seal	is intact: 🛛 yes 🔲 no
Thermometer Used	, Туре	of Ice	: (Ve	Blue None
Cooler Temperature Observed Temp	6-3	c	Corr	rection Factor: C Final Temp: S: 3 °C
Temp should be above freezing to 6°C				nt names of the Date and Initials of name on examining
Commente:	Ves	l No		- 1000391 contents: <u>MU-U-U-U-U-U-U-U-U-U-U-U-U-U-U-U-U-U-U-</u>
Chain of Custody Property	100	7	1107	
Chain of Custody Flesent.		1		2
Chain of Custody Palinquiched:	\vdash	+		3
Sampler Namo & Signature on COC:				<u>о.</u>
Sample Labels match COC:	-	5		5 Andrea Clarke Den Danala
-Includes date/lime/ID Matrix		,L	J	- NO TIME OCAIC (NI GOW MICS
Samples Arrived within Hold Time:		1		6.
Short Hold Time Analysis (<72hr remaining):			1	7.
Rush Turn Around Time Requested:	1	arphi	1	8.
Sufficient Volume:		1		9,
Correct Containers Used:		-		10.
-Pace Containers Used:		6		
Containers Intact:				11.
Orthophosphate field filtered				12.
Hex Cr Aqueous sample field filtered			N.	13.
Organic Samples checked for dechlorination:			\sim	14.
Filtered volume received for Dissolved tests			/	15.
li containers have been checked for preservation.	\leq			16. 04/2-Z
exceptions: VOA, coliform, TOC, O&G, Phenolics,	Radon	,		
N containers meet method preservation				Inifial when M/ Date/lime of
equirements.				completed preservation
	·			Lot # of added
leadspace in VOA Vials (>6mm);				17.
rip Blank Present:				18.
rip Blank Custody Seals Present			~	1
ad Samples Screened < 0.5 mrem/hr				Initial when Dire 11-11-16
lient Notification/ Resolution	1-			
Person Contacted:			Date/	Time: Contacted-Bv:
Comments/ Resolution:				+ +

Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers) *PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5April2019)

Appendix E

Statistical Evaluation

1.0 WILSON LANDFILL STATISTICAL PROCEDURES AND RESULTS

The Appendix III groundwater quality data were evaluated using an interwell approach that statistically compared constituent concentrations at downgradient monitoring wells to those present at a background monitoring well. For the D.B. Wilson landfill, monitoring well MW-8 is designated as the background well because it is located upgradient, whereas monitoring wells MW-5, MW-6, MW-7, and MW-10 are designated as compliance wells because they are located downgradient.

The statistical analyses were performed in accordance with the U.S. Environmental Protection Agency's Final CCR Rule 40 CFR Parts 257.93(f), 257.93(g), and 257.93(h) and the Groundwater Monitoring System and Statistical Methods Certification. Prediction limits (i.e., parametric or nonparametric) with 1 of 2 retesting were developed for each constituent based on the frequency of non-detect values and whether the background data for that constituent exhibited a normal, lognormal, or nonparametric distribution. For the statistical analysis, non-detect values were represented as one-half the detection limit. No outliers were identified in the background data. Analytical data from the background monitoring wells collected between June 2016 and November 2019 were used to develop an upper prediction limit (UPL) for the Appendix III and IV background data at 95 percent confidence. Data from the downgradient monitoring wells for the same time period were compared to the UPL to identify statistically significant increases (SSIs) over background. Mann-Kendall trend analysis was used to identify statistically significant increasing trends for constituents with SSIs. ProUCL Version 5.1 was used to store the data and run the statistical analyses. The results of the analyses, including the Appendix III and IV UPLs, are provided in **Tables E1** and **E2**.

The statistical analysis results indicate that Appendix III constituents calcium, chloride, sulfate, and total dissolved solids (TDS) at monitoring well MW-5; calcium, chloride, and TDS at monitoring well MW-6; boron, chloride, and TDs at monitoring well MW-7; and calcium, chloride, and TDS at monitoring well MW-10 have SSIs over background (**Table E3**) that were confirmed by subsequent sampling events. Fluoride and pH do not have any verified SSIs over background. Based on these results, detection monitoring is required to continue at the landfill on a semi-annual basis.

The statistical analysis results also indicate that Appendix IV constituents cobalt and lithium at monitoring wells MW-5, MW-6, and MW-7 and cobalt at monitoring well MW-10 have SSIs over background (**Table E4**) that were confirmed by subsequent sampling events. These constituents were further evaluated to determine whether they are present at statistically significant levels (SSLs) over the groundwater protection standards (GWPS) by calculating the lower confidence limit (LCL) at 95% confidence for each well and constituent using all of the baseline, detection, and assessment monitoring results collected to date. For a constituent to be present at a SSL over the GWPS, its LCL must be greater than the GWPS. **Table E5** provides a summary of the LCLs and GWPS for cobalt and lithium at monitoring wells MW-5, MW-6, MW-7, and MW-10. The results indicate that lithium at monitoring well MW-6 and cobalt at monitoring well MW-10 (yellow highlights) are present at a SSL above the GWPS. The LCLs for the remaining wells and constituents are equal to or less than the GWPS and thus are not considered SSLs.

Parameter (Units)	Number of Samples	Percent Non-detects	Normal or Lognormal Distribution?	Statistical Test	Background Limit
Boron (mg/L)	12	17	Yes/No	Parametric	0.053
Calcium (mg/L)	12	0	No/No	Nonparametric	329
Chloride (mg/L)	12	0	Yes/Yes	Parametric	5.32
Fluoride (mg/L)	12	0	No/Yes	Parametric	0.79
pH (std units)	13	0	Yes/Yes	Parametric	6.13/6.73
Sulfate (mg/L)	12	0	No/No	Nonparametric	1480
TDS (mg/L)	12	0	Yes/Yes	Parametric	1679

 Table E1. Well MW-8 Appendix III Constituents Background Upper Prediction Limits

 Table E2. Well MW-8 Appendix IV Constituents Background Upper Prediction Limits

Parameter (Units)	Number of Samples	Percent Non- detects	Normal or Lognormal Distribution?	Statistical Test	Background Limit (mg/L)
Antimony (mg/L)	12	42	Yes/Yes	Parametric	0.0005
Arsenic (mg/L)	12	0	Yes/Yes	Parametric	0.009
Barium (mg/L)	12	0	Yes/Yes	Parametric	0.026
Beryllium (mg/L)	11	100	No/No	Nonparametric	0.02
Cadmium (mg/L)	11	100	No/No	Nonparametric	0.01
Chromium (mg/L)	12	75	No/No	Nonparametric	0.03
Cobalt (mg/L)	lt (mg/L) 12		Yes/Yes	Parametric	0.0016
Fluoride (mg/L)	12	0	No/Yes	Parametric	0.79
Lead (mg/L)	12	92	No/No	Nonparametric	0.05
Lithium (mg/L)	12	33	Yes/Yes	Parametric	0.015
Mercury (mg/L)	11	100	No/No	Nonparametric	0.0002
Molybdenum (mg/L)	12	0	Yes/Yes	Parametric	0.0196
Ra-226+228 (pCi/L)	11	0	No/No	Nonparametric	2.8
Selenium (mg/L)	12	92	No/No	Nonparametric	0.1
Thallium (mg/L)	12	92	No/No	Nonparametric	0.01

Well	Location	В	Ca	CI	F	pH (LPL/UPL)		SO4	TDS
MW-8	Upgradient	Р	NP	Р	Р	Р	Р	Р	Р
MW-5	Downgradient								
MW-6	Downgradient								
MW-7	Downgradient								
MW-10	Downgradient								

Table E3. Big Rivers D.B. Wilson Landfill Appendix III SSI Summary

Notes:

SSIs determined using interwell prediction limits; MW-8 is upgradient background well

P = parametric prediction limit; NP = nonparametric prediction limit

Less than or equal to background upper prediction limit (UPL) or greater than lower prediction limit (LPL) for pH

Statistically significant increase (SSI) over background UPL or below background LPL for pH

Table E4. Big Rivers D.B. Wilson Landfill Appendix IV SSI Summary

Well	Location	Sb	As	Ва	Ве	Cd	Cr	Co	F	Pb	Li	Hg	Мо	Ra-226+228	Se	ті
MW-8	Upgradient	NP	Р	Р	NP	NP	NP	Р	Р	NP	Р	NP	Р	Р	NP	NP
MW-5	Downgradient															
MW-6	Downgradient															
MW-7	Downgradient															
MW-10	Downgradient															

Notes:

SSIs determined using interwell prediction limits; MW-8 is upgradient background well

P = parametric prediction limit; NP = nonparametric prediction limit

Less than or equal to background upper prediction limit (UPL) or greater than lower prediction limit (LPL) for pH

Statistically significant increase (SSI) over background UPL or below background LPL for pH

Table E5 Summary of LCLs and GWPS for Cobalt and Lithium

Well	Parameter	LCL	GWPS
MW-5	Со	0.006	0.006
MW-6	Со	0.006	0.006
MW-7	Со	0.004	0.006
MW-10	Co	0.082	0.006
MW-5	Li	0.032	0.04
MW-6	Li	0.042	0.04
MW-7	Li	0.025	0.04