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ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

Big Bend Power Station Economizer Ash and Pyrite Pond System 13031 Wyandotte Road Gibsonton, FL 33572

Prepared for

TECO Tampa Electric Tampa, FL

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ACRONYMS

Big Bend Power Station
Coal Combustion Residuals
Coal Combustion Residuals Rule
Code of Federal Regulations
Economizer Ash and Pyrite Pond System
Groundwater Protection Standard
Professional Engineer
Resource Conservation and Recovery Act
Statistical Analysis Plan
Statistically Significant Increase
Tampa Electric Company
United States Environmental Protection Agency

1. BACKGROUND

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published 40 Code of Federal Regulations (CFR) Parts 257 and 261: Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule (USEPA, 2015). This regulation addresses the safe disposal of coal combustion residuals (CCR) as solid waste under Subtitle D of the Resource Conservation and Recovery Act (RCRA) and is referred to herein as the CCR Rule. The CCR Rule became effective on October 14, 2015. The rule provides national minimum criteria for "the safe disposal of CCR in new and existing CCR landfills, surface impoundments, and lateral expansions, design and operating criteria, groundwater monitoring and corrective action, closure requirements and post closure care, and recordkeeping, notification, and internet posting requirements." The groundwater monitoring requirements of the CCR Rule apply to the economizer ash and pyrite pond system (EAPPS) at Tampa Electric Company's (TEC) Big Bend Power Station (BBS) in southeast Hillsborough County, Gibsonton, Florida (**Figure 1**).

This document has been prepared to meet the requirements of 40 CFR 257.90(e) concerning the Annual Groundwater Monitoring and Corrective Action reporting required by the CCR Rule for the EAPPS and BBS. At a minimum, the annual groundwater monitoring and corrective action report must contain the information described below and the information required by 257.90(e)(1) through (5), to the extent available:

"For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by § 257.105(h)(1)"

This annual report covers the period January 1, 2018 through December 31, 2018. Sections of this report that are required by the CCR Rule but are not applicable for the reporting period, contain the text "Not applicable for this annual reporting period".

Site features, geology, lithology, design of the CCR monitoring well network, the Sampling and Analysis Plan including requirements, procedures, documentation, laboratory analytical procedures and quality control, and the Quality Assurance Plan are provided in the *CCR Rule Groundwater Monitoring Program Plan (GWMP)*, *Big Bend Power Station*, (October 2016).

2. SITE DESCRIPTION

2.1 Site Setting

The BBS is located on the eastern shore of Tampa Bay in Sections 9, 10, 15, and 16, Township 31, Range 19 East of the Gibsonton Quadrangle, with the center of the facility at approximately 27°47'36" north latitude and 82°24'16" west longitude and encompasses approximately 1,492 acres. Topography at the Site ranges from approximately sea level (along the western portion of the BBS) to approximately 10 feet mean sea level (MSL) near the eastern portions of the property along U.S. Highway 41. The location of the BBS and the components of the EAPPS, namely the north and south economizer ash ponds and the suction pond, are shown on **Figures 1** and **2**.

Construction of BBS began in the late 1960s on two dredge/fill peninsulas. Four coal-fired power generating units are present at the BBS and were placed into service in 1970, 1973, 1976, and 1985. Units 1, 2, and 3 are wet-bottom slag-tap type units that originally used saltwater slag-handling systems and electrostatic precipitators for stack gas emissions control. However, these units are now operating as freshwater systems that allow more internal water recycling. Unit 4 is a dry-bottom unit with a closed-loop freshwater bottom ash-sluice system. All units are equipped with electrostatic precipitators and stack gasses are treated with limestone flue gas desulfurization (FGD) and selective catalytic reduction (SCR) systems.

2.2 CCR Units

The EAPPS was built in the early 1980s to support the operation of Big Bend Unit 4 and consists of three lined ponds. The EAPPS is considered one CCR unit by 40 CFR 257.53 and is located approximately 1,000 feet southeast of the active power generating units (**Figure 1**). The north economizer ash pond and economizer ash suction pond are still in operation. The south economizer ash pond has been converted to dry storage of material excavated from the south recycle pond when it was reconstructed and lined in 2010.

The pond bottom and dike crest elevations for each pond are reportedly 5.5 ft NGVD and 31 ft, NGVD respectively. The South Economizer Ash Pond contains an estimated 337,400 cubic yards (cy) of CCR material over a surface area of 7.2 acres. The north pond contains an estimated 90,000 cy of CCR material (Geosyntec, 2016) over a surface area of 5.4 acres. The suction pond has a surface area of 1.6 acres, receives decant water from the north and south economizer ash ponds, and contains only minor amounts of settleable CCR fines material.

2.3 Summary of Site Geology and Hydrogeology

The units that form the hydrogeologic framework in the region include the surficial aquifer system (SAS), the Intermediate Confining Unit (ICU), and the upper Floridan aquifer system (UFAS). Based on Site-specific data as well as hydrogeologic studies of west-central Florida, the intermediate aquifer system has not been identified as being present at this location (Tihanksy and Knochenmus, 2001).

The SAS sediments consist of Pleistocene shell deposits and terrace sands. Due to the irregular surface of the underlying limestone, the SAS varies in thicknesses but typically ranges between 20 and 30 feet (ft) thick in the area of the Site (SWFWMD, 2010). Groundwater (the water table) in the SAS is unconfined. The groundwater flow direction in the SAS is generally towards Tampa Bay as the discharge point; however, flow direction is influenced by various surface water features including ponds, drainage ditches, canals, and small creeks locally. Upward vertical flow gradients from the UFAS to the SAS are common based on historical data trends, and in certain cases can lead to artesian conditions (ECT, 2003; 2007).

The ICU resides within the undifferentiated Hawthorn Group. Due to the absence of the intermediate aquifer system, the permeable strata are absent and consequently the less permeable, fine grained clastic clay units are generally more prevalent. These clay units with varying silt, sand content, and marls comprise the semi-confining unit that separates the SAS and the UFAS.

The UFAS consists of a continuous series of carbonate units and is composed of the limestone sequences that occur in the Tampa Member of the Arcadia Formation of the Hawthorn Group as well as the underlying Suwannee Limestone and other carbonate strata. The Tampa Member encompasses sandy limestone containing varying amounts of clays and marls. The thickness of the UFAS may exceed 1,200 ft beneath the facility. Groundwater in the UFAS generally flows regionally from northeast to southwest towards Tampa Bay.

The *GWMP* may be consulted for additional details regarding the regional and Site-specific geology and hydrogeology.

2.4 Aquifer System Description

2.4.1 Identification of Uppermost Aquifer

The uppermost aquifer is defined by 40 CFR 257.53 as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. The uppermost aquifer at the Site is the SAS.

2.4.2 Groundwater Flow Direction

A surface water feature, Jackson Branch, to the north/northeast of the EAPPS appears to influence local groundwater flow toward the stream in contrast to the general groundwater flow direction at the BBS, which is east to west. The groundwater flow direction near the EAPPS is generally north/northeast; this flow direction was also observed during the April 2018 (**Figure 3**) and September 2018 (**Figure 4**) detection monitoring events.

2.4.3 Groundwater Flow Rates

The average linear velocity of groundwater in the SAS at the EAPPS ranges from 0.03 to 0.07 ft/day^1 . This flow velocity corresponds to a range of flow velocities from approximately 12 to 27 feet per year.

 $^{^{1}}$ Based on average hydraulic conductivity of 3.4 feet/day for SAS deposits, a porosity of 0.2 for sand, and horizontal hydraulic gradients between 0.002 and 0.004.

3. GROUNDWATER MONITORING SYSTEM

The groundwater monitoring system (GMS) installed at the EAPPS was designed to monitor the water quality in the SAS upgradient of the EAPPS to evaluate background concentrations and downgradient of the EAPPS to evaluate the potential effects of a release. The documentation for the design, installation, and development of these wells is found in *Groundwater Monitoring Well Design, Installation, Development, and Decommissioning Report, October 2017.* The GMS consists of two background monitoring wells (identified as BBS-CCR-BW1 and BBS-CCR-BW2) located hydraulically upgradient of EAPPS. The background monitoring wells will be used to derive background concentrations for Appendix III constituents. Three monitoring wells (identified as BBS-CCR1, BBS-CCR-2, and BBS-CCR-3) are located at the waste boundary and at the "hydraulically downgradient perimeter (i.e., the edge) of the CCR unit or at the closest practical distance from this location" [80 FR 21400]. The screen intervals are at or below the actual depth of CCR material in the upper portion of the SAS and therefore meet the performance standards specified in 257.91(a) through (d). The locations of the monitoring wells comprising the GMS are shown on **Figure 2**.

3.1 Status of the Groundwater Monitoring and Corrective Action Program

Groundwater monitoring was initiated at the EAPPS in June 2016 in accordance with the requirements of 40 CFR 257.90(b). Ten sampling events were conducted as part of baseline monitoring between June 2016 and August 2017. The first detection monitoring event was conducted in October 2017 and resulted in statistically significant increases (SSIs) in groundwater pH above the established upper prediction limit at two downgradient monitoring wells. An Alternate Source Demonstration (ASD) was prepared in April 2018 to document that the SSIs for pH were not associated with a release of CCR from the EAPPS. Therefore, detection monitoring resumed with sampling events in April and September 2018.

3.2 Identification of Monitoring Wells Installed, Abandoned, or Decommissioned -257.90 (E)(2)

The monitoring wells comprising the GMS for compliance with the CCR Rule were installed in May 2016 to meet the groundwater monitoring system requirements in 257.91. A monitoring well construction summary is provided in **Table 1**.

In 2018, no additional monitoring wells were installed, and none of the existing monitoring wells in the GMS were abandoned or decommissioned.

4. SUMMARY OF 2018 CCR RULE ACTIVITIES COMPLETED

4.1 **Requirements Completed**

The actions completed during this reporting period are summarized below.

- As required by §257.94(b)(1)(iv), the evaluation of the groundwater monitoring data for statistically significant increases over background levels for the constituents listed in Appendix III 40 CFR Part 257 was completed in January 2018.
- In April 2018, an Alternate Source Demonstration was prepared in accordance with §257.94(e)(2) and demonstrated that the SSIs for pH in two background monitoring wells were caused by a source other than the EAPPS.
- The evaluation of the groundwater monitoring data for SSIs over background levels for the constituents listed in Appendix III of 40 CFR Part 257, as required by \$257.94, was completed in October 2018.

4.2 Completion of Required Reports

The following reports were completed during the reporting period:

- Summary of Statistical Analyses of Baseline Groundwater Samples, Economizer Ash and Pyrite Pond System, Big Bend Station, January 2018.
- Annual Groundwater Monitoring and Corrective Action Report, Big Bend Power Station Economizer Ash and Pyrite Pond System, January 2018.
- Alternate Source Demonstration Economizer Ash and Pyrite Pond System, Big Bend Station, April 2018.
- Summary of Results Second Detection Monitoring Event, Economizer Ash and Pyrite Pond System, Big Bend Station, October 2018.

4.3 Problems Encountered and Resolution

No problems were encountered during the reporting period.

5. GROUNDWATER MONITORING DATA - 257.90(E)(3)

5.1 Detection Monitoring

Detection monitoring (Appendix III) parameters (**Table 2**) were evaluated to assess the potential release of CCR from the EAPPS into groundwater. Detection monitoring samples were collected semi-annually from each background and compliance well and analyzed for Appendix III constituents.

The second and third detection monitoring events were conducted in April 2018 and September 2018. The Appendix III and Appendix IV analytical results from the two detection monitoring events are provided in **Table 3** with the baseline monitoring results generated at the EAPPS between June 2016 and October 2017. The analytical laboratory reports for the April 2018 and September 2018 are provided in **Appendix A** and **Appendix B**, respectively.

5.1.1 Alternative Monitoring Frequency – 257.94(d)(3)

Not applicable for this annual reporting period.

5.1.2 Identification of Appendix III Constituents Detected at SSI Over Background – 257.94(e)

Groundwater pH was the only Appendix III constituent found to be above background concentrations in each of the detection monitoring events conducted in 2018. Groundwater pH was documented above the 95% upper prediction limit (UPL) at BBS-CCR-1 in the second (April 2018) and third (September 2018) detection monitoring events and above the UPL at BBS-CCR-2 in second (April 2018) detection monitoring event and therefore represented an SSI.

5.1.3 Alternate Source Demonstration – 257.94(e)(2)

In April 2018, an ASD was successfully completed and certified by a Professional Engineer to address SSIs of groundwater pH at BBS-CCR-1 and BBS-CCR-2 in accordance with 40 CFR.94(e)(2). The groundwater pH SSIs were shown to be a result of alternate sources. A copy of the ASD is provided in **Appendix C**.

5.1.4 Transition from Detection to Assessment Monitoring – 257.90(e)(4)

The detection monitoring program for the groundwater monitoring system was initiated in October 2017 pursuant to §257.90(b). Because of the successful ASD completed in April 2018 in accordance with §257.94(e)(2), the EAPPS remains in the detection monitoring program.

5.2 Assessment Monitoring

None of the provisions of 40 CFR 257.95 are applicable for this annual reporting period.

6. DATA USABILITY EVALUATION

The Appendix III and Appendix IV groundwater results were reviewed based on the following references:

- *CCR Groundwater Monitoring Program Plan*, Big Bend Power Station, September 2016;
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, August 2014 (OSWER 9355.0-131, EPA 540-R-013-001);
- the applicability and appropriateness of the analytical methods referenced by the data package; and
- professional and technical judgment by the data validation team.

A Stage 2A data validation report evaluating the quality control (QC) parameters was generated for each detection monitoring event. Additional data qualifiers generated from the data validation were applied where appropriate. The groundwater data generated from each detection monitoring event was deemed usable for meeting the project objectives.

The data validation reports for the second and third detection monitoring events are provided in **Appendix D**.

7. DETECTION MONITORING STATISTICAL ANALYSIS

The statistical analysis of the detection monitoring data (October 2017, April 2018, and September 2018) was performed in accordance with the *CCR Statistical Analysis Plan*. The statistical approach employed is based on the following findings documented in the *Summary of Statistical Analyses of Baseline Groundwater Samples* (15 January 2018).

- The baseline dataset revealed that each of the Appendix III constituents exhibited a non-parametric distribution among the two background monitoring wells.
- The two background monitoring wells exhibited spatial variability for all the Appendix III constituents.
- An intra-well comparison could not be performed due to the absence of groundwater data at the EAPPS representative of pre-operational conditions.
- The data from the two background monitoring wells were aggregated to create a pooled background dataset.
- The 95% UPL achieved 95% confidence and was calculated for each constituent and resulted in the maximum detected concentration of each constituent in each of the background monitoring wells.
- The Appendix III constituents detected in each of the detection monitoring events were compared to the 95% UPL for each constituent to evaluate the presence of SSIs.

During each of the three detection monitoring events conducted to date, groundwater pH was documented as an SSI in two of the three downgradient monitoring wells (BBS-CCR-1 and BBS-CCR-2). As stated in Section 5.1.3, the 2018 ASD documented that elevated groundwater pH is due to sources unrelated to the EAPPS and therefore does not indicate a release of CCR from the EAPPS.

Detection monitoring will continue in 2019.



8. ASSESSMENT MONITORING STATISTICAL ANALYSIS

9. ACTIVITIES PLANNED FOR 2019

The projected key activities for the upcoming year include the following:

- The statistical evaluation of the third detection monitoring event groundwater data for Appendix III SSIs was completed by January 15, 2019 in accordance with 257.93.
- Two semi-annual detection monitoring events (April 2019 and October 2019) and associated statistical analyses will be conducted.



10. CORRECTIVE MEASURES



11. REMEDY SELECTION



12. CORRECTIVE ACTION

13. REFERENCES

- Environmental Consulting & Technology (ECT). 2003. Supplemental Assessment Report, Tampa Electric Company, Big Bend Station. Tampa, Florida.
- Environmental Consulting & Technology. 2007. Sodium Ground Water Quality Exemption Application for the TECO Big Bend Station. Tampa, Florida.
- Geosyntec Consultants, Inc. 2016. CCR Groundwater Monitoring Program Plan, Big Bend Power Station, Economizer Ash and Pyrite Ponds, September 2016.
- Geosyntec Consultants, Inc. 2016. Basins of Design and Preliminary Closure Evaluation Report; Economizer Ash and Pyrite Ponds; Big Bend Power Station, September 2016.
- Geosyntec Consultants, Inc. 2017. Groundwater Monitoring Well Design, Installation, Development, and Decommissioning Report, Big Bend Power Station, Economizer Ash and Pyrite Pond System, October 2017.
- Geosyntec Consultants, Inc. 2017. Statistical Analysis Plan, Big Bend Power Station, Economizer Ash and Pyrite Pond System, October 2017.
- Southwest Florida Water Management District, 2010. 2010 Regional Water Supply Plan, Tampa Bay Planning Region. Brooksville, Florida.
- Tihanksy, A.B. and L.A. Knochenmus. 2001. Karst Features and Hydrogeology in Westcentral Florida-A Field Perspective. US Geological Survey-Water-Resources Investigations Report 01-4011.
- USEPA, April 2015. 40 CFR Part 257, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, EPA-HQ-RCRA-2009-0640.

TABLES

Table 1: CCR Monitoring Well Construction Details

TEC Big Bend Station Economizer Ash and Pyrite Pond System Gibsonton, FL

Well ID	Diameter (in)	Designation	Northing (NAD 1983)	Easting (NAD 1983)	Ground Surface Elevation (ft NAVD)	TOC Elevation* (ft NAVD)	Total Depth (ft bls)	Screen Interval (ft bls)	Top of Screen Elevation (ft NAVD)	Bottom of Screen Elevation (ft NAVD)
BBS-CCR-BW1	2	Background	1256638.34	528461.95	29.10	33.40	40	30-40	-0.90	-10.90
BBS-CCR-BW2	2	Background	1256966.67	527897.28	7.70	12.54	19	9-19	-1.30	-11.30
BBS-CCR-1	2	Detection	1257433.85	528211.74	5.00	9.82	17.5	7.5-17.5	-2.50	-12.50
BBS-CCR-2	2	Detection	1257429.29	528769.31	5.00	9.34	17.5	7.5-17.5	-2.50	-12.50
BBS-CCR-3	2	Detection	1257154.61	529023.26	4.90	9.20	18.5	8.5-18.5	-3.60	-13.60

Notes

1. in = Inches

2. ft bls = Feet Below Land Surface

3. Horizontal datum surveyed to the North American Datum (NAD) of 1983 US State Plane Florida West.

4. Vertical datum surveyed to the North American Vertical Datum (NAVD) of 1988.

5. *Top of casing elevations were revised in September 2016 during final aboveground well completions. The additional PVC stickup was measured in the field and added to the surveyed top of casing elevation.

Table 2: Summary of Detection and Assessment Monitoring Constituents TEC Big Bend Station Economizer Ash and Pyrite Pond System Gibsonton, FL

Constituent		t Reference	Analytical Methods(s)	EPA Primary or Secondary MCL (ug/L)
America (Total)	40 CFR 25/ Appendix III	40 CFR 257 Appendix IV	EPA 200.8 or 6020	
Arsenic (Total)		X		10
Antimony (Total)		X	EPA 200.8 or 6020	6
Barium (Total)		Х	EPA 6010	2,000
Beryllium (Total)		Х	EPA 6010	4
Boron (Total)	Х		EPA 6010	NA
Cadmium (Total)		Х	EPA 200.8 or 6020	5
Calcium (Total)	Х		EPA 6010	NA
Chloride	Х		EPA 300.0	250,000
Chromium (Total)		Х	EPA 6010	100
Cobalt (Total)		Х	EPA 6010	NA
Fluoride	Х		EPA 300.0	4,000
Lead (Total)		Х	EPA 200.8	15
Lithium (Total)		Х	EPA 6010	NA
Mercury (Total)		Х	EPA 7470	2
Molybdenum (Total)		Х	EPA 6010	NA
pH	Х		Field	6.5-8.5 (STD Units)
Radium 226 and 228 (Total)		Х	EPA 903	5 (pCi/L)
Selenium (Total)		Х	EPA 200.8 or 6020	50
Sulfate	Х		EPA 300.0	250,000
TDS	Х		SM2540C	500,000
Thallium (Total)		Х	EPA 6020	2

Notes.

1. EPA = US Environmental Protection Agency

2. MCL = Maximum Contaminant Level

3. ug/L = Micrograms per liter

4. STD Units = Standard Units

5. pCi/L = picoCuries per liter

					Field Param	eters			
Well ID	Sample Date	Top of Casing Elevation (a)	Depth to Water	Groundwater Elevation	Temperature	Specific Conductivity	Dissolved Oxygen	Redox Potential	Turbidity
wen ib	Sample Date	ft NAVD 88	ft BTOC	ft NAVD 88	С	umhos/cm	mg/L	mV	NTU
		Result	Result	Result	Result	Result	Result	Result	Result
BBS-CCR-BW1	6/24/2016	30.13	25.37	4.76	27.84	5620	0.18	-8.6	5.14
(BKGD)	7/27/2016	30.13	26.19	3.94	28.25	5420	0.17	-7.3	7.1
	8/26/2016	30.13	25.78	4.35	28.11	5140	0.12	-22.8	6.47
	10/28/2016	33.40	29.42	3.98	27.46	4860	0.13	-76.2	4.08
	11/10/2016	33.40	29.84	3.56	27.50	5000	0.13	-71.1	1.77
	1/26/2017	33.40	30.49	2.91	26.98	4940	0.20	-20.2	2.04
	4/13/2017	33.40	30.71	2.69	27.20	1580	0.14	-114	4.22
	6/28/2017	33.40	29.92	3.48	27.72	5010	0.42	-11.4	0.69
	7/20/2017	33.40	28.89	4.51	27.89	4960	0.60	-23	2.38
	8/16/2017	33.40	28.74	4.66	28.08	5000	0.45	3.6	6.03
	10/13/2017	33.40	29.60	3.80	28.16	4570	0.40	-18.4	2.51
	4/13/2018	33.40	29.37	4.03	27.64	4800	0.27	-10.3	4.26
	9/12/2018	33.40	28.42	4.98	27.71	4410	0.55	-11.1	2.62
BBS-CCR-BW2	6/24/2016	9.81	4.72	5.09	26.42	1640	0.37	-59.4	6.7
(BKGD)	7/27/2016	9.81	5.52	4.29	27.56	1500	0.15	-84.1	4.86
	8/26/2016	9.81	5.22	4.59	27.74	1380	0.10	-59.5	1.73
	10/28/2016	12.54	8.06	4.48	27.22	1340	0.37	-91.5	3.99
	11/10/2016	12.54	8.45	4.09	27.1	1400	0.20	-73.8	5.86
	1/26/2017	12.54	9.13	3.41	25.25	1460	0.30	-74.1	16.4
	4/13/2017	12.54	9.24	3.3	30.71	1480	1.3	-42	19
	6/28/2017	12.54	8.53	4.01	26.69	1538	0.19	-82.4	6.09
	7/20/2017	12.54	7.45	5.09	27.2	1540	0.33	-94	5.27
	8/16/2017	12.54	7.33	5.21	27.69	1580	0.43	-53.3	3.66
	10/13/2017	12.54	7.38	5.16	27.95	1700	0.28	-72.1	3.96
	4/13/2018	12.54	8.02	4.52	24.90	1590	0.61	-36.3	17.3
	9/12/2018	12.54	7.05	5.49	27.46	1960	0.83	-44.2	4.34
BBS-CCR-1	6/24/2016	7.79	3.51	4.28	25.48	3940	0.10	-49.1	8.01
(DOWNGRADIENT)	7/27/2016	7.79	5.00	2.79	26.41	4180	0.22	-74.1	3.88
	8/26/2016	7.79	5.06	2.73	27.05	4000	0.14	-34.8	2.08
	10/28/2016	9.82	6.78	3.04	25.78	4060	0.10	-107	3.22
	11/10/2016	9.82	7.38	2.44	25.70	4290	0.10	-136	0.89
	1/26/2017	9.82	7.46	2.36	24.03	4320	0.10	-110	1.99
	4/13/2017	9.82	7.64	2.18	23.70	4170	0.10	-80.4	4.12
	6/28/2017	9.82	7.41	2.41	25.54	4063	0.27	-80.6	3.63
	7/20/2017	9.82	5.86	3.96	25.81	3960	0.10	-122	1.58
	8/16/2017	9.82	7.03	2.79	25.80	4110	0.28	-109	1.88
	10/13/2017	9.82	7.32	2.50	26.57	4260	0.24	-83.3	0.89
	4/13/2018	9.82	7.40	2.42	24.90	4170	0.11	-61.6	3.76
	9/12/2018	9.82	6.75	3.07	26.10	4120	0.20	-74.9	9.47

Table 3: Summary of Baseline and Detection Monitoring Groundwater Analytical Results

TEC Big Bend Station Economizer Ash and Pyrite Pond System

Gibsonton, FL

					Field Param	eters			
Well ID	Sample Date	Top of Casing Elevation (a)	Depth to Water	Groundwater Elevation	Temperature	Specific Conductivity	Dissolved Oxygen	Redox Potential	Turbidity
wen id	Sample Date	ft NAVD 88	ft BTOC	ft NAVD 88	С	umhos/cm	mg/L	mV	NTU
		Result	Result	Result	Result	Result	Result	Result	Result
BBS-CCR-2	6/24/2016	8.14	3.45	4.69	25.62	1580	0.10	-71	4.9
(DOWNGRADIENT)	7/27/2016	8.14	5.30	2.84	26.42	1700	0.13	-67.4	7.16
	8/26/2016	8.14	5.35	2.79	27.35	1570	0.10	-27.3	3.31
	10/28/2016	9.34	6.78	2.56	25.64	1500	0.10	-183	3.73
	11/10/2016	9.34	6.88	2.46	25.66	1540	0.13	-186	7.1
	1/26/2017	9.34	6.93	2.41	24.27	1560	0.10	-182	4.93
	4/13/2017	9.34	7.15	2.19	23.95	1540	0.10	-138	3.43
	6/28/2017	9.34	6.97	2.37	25.12	1485	0.24	-131	4.71
	7/20/2017	9.34	5.06	4.28	25.74	1630	0.10	-154	4.56
	8/16/2017	9.34	6.53	2.81	26.43	1560	0.25	-233	3.22
	10/13/2017	9.34	6.88	2.46	26.46	1350	0.20	-188	3.03
	4/13/2018	9.34	6.89	2.45	24.60	1360	0.20	-92	2.96
	9/12/2018	9.34	6.23	3.11	26.74	1520	0.24	-38.8	3.43
BBS-CCR-3	6/24/2016	6.78	1.51	5.27	26.62	1580	0.54	-145	11.5
(DOWNGRADIENT)	7/27/2016	6.78	3.60	3.18	27.28	1740	0.10	-74.4	8.04
	8/26/2016	6.78	3.48	3.30	27.07	1690	0.15	-155	6.35
	10/28/2016	9.20	6.54	2.66	26.20	1640	0.10	-266	3.26
	11/10/2016	9.20	6.77	2.43	26.10	1650	0.10	-239	1.18
	1/26/2017	9.20	6.81	2.39	24.25	1510	0.11	-168	1.79
	4/13/2017	9.20	7.13	2.07	24.27	1580	0.14	-114	4.22
	6/28/2017	9.20	6.64	2.56	26.15	1755	0.28	-125	0.94
	7/20/2017	9.20	4.77	4.43	26.73	1750	0.17	-122	0.51
	8/16/2017	9.20	6.04	3.16	26.86	1790	0.29	-206	0.47
	10/13/2017	9.20	6.52	2.68	27.18	1750	0.37	-249	2.39
	4/13/2018	9.20	6.63	2.57	24.06	1810	0.19	-101	3.79
	9/12/2018	9.20	5.79	3.41	26.88	1690	0.52	-105	3.47

						Арј	pendix I	II Pa	rameter	rs.									A	Apper	ndix IV F	Parar	neters					
Well ID	Sample Date	pН	Boron		Calcium		Chloride		Fluoride		Sulfate		TDS		Antimony		Arsenic		Barium		Beryllium	l	Cadmium		Chromium	1	Cobalt	
weirin	Sample Date	SU	mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	I
		Result	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
BBS-CCR-BW1	6/24/2016	6.51	59.1		781		1140	J-	0.199		1440	J-	5050	J-	0.600	U	10.2		72.9		0.200	U	0.100	U	1.60	U	1.40	Ι
(BKGD)	7/27/2016	6.38	56.9		737		1120		0.11		1510		4190	(-)	0.600	U	8.10		68.2		0.200	U	0.100	U	1.60	U	1.33	Ι
	8/26/2016	6.41	53.7	V	729		1030		0.18		1420		4290		1.77	Ι	8.89		61.4		0.200	U	0.100	U	1.60	U	1.52	Ι
	10/28/2016	6.50	51.4		675	V	939	V	0.194		1400		4120	J-	6.00	U	3.20	U	60		0.200	U	1.00	U	1.60	U	0.963	Ι
	11/10/2016	6.52	49.7		692		993	V	0.261		1440		4170	J-	0.600	U	8.49		61.2		0.200	U	0.100	U	1.60	U	1.45	Ι
	1/26/2017	6.46	45.9		728		942	V	0.315		1520		4510	J	0.600	U	0.32	U	54.6		0.200	U	0.100	U	1.60	U	1.5	Ι
	4/13/2017	6.49	49.0		693		934		0.256		1550		4060	J	0.600	U	8.61		53.6		0.200	U	0.108	Ι	3.23	Ι	2.00	U
	6/28/2017	6.47	51.7		781		995		0.298		1510		4430		0.600	U	7.68		55.4		0.200	U	0.124	Ι	2.29	Ι	1.71	Ι
	7/20/2017	6.49	47.0		744	V	915	V	0.255	J	1470		4160	J	6.00	U	8.48	Ι	51.7		0.200	U	1.00	U	2.16	Ι	1.97	Ι
	8/16/2017	6.52	48.0		743		793		0.01	U	1320		4340		0.600	U	6.60		55.6		0.200	U	0.100	U	2.48	J	1.66	J
	10/13/2017	6.55	44.2		691		809		0.334		217		3890		0.600	U	9.06		55.8		0.200	U	0.100	U	1.60	U	1.86	J
	4/13/2018	6.51	36.9		694		874		0.346		1380		4000		0.600	U	8.76		52.3		0.200	U	0.145		3.90		1.87	
	9/12/2018	6.51	33.2		664		737		0.818		1290		3740		0.600	U	10.1		51.5		0.500	U	0.203	Ι	1.60		1.88	Ι
BBS-CCR-BW2	6/24/2016	6.53	3.89		313		123		0.409		414		1230		0.600	U	2.65		51.3		0.200	U	0.100	U	1.60	U	1.00	U
(BKGD)	7/27/2016	6.48	4.25		271		116		0.432		341		1060		0.600	U	1.75	Ι	49.8		0.200	U	0.100	U	1.60	U	0.14	Ι
, , , , , , , , , , , , , , , , , , ,	8/26/2016	6.48	3.70	V	237		116		0.455		276		980		0.600	U	2.03		43.2		0.200	U	0.100	U	1.60	U	0.153	Ι
	10/28/2016	6.67	3.90		238	J-,V	125	V	0.44		246		1010		0.600	U	1.62	Ι	46.3		0.200	U	0.100	U	1.60	U	0.151	Ι
	11/10/2016	6.68	3.75		243	,	129	V	0.464		255		966	J-	0.600	U	2.59		45.8		0.200	U	0.100	U	1.60	U	0.157	Ι
	1/26/2017	6.62	3.27		240		145	V	0.472		255		1140		0.600	U	0.709	Ι	38.8		0.200	U	0.100	U	1.60	U	0.136	Ι
	4/13/2017	6.67	4.08		260		140		0.478		323		1120		0.600	U	1.45	Ι	42.7		0.200	U	0.100	U	1.60	U	2.00	U
	6/28/2017	6.64	4.54	J-	290	J-	135		0.559		402		1170		0.600	U	1.68	Ι	48.8		0.200	U	0.100	U	1.68	Ι	0.0959	Ι
	7/20/2017	6.66	4.57		278	V	123	V	0.319	J	41.7		1200		6.00	U	3.20	U	47.7		0.22	U	1.00	U	2.26	Ι	0.400	U
	8/16/2017	6.68	4.39		287		117		0.352		462		1180	J	0.600	U	1.80	J	49.9		0.200	U	0.100	U	1.60	U	0.11	J
	10/13/2017	6.70	4.08		321		84.9		0.513		632		1330		0.600	U	2.01		56.2		0.254	J	0.100	U	1.60	U	0.129	J
	4/13/2018	6.69	2.93		297		83.2		0.457		458		1190		0.600	U	4.63		46.9		0.200	U	0.100	U	1.60	U	0.247	
	9/12/2018	6.60	2.64	V	344		148		0.338	I, V	638		1500		0.600	U	5.01		63.6		0.500	U	0.100	U	1.60	U	0.285	Ι
BBS-CCR-1	6/24/2016	6.80	14.4		541		619		0.211	-	1240		3060	J	0.600	U	8.74		122		0.200	U	0.100	U	1.60	U	1.00	U
(DOWNGRADIENT)	7/27/2016	6.67	0.306		227		742	J-	0.128		1320	J-	3140		1.03	Ι	7.38		30.8		0.200	U	0.100	U	1.60	U	0.45	Ι
· · · · · ·	8/26/2016	6.71	11.4		556		695		0.454		1240		2980		0.600	U	7.94		115		0.200	U	0.100	U	1.60	U	0.485	
	10/28/2016	6.83	15.7		556	V	743	J-	0.104		1230	J-	3170	J-	0.600	U	8.30		122		0.200	U	0.100	U	1.60	U	0.507	Ι
	11/10/2016	6.82	16.2		606		817	V	0.0871		1290		3470	J-	0.600	U	8.93		129		0.200	U	0.100	U	1.60	U	0.519	Ι
	1/26/2017	6.79	15.5	J-	579	J-	820	V	0.184		1350		3670	J	0.602	Ι	9.04		115		0.200	U	0.100	U	1.60	U	0.489	Ι
	4/13/2017	6.84	16.4		555		124		0.17		443		3110	J	0.600	Ū	10.53		116	Ι	2.00	Ū	0.100	Ū	1.60	Ū	2.00	Ū
	6/28/2017	6.78	16.5		569		720		0.208		1120		3140	-	0.600	Ū	9.76		113	-	0.200	Ū	0.100	Ū	1.93	Ī	0.484	Ī
	7/20/2017	6.81	16.0		576	V		J-, V	0.157	J	1390		3400	J	3.00	Ū	10.3		112		0.200	Ū	0.500	Ū	1.62	Ī	0.495	Ī
	8/16/2017	6.82	17.0		572	•	710	- , .	0.2	2	1240		2960	J	0.600	U	9.33		122		0.200	U	0.100	U	1.60	Ū	0.473	J
	10/13/2017	6.83	19.9		596		716		0.201		1210		3470	v	0.600	U	9.03		122		0.200	Ũ	0.100	U	1.60	U	0.453	J
	4/13/2018	6.83	19.6		577		714		0.21		1290		3230		0.600	Ŭ	8.44		117		0.200	Ū	0.25	2	1.60	I	0.522	-
	9/12/2018	6.80	19.9		549		674		0.235	I, V	1220		3250		0.600	U	9.80		114		0.500	Ŭ	0.100	U	1.60	U	0.556	I
	7/12/2010	0.00			017		571		0.200	-, •			2200		0.000	5	2.00				0.000	U		2	1.00	č	0.000	

Table 3: Summary of Baseline and Detection Monitoring Groundwater Analytical Results

TEC Big Bend Station Economizer Ash and Pyrite Pond System

Gibsonton, FL

				Appendix III Parameters Boron Calcium Chloride Fluoride Sulfate TDS															A	Appen	dix IV	Paran	neters					
Well ID	Sample Date	pН	Boron		Calcium		Chloride		Fluoride		Sulfate		TDS		Antimony		Arsenic		Barium		Berylliun	n	Cadmium		Chromiun	n	Cobalt	
Well ID	Sample Date	SU	mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
		Result	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
BBS-CCR-2	6/24/2016	6.80	1.55		198		118		0.148		471		1170	J-	0.600	U	1.83	Ι	65		0.200	U	0.100	U	1.60	U	1.00	U
(DOWNGRADIENT)	7/27/2016	6.68	2.81		193		140		0.183		542		1170		0.83	Ι	0.99	Ι	64.8		0.200	U	0.100	U	1.60	U	0.09	Ι
	8/26/2016	6.74	2.86		192		124		0.15		484		1120		0.600	U	1.25		61.4		0.200	U	0.100	U	1.60	U	0.0776	
	10/28/2016	6.87	2.08		181	V	112	V	0.171		468		1130		0.600	U	1.16	Ι	60.6		0.200	U	0.100	U	1.60	U	0.107	Ι
	11/10/2016	6.89	2.28		181		111	V	0.168		468		1110		0.600	U	1.37	Ι	62.4		0.200	U	0.100	U	1.60	U	0.105	Ι
	1/26/2017	6.89	3.86		172		115	J+	0.248	J+	490	J-	1140		0.600	U	1.09	Ι	54.6		0.200	U	0.100	U	1.60	U	0.0902	Ι
	4/13/2017	6.93	5.01		163		119		0.237		485	J-	1150		0.600	U	2.64		55.8		0.200	U	0.100	U	2.29	Ι	2.00	U
	6/28/2017	6.87	3.20		173		105		0.214		415	J-	1080		0.600	U	1.01	Ι	54.6		0.200	U	0.100	U	1.96	Ι	0.0875	Ι
	7/20/2017	6.97	4.94		178	V	114	V	0.166	J	481		1140		0.600	U	0.974	Ι	54.6		0.423	U	0.100	U	3.11	Ι	0.0857	Ι
	8/16/2017	6.92	4.32		171		113		0.155		459		1080		1.20	U	1.02	J	56.8		0.200	U	0.200	U	1.60	U	0.15	J
	10/13/2017	6.87	0.888		169		70.9		0.182		432		1030		0.600	U	1.14		53.3		0.200	U	0.100	U	1.60	U	0.115	J
	4/13/2018	6.86	0.966		183		74.8		0.238		436		1000		0.600	U	0.849		49.2		0.200	U	0.100	U	1.60	U	0.108	
	9/12/2018	6.29	0.177	J-, V	218		88.7		0.298	I, V	375		1060		0.600	U	1.34	Ι	65.2	J-	0.500	J-, U	0.100	U	1.60	J-, U	0.136	U
BBS-CCR-3	6/24/2016	6.42	0.662		187		88.9		0.313		474		1200		0.600	U	1.23	Ι	65.3		0.200	U	0.100	U	1.60	U	1.00	U
(DOWNGRADIENT)	7/27/2016	6.19	13.2		196		140		0.262		516		1220		0.77	Ι	0.54	Ι	67.6		0.200	U	0.100	U	1.60	U	0.09	Ι
	8/26/2016	6.29	0.54	V	200		136		0.286		517		1210		0.600	U	0.603	Ι	63.6		0.272	Ι	0.100	U	1.60	U	0.125	Ι
	10/28/2016	6.42	0.532		201	V	140	V	0.299		541		1220		0.600	U	0.623	Ι	66.3		0.200	U	0.100	U	1.60	U	0.124	Ι
	11/10/2016	6.46	0.502		200		129	V	0.331		492		1220		0.600	U	0.765	Ι	63		0.200	U	0.100	U	1.60	U	0.117	Ι
	1/26/2017	6.42	0.381		176		129	V	0.391		454		1200		0.600	U	0.32	U	56.2		0.200	U	0.100	U	1.60	U	0.0989	Ι
	4/13/2017	6.49	0.385		176		124		0.415		443		1120		0.600	U	0.32	U	58.6		0.200	U	0.100	U	1.60	U	2.00	U
	6/28/2017	6.38	0.184		192		168		0.338		493		1280		0.600	U	0.525	Ι	61.8		0.200	U	0.100	U	3.12	Ι	0.119	Ι
	7/20/2017	6.36	0.211		205	J-, V	158	V	0.23	J	506		1310		3.00	U	1.60	U	63.4		0.356	U	0.500	U	3.43	Ι	0.200	U
	8/16/2017	6.42	0.266		187		156		0.338		484		1290		0.600	U	0.536	J	59.8		0.200	U	0.100	U	2.02	J	0.123	J
	10/13/2017	6.44	0.373		190		153		0.333		503		1310		0.600	U	0.665	J	59.3		0.200	U	0.100	U	1.60	U	0.115	J
	4/13/2018	6.41	0.180		206		168		0.372		506		1310		0.600	U	0.365		66.1		0.200	U	0.100	U	4.67		0.154	
	9/12/2018	6.41	0.398	V	191		132		0.309	I, V	469		1200		0.600	U	0.613	Ι	62.8		0.500	U	0.100	U	1.60	U	0.136	

							A	ppendix IV	Para	ameters					
Well ID	Sample Date	Lead		Lithium		Mercury		Molybdenum		Radium 226/228		Selenium		Thallium	l
wen ib	Sample Date	ug/L		ug/L		ug/L		ug/L		pCi/L		ug/L		ug/L	
		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
BBS-CCR-BW1	6/24/2016	0.0800	U	8.9	Ι	0.0500	U	4.46	Ι	38		2.09		0.118	Ι
(BKGD)	7/27/2016	0.200	Ι	20	Ι	0.0500	U	2.88	Ι	35		1.92	Ι	0.100	U
	8/26/2016	0.111	Ι	7.4	Ι	0.0500	U	11.1	Ι	31		1.73	Ι	0.100	U
	10/28/2016	0.800	U	11	Ι	0.0500	U	6	Ι	32.3		2.00	U	1.00	U
	11/10/2016	0.102	Ι	10	Ι	0.0500	U	6.58	Ι	29.9		2.51		0.100	U
	1/26/2017	0.113	Ι	18	Ι	0.0500	U	7.16	Ι	32.5		0.2	U	0.100	U
	4/13/2017	0.129	Ι	39.7		0.0500	U	15.6	Ι	39.7		1.62	Ι	0.100	U
	6/28/2017	0.0800	U	15	U	0.0500	U	16.3	U	37.8		1.81	Ι	0.100	U
	7/20/2017	0.800	U	17	Ι	0.0500	U	13.6	Ι	37.2		2.00	U	1.00	U
	8/16/2017	0.291	J	0.05	U	0.0500	U	1.43	J	30.1		1.76	J	0.100	U
	10/13/2017	0.103	J	17	V	0.0500	U	4.27	J	22.1		2.14	J	0.100	U
	4/13/2018	0.236		26		0.0500	U	8.65		36.3		2.66		0.101	
	9/12/2018	0.141	Ι	17	Ι	0.0500	U	22.5		23.6		1.83	Ι	0.126	Ι
BBS-CCR-BW2	6/24/2016	0.0800	U	3.8	Ι	0.0500	U	2.4	Ι	4.8		0.722	Ι	0.100	U
(BKGD)	7/27/2016	0.0800	U	9.1	Ι	0.0500	U	1	U	5.1	J	0.76	Ι	0.100	U
	8/26/2016	0.0800	U	2	Ι	0.0500	U	7.57		4		0.577	Ι	0.100	U
	10/28/2016	0.0800	U	3.8	Ι	0.0500	U	1.42	Ι	4.8		0.489	Ι	0.100	U
	11/10/2016	0.0800	U	1.7	Ι	0.0500	U	1	U	8		0.485	Ι	0.100	U
	1/26/2017	0.0800	U	5.2	Ι	0.0500	U	2.56	Ι	4.8	J	0.26	Ι	0.100	U
	4/13/2017	0.0800	U	3.4		0.0500	U	9.65	Ι	4.5		0.539	Ι	0.100	U
	6/28/2017	0.0800	U	5.2	Ι	0.0500	U	10.2	U	4.8		0.386	Ι	0.100	U
	7/20/2017	0.800	U	5.9	Ι	0.0500	U	8.9	Ι	4.4		2.00	U	1.00	U
	8/16/2017	0.101	J	0.05	U	0.0500	U	4.08	J	4.9		0.42	J	0.100	U
	10/13/2017	0.0800	U	8.2	I,V	0.0500	U	2.51	J	4.9		0.523	J	0.100	U
	4/13/2018	0.112		9.9		0.0500	U	3.28		4.7		0.666		0.100	U
	9/12/2018	0.0800	U	6.2	Ι	0.0500	U	2.50	U	3.7		0.563	Ι	0.100	U
BBS-CCR-1	6/24/2016	0.0800	U	8.3	Ι	0.0500	U	106		39		0.696	Ι	0.100	U
(DOWNGRADIENT)	7/27/2016	0.110	Ι	15	Ι	0.0500	U	105		33		0.96	Ι	0.100	U
	8/26/2016	0.0800	U	7.4	Ι	0.0500	U	80.3		15		0.385		0.100	U
	10/28/2016	0.0800	U	12	Ι	0.0500	U	95.5		42.6		0.69	Ι	0.100	U
	11/10/2016	0.0800	U	8.4	Ι	0.0500	U	98.4		37.3		1.04	Ι	0.100	U
	1/26/2017	0.0800	U	14	Ι	0.0500	U	92.4		32.5		0.653	Ι	0.100	U
	4/13/2017	0.0979	Ι	10	Ι	0.0500	U	124	Ι	35.8	Ι	0.937	Ι	0.100	U
	6/28/2017	0.0800	U	13	Ι	0.0500	U	96.5	Ι	41.4		0.756	Ι	0.100	U
	7/20/2017	0.400	U	14	I, J3	0.0500	U	99.6		34.7		2.25	Ι	0.500	U
	8/16/2017	0.0800	U	0.05	U	0.0500	U	86.4		33.4		0.918	J	0.100	U
	10/13/2017	0.0800	U	15	I,V	0.0500	U	82.5		35.6		0.99	J	0.100	U
	4/13/2018	0.328		22		0.0500	U	74.8		34		0.908		0.100	U
	9/12/2018	0.0800	U	16	Ι	0.0500	U	73.4		34.7		0.721	Ι	0.100	U

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Table 3: Summary of Baseline and Detection Monitoring Groundwater Analytical Results

TEC Big Bend Station Economizer Ash and Pyrite Pond System

Gibsonton, FL

							A	ppendix IV	Para	meters					
Well ID	Sample Date	Lead		Lithium		Mercury		Molybdenum		Radium 226/228		Selenium		Thallium	
wen ib	Sample Date	ug/L		ug/L		ug/L		ug/L		pCi/L		ug/L		ug/L	
		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
BBS-CCR-2	6/24/2016	0.0800	U	10	Ι	0.0500	U	1.73	Ι	15		0.376	Ι	0.100	U
(DOWNGRADIENT)	7/27/2016	0.110	Ι	17	Ι	0.0500	U	1	U	13.2		0.28	Ι	0.100	U
	8/26/2016	0.0800	U	11	Ι	0.0500	U	7.78		32		0.200	U	0.100	U
	10/28/2016	0.129	Ι	14	Ι	0.0500	U	1	U	14.9		0.333	Ι	0.100	U
	11/10/2016	0.0955	Ι	11	Ι	0.0500	U	1.43	Ι	14.8		0.259	Ι	0.100	U
	1/26/2017	0.0800	U	13	Ι	0.0500	U	2.52	Ι	13.9		0.200	U	0.100	U
	4/13/2017	0.176	Ι	13	Ι	0.0500	U	9.82	Ι	14.2		0.200	U	0.100	U
	6/28/2017	0.144	Ι	14	Ι	0.0500	U	9.59	U	14.7		0.200	U	0.100	U
	7/20/2017	0.127	Ι	16	Ι	0.0500	U	9.88	Ι	14.4		0.474	Ι	0.100	U
	8/16/2017	0.244	J	0.05	U	0.0500	U	3.02	J	12.1		0.662	J	0.200	U
	10/13/2017	0.150	J	16	I,V	0.0500	U	1.99	J	13.5		0.474	J	0.100	U
	4/13/2018	0.167		17		0.0500	U	2.69		17.4		0.395		0.100	U
	9/12/2018	0.102	Ι	13	Ι	0.0500	U	2.50	J-, U	15.3		0.509	U	0.100	U
BBS-CCR-3	6/24/2016	0.125	Ι	3.7	Ι	0.058	Ι	4.09	Ι	10.3		0.262	Ι	0.100	U
(DOWNGRADIENT)	7/27/2016	0.0800	Ι	11	Ι	0.0500	U	2.23	Ι	12.3		0.27	Ι	0.100	U
	8/26/2016	0.0800	U	6.1	Ι	0.0500	U	8.1		15		0.200	U	0.100	U
	10/28/2016	0.107	Ι	8.2	Ι	0.0500	U	3.63	Ι	18.1		0.200	U	0.100	U
	11/10/2016	0.0800	U	6.1	Ι	0.0500	U	3.9	Ι	17.5		0.253	Ι	0.100	U
	1/26/2017	0.0800	U	7.7	Ι	0.0500	U	5.42	Ι	15		0.200	U	0.100	U
	4/13/2017	0.0800	U	6.3	Ι	0.0500	U	11.7	Ι	14.4		0.200	U	0.100	U
	6/28/2017	0.0800	U	5.2	Ι	0.0500	U	11.9	U	17.7		0.200	U	0.100	U
	7/20/2017	0.400	U	10	Ι	0.0500	U	10.6	Ι	20.3		1.00	U	0.500	U
	8/16/2017	0.0800	U	0.05	U	0.0500	U	3.14	J	19.6		0.200	U	0.100	U
	10/13/2017	0.0800	U	11	I,V	0.0500	U	3.82	J	20		0.285	J	0.100	U
	4/13/2018	0.0911		15		0.0500	U	3.64		19.9		0.357		0.100	U
	9/12/2018	0.0800	U	11	Ι	0.0500	U	3.99	Ι	14.8		0.509	U	0.100	U

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Abbreviations:

Q - Data qualifier C - Celsius ft BTOC - feet below top of well casing mg/L - milligrams per liter SU - Standard units ft NAVD 88 - feet elevation in North American Vertical Datum 1988 ug/L - micrograms per liter umhos/cm - micromohs per centimeter mV - millivolts pCI/L - picocuries per liter

Notes:

1. U: Laboratory qualifer - Indicates that the compound was not detected above the reporting limit.

2. I: Laboratory qualifier - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit; estimated value

3. J(-): Laboratory gualifier - The reported value is an estimated value.

4. J: Data validation qualifer - The analyte was postively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

5. UJ: Data validation qualifer - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

6. J-: Data validation qualifer - The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

7. V: Analyte detected in the method blank.

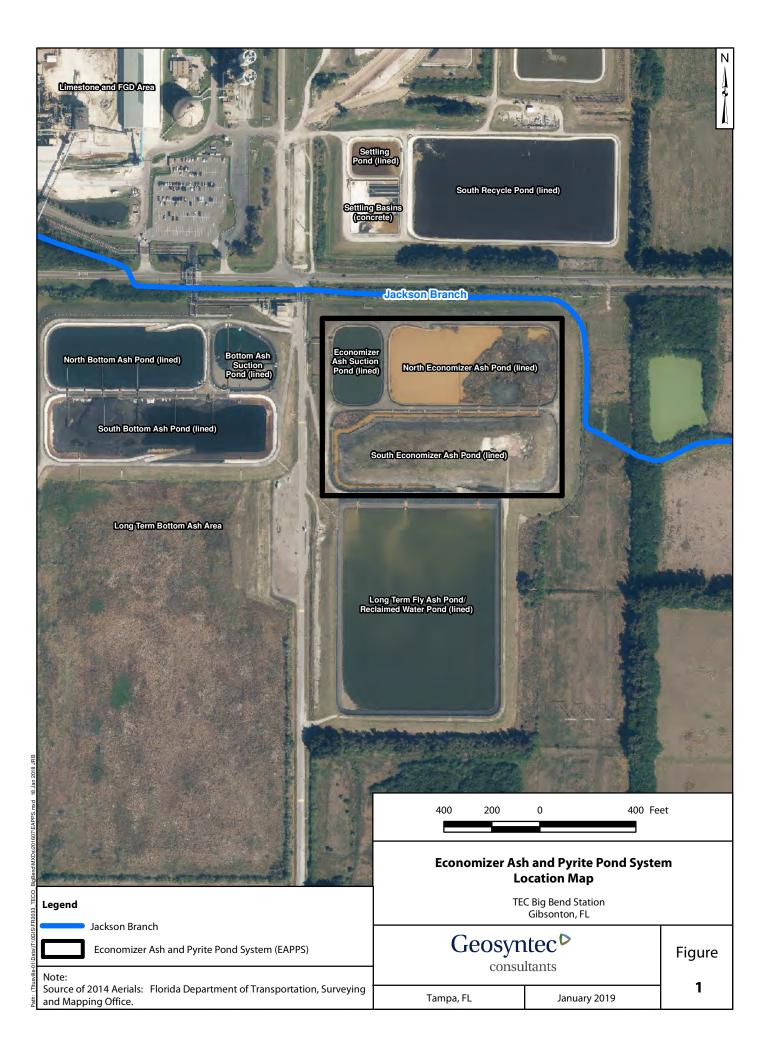
8. Q: Laboratory qualifer- Re-analysis of sample beyond the accepted holding time.

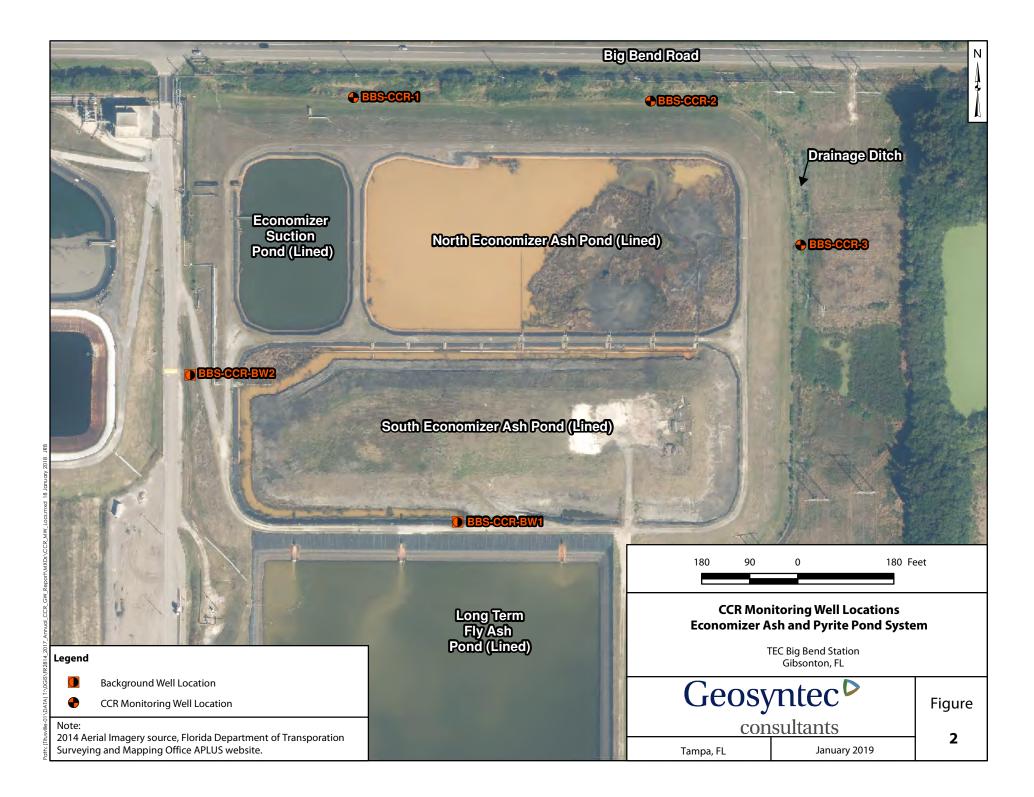
9. J3: Laboratory qualifer - Estimated value; value may not be accurate. Spike recovery or RPD outside of

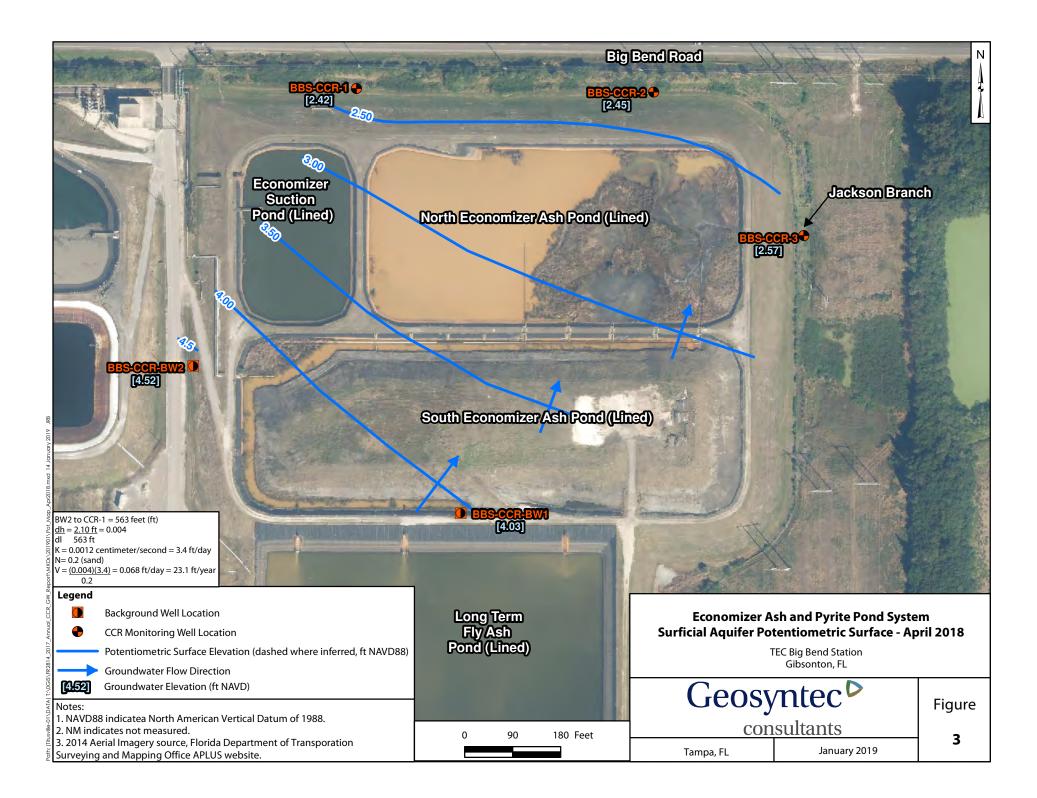
(a) - Top of well casings revised in September 2016 once final aboveground completions were constructed. The additional PVC stickup was measured and added to the original surveyed top of casing elevation.

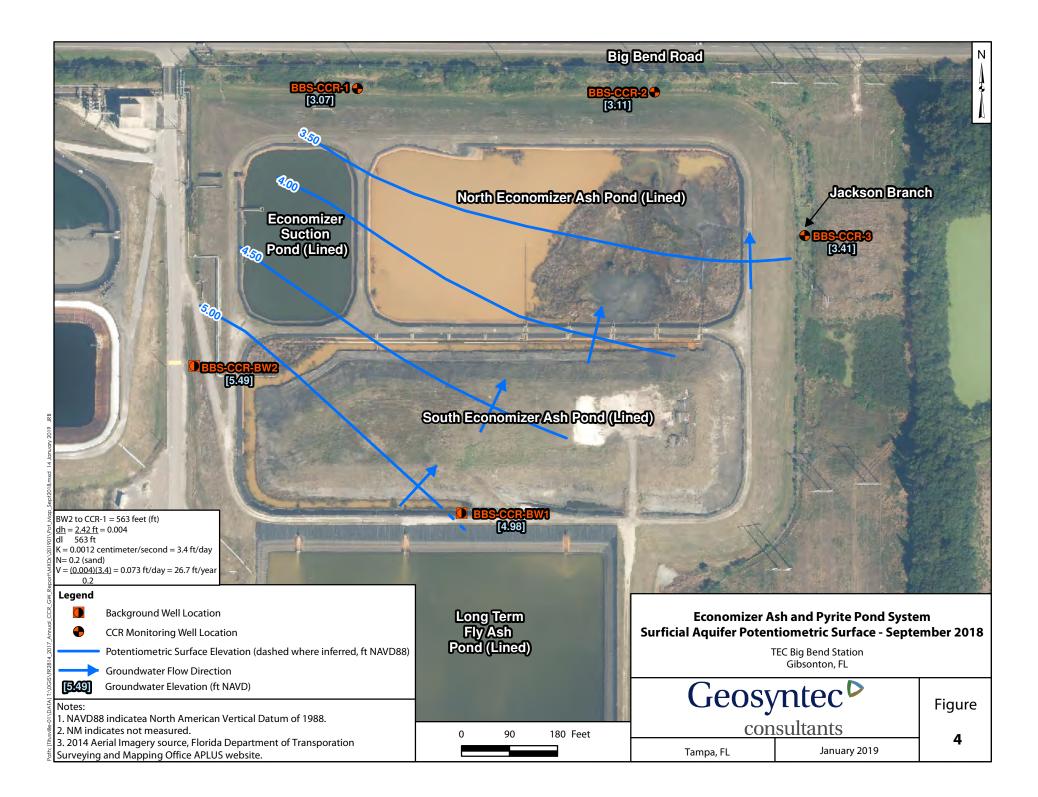
2018 Annual Groundwater Monitoring Corrective Action Report

FIGURES









APPENDIX A

Laboratory Analytical Data Report – Second Detection Monitoring Event (April 2018)



Tampa Electric Laboratory Services

5012 Causeway Blvd Tampa Fl. 33619 * Ph (813)630-7490 * Fax (813)630-7360 * DOH #E54272

	Case Narrative	
Work Order - L18D079	Project - CCR Wells Economizer Ash Pond	
tleastley@tecoenergy.com		
Apollo Beach, FL 33572		
13031 Wyandott Rd		
Terry Eastley		
Big Bend Power Station	Report Date:	05/03/18 11:00

5 sample(s) were received on 04/13/18 14:43.

There were no issues noted with the sample(s) associated with this workorder unless noted below.

Radiological Analysis for sample BBS-CCR2 was lost in the laboratory during analysis. This sample was resampled on 4/25/2018. The report is attached under workorder number L18D118.

EPA 300.0

The recovery of the matrix spike and spike duplicate for Chloride and Sulfate was below the control limits due to matrix interference. The parent sample is flagged with a J qualifier.

SM 2540C

A constant weight could not be acheived after three consectutive weighing and drying cycles for samples BBS-CCR-3. The sample(s) are flagged with a J qualifier.

Laboratory Services certifies that the test result in this report meet all requirements of the latest promulgated TNI standards, unless indicated otherwise in the body of the report. Unless otherwise noted, all methods followed are per the most current published version of 40 CFR Part 136, Table B. Results reported on this report pertain to the above referenced sample only.



5012 Causeway Blvd Tampa Fl. 33619 * Ph (813)630-7490 * Fax (813)630-7360 * DOH #E54272

		Sam	ple Infor	matior	1				
Client: Big Ber	nd Power Station		-						
Lab Sample ID: L18D07					S	ampled	By: Robert Bart	helette	
Sample Description: BBS-CO						•	•	4/13/18	3.23
Sample Collection Method: Grab Date of Sample Receipt: 4/13/18 14:43									
Sample Concetion Wethod.	0140	Lak		D 14 .				15/10 14	.+
			oratory l	Kesuits	8				
Sample Qualifier:									
Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
	J	Fampa Elec	tric Compa	ny, Labo	oratory Ser	vices			
General Chemistry Paramete	rs								
Chloride	714	mg/L	0.400	10.0	J-,V	20	EPA 300.0	TMH	4/13/18 19:02
Specific Conductance	4170	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	4/13/18 13:23
Dissolved Oxygen	0.110	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	4/13/18 13:23
Fluoride	0.210	mg/L	0.0100	0.0500	V	1	EPA 300.0	TMH	4/13/18 18:52
рН	6.83	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	4/13/18 13:23
REDOX Potential	-61.6	mV	-999	-999		1	SM 2580B	RAB	4/13/18 13:23
Total Dissolved Solids	3230	mg/L	24.0	40.0		2	SM 2540C	NLT	4/16/18 14:40
Sulfate	1290	mg/L	10.0	40.0	J-	20	EPA 300.0	TMH	4/13/18 19:02
Turbidity	3.76	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	4/13/18 13:23
Total Mercury by SW846 Me								DI G	
Mercury	0.0500	ug/L	0.0500	0.200	U	1	EPA 7470A	RLC	4/16/18 14:31
Total Recoverable Metals by 2									
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	RLC	4/16/18 6:44
Arsenic	8.44	ug/L	0.320	2.00	171	1	EPA 200.8	RLC	4/16/18 6:44
Cadmium	0.250	ug/L	0.100	0.500	V,I	1	EPA 200.8	RLC	4/16/18 6:44
Cobalt	0.522	ug/L	0.0400	2.00	V,I	1	EPA 200.8	RLC	4/16/18 6:44
Lead	0.000328	mg/L	8.00E-5	0.00200	V,I	1	EPA 200.8	RLC	4/16/18 6:44
Selenium	0.908	ug/L	0.200	2.00	I	1	EPA 200.8	RLC	4/16/18 6:44
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	RLC	4/16/18 6:44
Total Recoverable Metals by S			0.000500	0.0200		1		DLC	4/16/19 7.52
Barium Beryllium	0.117 0.200	mg/L	0.000500	0.0200	U	1 1	EPA 6010B	RLC	4/16/18 7:53 4/16/18 7:53
-		ug/L	0.200	2.00	U		EPA 6010B	RLC	
Boron Calcium	19.6 577000	mg/L	0.0100	0.0500	v	1 1	EPA 6010B EPA 6010B	RLC RLC	4/16/18 7:53 4/16/18 6:30
Chromium	1.60	ug/L	30.0 1.60	1000 12.0	V I	1	EPA 6010B	RLC	4/16/18 6:30
Molybdenum	74.8	ug/L ug/L	1.00	20.0	1	1	EPA 6010B EPA 6010B	RLC	4/16/18 7:53
	/ ٦.0	ug/L		boratory	v	1	LINGUID	NLC.	ті 10/10 /.33
Radium - 226				soi atoi y	,				
Rad - 226	29.3	pCi/L	0.5	0.5		1	EPA 903.0	KL1	4/25/18 12:08
Rad - 226 Counting Error +/-	1.6	pCi/L				1	EPA 903.0	KL1	4/25/18 12:08
<u>Radium - 228</u>									
Rad - 228	4.7	pCi/L	0.7	0.7		1	EPA Ra-05	KL1	4/27/18 11:46
Rad - 228 Counting Error +/-	0.8	pCi/L				1	EPA Ra-05	KL1	4/27/18 11:46



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Sample Information

			-p00		_				
Client:	Big Bend Power Station								
Lab Sample ID:	18D079-01					Sampled I	By: Robert B	arthelette	
Sample Description: E	BBS-CCR-1					Date and	Time Collected:	4/13/18	13:23
Sample Collection Metho			4/13/18 14	18 14:43					
		Lat	ooratory	Results	5				
Sample Qualifier:									
					Qualifie	r	Test		Analysis
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time
Radium-226/228									
Rad-226/228	34.0	pCi/L	0.7	0.7		1	Calc	KL1	4/27/18 11:46
Rad-226/228 Counting Error	+/- 1.6	pCi/L				1	Calc	KL1	4/27/18 11:46
			TestAmer	ica Pensa	cola				
<u>Metals (ICP)</u>									
Lithium	0.022	mg/L	0.0010	0.050	Ι	1	6010B Z01	GESP	4/19/18 14:32



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Sample Information

Client:	Big Bend Power Station	
Lab Sample ID:	L18D079-02	Sampled By: Robert Barthelette
Sample Description:	BBS-CCR-2	Date and Time Collected: 4/13/18 12:51
Sample Collection Me	thod: Grab	Date of Sample Receipt: 4/13/18 14:43

Laboratory Results

Sample Qualifier:

r ·					Qualifier		Test		Analysis
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time
]	Fampa Elec	tric Compa	iny, Labo	ratory Sei	vices			
General Chemistry Parame	ters								
Chloride	74.8	mg/L	0.0200	0.500	V	1	EPA 300.0	TMH	4/13/18 19:59
Specific Conductance	1360	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	4/13/18 12:51
Dissolved Oxygen	0.200	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	4/13/18 12:51
Fluoride	0.238	mg/L	0.0100	0.0500	V	1	EPA 300.0	TMH	4/13/18 19:59
pН	6.86	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	4/13/18 12:51
REDOX Potential	-92.0	mV	-999	-999		1	SM 2580B	RAB	4/13/18 12:51
Total Dissolved Solids	1000	mg/L	24.0	40.0		2	SM 2540C	NLT	4/16/18 14:40
Sulfate	436	mg/L	10.0	40.0		20	EPA 300.0	TMH	4/13/18 19:59
Turbidity	2.96	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	4/13/18 12:51
Total Mercury by SW846 M	lethod 7470/7471								
Mercury	0.0500	ug/L	0.0500	0.200	U	1	EPA 7470A	RLC	4/16/18 14:35
Total Recoverable Metals by	y 200 Series								
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	RLC	4/16/18 6:46
Arsenic	0.849	ug/L	0.320	2.00	Ι	1	EPA 200.8	RLC	4/16/18 6:46
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	RLC	4/16/18 6:46
Cobalt	0.108	ug/L	0.0400	2.00	V,I	1	EPA 200.8	RLC	4/16/18 6:46
Lead	0.000167	mg/L	8.00E-5	0.00200	V,I	1	EPA 200.8	RLC	4/16/18 6:46
Selenium	0.395	ug/L	0.200	2.00	Ι	1	EPA 200.8	RLC	4/16/18 6:46
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	RLC	4/16/18 6:46
Total Recoverable Metals by	y SW846 Method	6010B							
Barium	0.0492	mg/L	0.000500	0.0200		1	EPA 6010B	RLC	4/16/18 7:56
Beryllium	0.200	ug/L	0.200	2.00	U	1	EPA 6010B	RLC	4/16/18 7:56
Boron	0.966	mg/L	0.0100	0.0500		1	EPA 6010B	RLC	4/16/18 7:56
Calcium	183000	ug/L	30.0	1000	V	1	EPA 6010B	RLC	4/16/18 6:32
Chromium	1.60	ug/L	1.60	12.0	U	1	EPA 6010B	RLC	4/16/18 7:56
Molybdenum	2.69	ug/L	1.00	20.0	Ι	1	EPA 6010B	RLC	4/16/18 7:56
			TestAmerio	ca Pensac	ola				
Metals (ICP)									
Lithium	0.017	mg/L	0.0010	0.050	Ι	1	6010B Z01	GESP	4/19/18 14:36
		5							



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Sample Information

Client:	Big Bend Power Station		
Lab Sample ID:	L18D079-03	Sampled By: Robert Barthelette	
Sample Description:	BBS-CCR-3	Date and Time Collected: 4/13/18	12:22
Sample Collection Me	thod: Grab	Date of Sample Receipt: 4/13/18 14	4:43

Laboratory Results

Sample Qualifier:

Sample Quamer:					Qualifier		Teat		A
Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
	,	Tampa Elec	tric Compa	ny, Labo	ratory Ser	vices			
General Chemistry Parameter	`S								
Chloride	168	mg/L	0.400	10.0	V	20	EPA 300.0	TMH	4/13/18 20:1
Specific Conductance	1810	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	4/13/18 12:2
Dissolved Oxygen	0.190	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	4/13/18 12:2
Fluoride	0.372	mg/L	0.0100	0.0500	V	1	EPA 300.0	TMH	4/13/18 20:0
pН	6.41	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	4/13/18 12:22
REDOX Potential	-101	mV	-999	-999		1	SM 2580B	RAB	4/13/18 12:22
Total Dissolved Solids	1310	mg/L	24.0	40.0	J-	2	SM 2540C	NLT	4/16/18 14:4
Sulfate	506	mg/L	10.0	40.0		20	EPA 300.0	TMH	4/13/18 20:1
Turbidity	3.79	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	4/13/18 12:22
Total Mercury by SW846 Met	hod 7470/7471								
Mercury	0.0500	ug/L	0.0500	0.200	U	1	EPA 7470A	RLC	4/16/18 14:3
Total Recoverable Metals by 2	00 Series								
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	RLC	4/16/18 6:48
Arsenic	0.365	ug/L	0.320	2.00	Ι	1	EPA 200.8	RLC	4/16/18 6:48
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	RLC	4/16/18 6:48
Cobalt	0.154	ug/L	0.0400	2.00	V,I	1	EPA 200.8	RLC	4/16/18 6:48
Lead	9.11E-5	mg/L	8.00E-5	0.00200	V,I	1	EPA 200.8	RLC	4/16/18 6:48
Selenium	0.357	ug/L	0.200	2.00	Ι	1	EPA 200.8	RLC	4/16/18 6:48
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	RLC	4/16/18 6:48
Total Recoverable Metals by S	W846 Method	<u>6010B</u>							
Barium	0.0661	mg/L	0.000500	0.0200		1	EPA 6010B	RLC	4/16/18 7:59
Beryllium	0.200	ug/L	0.200	2.00	U	1	EPA 6010B	RLC	4/16/18 7:59
Boron	0.180	mg/L	0.0100	0.0500		1	EPA 6010B	RLC	4/16/18 7:59
Calcium	206000	ug/L	30.0	1000	V	1	EPA 6010B	RLC	4/16/18 6:34
Chromium	4.67	ug/L	1.60	12.0	Ι	1	EPA 6010B	RLC	4/16/18 7:59
Molybdenum	3.64	ug/L	1.00	20.0	Ι	1	EPA 6010B	RLC	4/16/18 7:59
			KNL La	boratory					
Radium - 226									
Rad - 226	19.3	pCi/L	0.5	0.5		1	EPA 903.0	KL1	4/26/18 12:20
Rad - 226 Counting Error +/-	1.4	pCi/L				1	EPA 903.0	KL1	4/26/18 12:20
<u>Radium - 228</u>									
Rad - 228	0.7	pCi/L	0.7	0.7	U	1	EPA Ra-05	KL1	4/26/18 11:32
Rad - 228 Counting Error +/-	0.5	pCi/L				1	EPA Ra-05	KL1	4/26/18 11:32



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Sample Information

			-p		-					
Client:	Big Bend Power Station									
Lab Sample ID:	18D079-03					Sampled I	By: Robert B	arthelette		
Sample Description: E	BBS-CCR-3					Date and	Time Collected:	4/13/18	12:22	
Sample Collection Metho		Date of Sample Receipt:						4/13/18 14:43		
		Lat	oratory	Results	5					
Sample Qualifier:										
					Qualifie	r	Test		Analysis	
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time	
Radium-226/228										
Rad-226/228	19.9	pCi/L	0.7	0.7		1	Calc	KL1	4/26/18 12:20	
Rad-226/228 Counting Error	+/- 1.4	pCi/L				1	Calc	KL1	4/26/18 12:20	
			TestAmer	ica Pensao	cola					
Metals (ICP)										
Lithium	0.015	mg/L	0.0010	0.050	Ι	1	6010B Z01	GESP	4/19/18 14:39	



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Sample Information

Client:	Big Bend Power Station		
Lab Sample ID:	L18D079-04	Sampled By: Robert E	Barthelette
Sample Description:	BBS-CCR-BW1	Date and Time Collected:	4/13/18 11:51
Sample Collection Met	hod: Grab	Date of Sample Receipt:	4/13/18 14:43

Laboratory Results

Sample Qualifier:

					Qualifier		Test		Analysis
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time
]	Fampa Elec	tric Compa	ny, Labo	ratory Se	rvices			
General Chemistry Parameter	ſS								
Chloride	874	mg/L	0.400	10.0	V	20	EPA 300.0	TMH	4/13/18 20:37
Specific Conductance	4800	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	4/13/18 11:51
Dissolved Oxygen	0.270	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	4/13/18 11:51
Fluoride	0.346	mg/L	0.0100	0.0500	V	1	EPA 300.0	TMH	4/13/18 20:28
рН	6.51	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	4/13/18 11:51
REDOX Potential	-10.3	mV	-999	-999		1	SM 2580B	RAB	4/13/18 11:51
Total Dissolved Solids	4000	mg/L	24.0	40.0		2	SM 2540C	NLT	4/16/18 14:40
Sulfate	1380	mg/L	10.0	40.0		20	EPA 300.0	TMH	4/13/18 20:37
Turbidity	4.26	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	4/13/18 11:51
Total Mercury by SW846 Met	hod 7470/7471								
Mercury	0.0500	ug/L	0.0500	0.200	U	1	EPA 7470A	RLC	4/16/18 14:42
Total Recoverable Metals by 2	00 Series								
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	RLC	4/16/18 6:51
Arsenic	8.76	ug/L	0.320	2.00		1	EPA 200.8	RLC	4/16/18 6:51
Cadmium	0.145	ug/L	0.100	0.500	V,I	1	EPA 200.8	RLC	4/16/18 6:51
Cobalt	1.87	ug/L	0.0400	2.00	V,I	1	EPA 200.8	RLC	4/16/18 6:51
Lead	0.000236	mg/L	8.00E-5	0.00200	V,I	1	EPA 200.8	RLC	4/16/18 6:51
Selenium	2.66	ug/L	0.200	2.00		1	EPA 200.8	RLC	4/16/18 6:51
Thallium	0.101	ug/L	0.100	0.500	V,I	1	EPA 200.8	RLC	4/16/18 6:51
Total Recoverable Metals by S	W846 Method	6010B							
Barium	0.0523	mg/L	0.000500	0.0200		1	EPA 6010B	RLC	4/16/18 8:08
Beryllium	0.200	ug/L	0.200	2.00	U	1	EPA 6010B	RLC	4/16/18 8:08
Boron	36.9	mg/L	0.0100	0.0500		1	EPA 6010B	RLC	4/16/18 8:08
Calcium	694000	ug/L	30.0	1000	V	1	EPA 6010B	RLC	4/16/18 6:37
Chromium	3.90	ug/L	1.60	12.0	Ι	1	EPA 6010B	RLC	4/16/18 8:08
Molybdenum	8.65	ug/L	1.00	20.0	Ι	1	EPA 6010B	RLC	4/16/18 8:08
			KNL La	boratory					
<u>Radium - 226</u>									
Rad - 226	32.2	pCi/L	0.5	0.5		1	EPA 903.0	KL1	4/26/18 12:20
Rad - 226 Counting Error +/-	1.8	pCi/L				1	EPA 903.0	KL1	4/26/18 12:20
<u>Radium - 228</u>		-							
Rad - 228	4.1	pCi/L	0.7	0.7		1	EPA Ra-05	KL1	4/26/18 11:32
Rad - 228 Counting Error +/-	0.7	pCi/L				1	EPA Ra-05	KL1	4/26/18 11:32



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Sample Information

		200			-				
Client:	Big Bend Power Station								
Lab Sample ID: I	.18D079-04					Sampled I	By: Robert B	arthelette	
Sample Description: I	BBS-CCR-BW1					Date and	Time Collected:	4/13/18 1	11:51
Sample Collection Metho	od: Grab		Date of Sample Receipt: 4/13/18 14						
		Lat	oratory	Results	5				
Sample Qualifier:									
					Qualifier	r	Test		Analysis
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time
<u>Radium-226/228</u>									
Rad-226/228	36.3	pCi/L	0.7	0.7		1	Calc	KL1	4/26/18 12:20
Rad-226/228 Counting Error	r +/- 1.8	pCi/L				1	Calc	KL1	4/26/18 12:20
			TestAmer	ica Pensao	cola				
Metals (ICP)									
Lithium	0.026	mg/L	0.0010	0.050	Ι	1	6010B Z01	GESP	4/19/18 14:42



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Sample Information

Client:	Big Bend Power Station		
Lab Sample ID:	L18D079-05	Sampled By: Robert	Barthelette
Sample Description:	BBS-CCR-BW2	Date and Time Collected	1: 4/13/18 11:02
Sample Collection Met	hod: Grab	Date of Sample Receipt:	4/13/18 14:43

Laboratory Results

Sample Qualifier:

					Qualifier		Test		Analysis
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time
	r	Fampa Elec	tric Compa	ny, Labo	ratory Sei	rvices			
General Chemistry Parameter	<u>S</u>								
Chloride	83.2	mg/L	0.0200	0.500	V	1	EPA 300.0	TMH	4/13/18 20:47
Specific Conductance	1590	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	4/13/18 11:02
Dissolved Oxygen	0.610	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	4/13/18 11:02
Fluoride	0.457	mg/L	0.0100	0.0500	V	1	EPA 300.0	TMH	4/13/18 20:47
pH	6.69	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	4/13/18 11:02
REDOX Potential	-36.3	mV	-999	-999		1	SM 2580B	RAB	4/13/18 11:02
Total Dissolved Solids	1190	mg/L	24.0	40.0		2	SM 2540C	NLT	4/16/18 14:40
Sulfate	458	mg/L	10.0	40.0		20	EPA 300.0	TMH	4/13/18 20:50
Turbidity	17.3	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	4/13/18 11:02
Total Mercury by SW846 Meth	nod 7470/7471								
Mercury	0.0500	ug/L	0.0500	0.200	U	1	EPA 7470A	RLC	4/16/18 14:4:
Total Recoverable Metals by 20	00 Series								
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	RLC	4/16/18 7:08
Arsenic	4.63	ug/L	0.320	2.00		1	EPA 200.8	RLC	4/16/18 7:08
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	RLC	4/16/18 7:08
Cobalt	0.247	ug/L	0.0400	2.00	V,I	1	EPA 200.8	RLC	4/16/18 7:08
Lead	0.000112	mg/L	8.00E-5	0.00200	V,I	1	EPA 200.8	RLC	4/16/18 7:08
Selenium	0.666	ug/L	0.200	2.00	Ι	1	EPA 200.8	RLC	4/16/18 7:08
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	RLC	4/16/18 7:08
Total Recoverable Metals by S	W846 Method	6010B							
Barium	0.0469	mg/L	0.000500	0.0200		1	EPA 6010B	RLC	4/16/18 8:10
Beryllium	0.200	ug/L	0.200	2.00	U	1	EPA 6010B	RLC	4/16/18 8:10
Boron	2.93	mg/L	0.0100	0.0500		1	EPA 6010B	RLC	4/16/18 8:10
Calcium	297000	ug/L	30.0	1000	V	1	EPA 6010B	RLC	4/16/18 6:44
Chromium	1.60	ug/L	1.60	12.0	U	1	EPA 6010B	RLC	4/16/18 8:10
Molybdenum	3.28	ug/L	1.00	20.0	Ι	1	EPA 6010B	RLC	4/16/18 8:10
			KNL La	aboratory					
<u>Radium - 226</u>									
Rad - 226	4.6	pCi/L	0.4	0.4		1	EPA 903.0	KL1	4/26/18 12:20
Rad - 226 Counting Error +/-	0.7	pCi/L				1	EPA 903.0	KL1	4/26/18 12:20
<u>Radium - 228</u>		•							
Rad - 228	0.7	pCi/L	0.7	0.7	U	1	EPA Ra-05	KL1	4/26/18 11:32
Rad - 228 Counting Error +/-	0.7	pCi/L pCi/L	0.7	0.7	0	1	EPA Ra-05	KL1	4/26/18 11:32



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			Sam	ple Info	rmatio	n				
Client:	Big	Bend Power Station								
Lab Sample I	D: L18E	0079-05				S	Sampled	By: Robert B	arthelette	
Sample Descr	ription: BBS	-CCR-BW2					Date and	l Time Collected:	4/13/18 1	11:02
Sample Colle	ction Method:	Grab				Da	ate of Saı	nple Receipt:	4/13/18 14	:43
			Lab	oratory	Result	5				
Sample Quali	ifier:									
Parameter		Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Radium-226/2	110	ittosuit	Cints		I QL	coue	DI	1.iethou	1 11111 9 50	Dute & Thine
Rad-226/228	220	4.7	pCi/L	0.7	0.7		1	Calc	KL1	4/26/18 12:20
Rad-226/228 Co	ounting Error +/-	0.7	pCi/L				1	Calc	KL1	4/26/18 12:20
				TestAmeri	ica Pensa	cola				
Metals (ICP)										
Lithium		0.0099	mg/L	0.0010	0.050	Ι	1	6010B Z01	GESP	4/19/18 14:46
			(Commen	ts					
U Ind	licates that the co	mpound was analyzed fo	or but not det	ected.						
J- Th	e reported value i	is an estimated value, see	the case nat	rative for spe	cifics.					
I Est	timated value									
I Th	e reported value i	s between the laboratory	method dete	ection limit an	d the labor	atory practica	l quantita	tion limit.		
V An	alyte detected in	the method blank								
Subcontract L	aboratories:									
KNL Laborator	тy		E84025							
FestAmerica Pe	ensacola		E81010							



Total Recoverable Metals by SW846 Method 6010B - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
D-4-1 10D0005 ED4 (010D											-
Batch 18D0095 - EPA 6010B											
Blank (18D0095-BLK1)					Prepared: (04/13/18 A	nalyzed: 04	/16/18			
Barium	0.000500	0.000500	0.0200	mg/L							U
Beryllium	0.200	0.200	2.00	ug/L							U
Boron	0.0100	0.0100	0.0500	mg/L							U
Calcium	184	30.0	1000	ug/L							Ι
Chromium	1.60	1.60	12.0	ug/L							U
Molybdenum	1.00	1.00	20.0	ug/L							U
LCS (18D0095-BS1)					Prepared: (04/13/18 A	nalyzed: 04	/16/18			
Barium	1.01	0.000500	0.0200	mg/L	1.0000		101	80-120			
Beryllium	1020	0.200	2.00	ug/L	1000.0		102	80-120			
Boron	1.07	0.0100	0.0500	mg/L	1.0000		107	80-120			
Chromium	1060	1.60	12.0	ug/L	1000.0		106	80-120			
Molybdenum	1000	1.00	20.0	ug/L	1000.0		100	80-120			
Matrix Spike (18D0095-MS1)		Sourc	e: L18D07	75-02	Prepared: (04/13/18 A	nalyzed: 04	/16/18			
Barium	2.08	0.000500	0.0200	mg/L	2.0000	U	104	75-125			
Beryllium	2100	0.200	2.00	ug/L	2000.0	U	105	75-125			
Boron	2.21	0.0100	0.0500	mg/L	2.0000	U	111	75-125			
Chromium	2160	1.60	12.0	ug/L	2000.0	U	108	75-125			
Molybdenum	1020	1.00	20.0	ug/L	1000.0	U	102	75-125			
Matrix Spike Dup (18D0095-MSD1)		Sourc	e: L18D07	75-02	Prepared: (04/13/18 A	nalyzed: 04	/16/18			
Barium	1.97	0.000500	0.0200	mg/L	2.0000	U	98.3	75-125	5.59	20	
Beryllium	1970	0.200	2.00	ug/L	2000.0	U	98.5	75-125	6.24	20	
Boron	2.10	0.0100	0.0500	mg/L	2.0000	U	105	75-125	5.09	20	
Chromium	2050	1.60	12.0	ug/L	2000.0	U	103	75-125	5.28	20	
Molybdenum	1000	1.00	20.0	ug/L	1000.0	U	100	75-125	1.33	20	



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Total Mercury by SW846 Method 7470/7471 - Quality Control

					Spike	Source		%Rec		RPD	
Analyte	Result	MDL	PQL	Units	Level	Result	%Rec	Limits	RPD	Limit	Qualifier
Batch 18D0103 - EPA 7470A											
Blank (18D0103-BLK1)					Prepared &	Analyzed:	04/16/18				
Mercury	0.0500	0.0500	0.200	ug/L							U
LCS (18D0103-BS1)					Prepared &	Analyzed:	04/16/18				
Mercury	1.14	0.0500	0.200	ug/L	1.0000		114	80-120			
Matrix Spike (18D0103-MS1)		Sour	e: L18D07	9-05	Prepared &	Analyzed:	04/16/18				
Mercury	1.08	0.0500	0.200	ug/L	1.0000	U	108	75-125			
Matrix Spike Dup (18D0103-MSD1)		Sour	ce: L18D07	9-05	Prepared &	Analyzed:	04/16/18				
Mercury	1.15	0.0500	0.200	ug/L	1.0000	U	115	75-125	6.53	20	



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Total Recoverable Metals by 200 Series - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
Batch 18D0100 - EPA 200.8											
Blank (18D0100-BLK1)					Prepared: (04/13/18 An	alyzed: 04	/16/18			
Antimony	0.600	0.600	2.00	ug/L							U
Arsenic	0.320	0.320	2.00	ug/L							U
Cadmium	0.392	0.100	0.500	ug/L							Ι
Cobalt	0.344	0.0400	2.00	ug/L							Ι
Lead	0.000543	8.00E-5	0.00200	mg/L							Ι
Selenium	0.200	0.200	2.00	ug/L							U
Thallium	0.330	0.100	0.500	ug/L							Ι
LCS (18D0100-BS1)					Prepared: (04/13/18 An	alyzed: 04	/16/18			
Antimony	103	0.600	2.00	ug/L	100.00		103	85-115			
Arsenic	103	0.320	2.00	ug/L	100.00		103	85-115			
Cadmium	103	0.100	0.500	ug/L	100.00		103	85-115			V
Cobalt	102	0.0400	2.00	ug/L	100.00		102	85-115			V
Lead	0.107	8.00E-5	0.00200	mg/L	0.10000		107	85-115			V
Selenium	99.7	0.200	2.00	ug/L	100.00		99.7	85-115			
Thallium	107	0.100	0.500	ug/L	100.00		107	85-115			V
Matrix Spike (18D0100-MS1)		Sour	ce: L18D079	9-01	Prepared: (04/13/18 An	alyzed: 04	/16/18			
Antimony	99.9	0.600	2.00	ug/L	100.00	U	99.9	70-130			
Arsenic	93.1	0.320	2.00	ug/L	100.00	8.44	84.6	70-130			
Cadmium	79.5	0.100	0.500	ug/L	100.00	0.250	79.2	70-130			V
Cobalt	87.6	0.0400	2.00	ug/L	100.00	0.522	87.0	70-130			V
Lead	0.0886	8.00E-5	0.00200	mg/L	0.10000	0.000328	88.3	70-130			V
Selenium	79.8	0.200	2.00	ug/L	100.00	0.908	78.9	70-130			
Thallium	92.8	0.100	0.500	ug/L	100.00	U	92.8	70-130			V
Matrix Spike Dup (18D0100-MSD1)		Sour	ce: L18D079	9-01	Prepared: ()4/13/18 An	alyzed: 04	/16/18			
Antimony	99.4	0.600	2.00	ug/L	100.00	U	99.4	70-130	0.437	20	
Arsenic	94.4	0.320	2.00	ug/L	100.00	8.44	86.0	70-130	1.44	20	
Cadmium	82.3	0.100	0.500	ug/L	100.00	0.250	82.0	70-130	3.44	20	V
Cobalt	89.5	0.0400	2.00	ug/L	100.00	0.522	89.0	70-130	2.25	20	V
Lead	0.0895	8.00E-5	0.00200	mg/L	0.10000	0.000328	89.2	70-130	1.03	20	V
Selenium	81.6	0.200	2.00	ug/L	100.00	0.908	80.7	70-130	2.26	20	
Thallium	92.9	0.100	0.500	ug/L	100.00	U	92.9	70-130	0.0464	20	v



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General Chemistry Parameters - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifie
7 mary te	result	MDL	TQL	Cinto	Lever	resurt	Virtee	Linits	Iu D	Linit	Quanne
Batch 18D0099 - EPA 300.0											
Blank (18D0099-BLK1)					Prepared &	Analyzed:	04/13/18				
Chloride	0.0647	0.0200	0.500	mg/L							Ι
Fluoride	0.0171	0.0100	0.0500	mg/L							Ι
Sulfate	0.500	0.500	2.00	mg/L							U
LCS (18D0099-BS1)					Prepared &	Analyzed:	04/13/18				
Chloride	5.14	0.0200	0.500	mg/L	5.0000		103	90-110			V
Fluoride	5.29	0.0100	0.0500	mg/L	5.0000		106	90-110			V
Sulfate	5.10	0.500	2.00	mg/L	5.0000		102	90-110			
Matrix Spike (18D0099-MS1)		Sour	ce: L18D00	2-01	Prepared &	Analyzed:	04/13/18				
Chloride	312	0.200	5.00	mg/L	50.000	272	80.4	90-110			J-,V
Fluoride	55.4	0.100	0.500	mg/L	50.000	1.80	107	90-110			V
Sulfate	803	5.00	20.0	mg/L	50.000	785	36.7	90-110			
Matrix Spike (18D0099-MS2)		Sour	ce: L18D07	9-01	Prepared &	Analyzed:	04/13/18				
Chloride	800	0.400	10.0	mg/L	100.00	714	86.2	90-110			J-,V
Fluoride	109	0.200	1.00	mg/L	100.00	0.210	109	90-110			V
Sulfate	1340	10.0	40.0	mg/L	100.00	1290	55.8	90-110			J-
Matrix Spike Dup (18D0099-MSD1)		Sour	ce: L18D00	2-01	Prepared &	Analyzed:	04/13/18				
Chloride	314	0.200	5.00	mg/L	50.000	272	84.4	90-110	0.644	20	J-,V
Fluoride	55.7	0.100	0.500	mg/L	50.000	1.80	108	90-110	0.689	20	V
Sulfate	805	5.00	20.0	mg/L	50.000	785	39.6	90-110	0.181	20	
Matrix Spike Dup (18D0099-MSD2)		Sour	ce: L18D07	9-01	Prepared &	Analyzed:	04/13/18				
Chloride	796	0.400	10.0	mg/L	100.00	714	82.3	90-110	0.491	20	J-,V
Fluoride	110	0.200	1.00	mg/L	100.00	0.210	110	90-110	0.838	20	V
Sulfate	1340	10.0	40.0	mg/L	100.00	1290	49.7	90-110	0.448	20	J-



5012 Causeway Blvd Tampa Fl. 33619 * Ph (813)630-7490 * Fax (813)630-7360 * DOH #E54272

General Chemistry Parameters - Quality Control

					Spike	Source		%Rec		RPD	
Analyte	Result	MDL	PQL	Units	Level	Result	%Rec	Limits	RPD	Limit	Qualifier
Batch 18D0106 - SM 2540C											
Blank (18D0106-BLK1)					Prepared &	Analyzed:	04/16/18				
Total Dissolved Solids	12.0	12.0	20.0	mg/L							U
LCS (18D0106-BS1)					Prepared &	Analyzed:	04/16/18				
Total Dissolved Solids	996	12.0	20.0	mg/L	1000.0		99.6	80-120			
Duplicate (18D0106-DUP1)		Sour	ce: L18D02	23-01	Prepared &	Analyzed:	04/16/18				
Total Dissolved Solids	342	12.0	20.0	mg/L		348			1.74	10	
Duplicate (18D0106-DUP2)		Sour	ce: L18D07	79-01	Prepared &	Analyzed:	04/16/18				
Total Dissolved Solids	3160	24.0	40.0	mg/L		3230			2.44	10	



5012 Causeway Blvd Tampa Fl. 33619 * Ph (813)630-7490 * Fax (813)630-7360 * DOH #E54272

Metals (ICP) - Quality Control

					Spike	Source		%Rec		RPD	
Analyte	Result	MDL	PQL	Units	Level	Result	%Rec	Limits	RPD	Limit	Qualifier
Batch 394328 - 6010B Z01											
Blank (394603-42)					Prepared: (04/18/18 Ai	nalyzed: 04	/19/18			
Lithium	0.0010	0.0010	0.050	mg/L				-			U
LCS (394603-43)					Prepared: (04/18/18 Ai	nalyzed: 04	/19/18			
Lithium	1.05	0.0010	0.050	mg/L	1.00		105	80-120			
Matrix Spike (394603-48)		Sourc	e: 400-394	603-45	Prepared: (04/18/18 Ai	nalyzed: 04	/19/18			
Lithium	1.40	0.0010	0.050	mg/L	1.00		110	75-125			
Matrix Spike Dup (394603-49)		Sourc	ce: 400-394	603-45	Prepared: (04/18/18 Ai	nalyzed: 04	/19/18			
Lithium	1.41	0.0010	0.050	mg/L	1.00		111	75-125	1	20	

Tampa Electric Company, Laboratory Services

Peggy Penner, Manager, Laboratory Services

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Site:	Big I	Bend	Date:	04/13/18	File Name:	041318_	Wells_RAB	Weather:	Clear	& Hot	Sampler(s) / Initials	RAB /TEC	O Initials	AB
LIMS #	Loction Code	Time	FE ²	pH (SU)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor	1	IGVD
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	\$COLOR-W	\$ODOR-W	Time	LEVEL
L18D079-01 A	BBS-CCR-1	13:23		6.83	24.90	4167	0.11	3.76	-61.60		Lt. Yellow	None		
L18D079-02 A	BBS-CCR-2	12:51		6.86	24.60	1365	0.20	2.96	-92.00		Lt Yellow	Mild		
LIMS #	250ml Cyan (3)	1L Inorg (1)	500ml inorg (2)	250ml Inorg (3)	1L Mtls (1)	250ml Mtls (3)	1L Rads (1)	500ml Sulfide (2)	500ml Mtls (2)	250ml Nuts (3)	40ml Vial (6)	500 ml Nuts (2)	1L Rads Diss. (1)	Total Containers
L18D079-01 A			1			2 2	2 2							10
L18D079-02 A			1			2 2	2 2							10
I) 1L plastic (PP)		(2) 500ml plastic (PP)		(3) 250ml plastic (Pf	>)	(4) 100ml coliform b	ottle	(5) 1L amber glass	(AG)	(6) 40ml VOA vial	(CG)		Samples On Ice	Sample Reciept
SS	0121301C	ESS	0218201Y	ESS	0321301C	ESS		ESS		ESS			Yes No	Time 14:43
	Preservation			Pres ID		Preservation	-		Pres ID		Preservation		Pres ID	Temp 1.2
bottles (rads): 5 ml H				L 020807M	250ml bottles (nu	ts): 1 ml H2SO4 to p	H <2		I E	500 ml bottles(Sulfi		Acet. to pH >12	L	
AA	2 ml HNO3 to pH <2	1				0.5 ml H2SO4 to pH			ti C		in) 1g NAOH to pH		LE	
50 ml bottles (metal);		1		L 020807M 2			5um, 5 ml HNO3 to pH	0				nple was verified to	a pH of <2	
		Buffer ID	DufforMature		Time	ICV	Time	CCV	Time	Redox Cal	Time	Temp °C	Reading my	Theo Value my
H Meter Calibration	MONOS	Buffer ID L 021961B	Buffer Value 7	Cal	Tittle	icv	lime	7.03	14:51	Meter ID:	8:26	21.6	236.2	236.2
DEP FT 1100	MPM08	L 020460B	10	7.00	8:07 8:07	00.104.11.0.01.10	ond +/- 5%) (DO +/- 0.3			Meter ID: MPM08	14:56	21.6	235.5	236.2
Inits: SU		L 020896E	4	4.00	8:07		icates ICV / CCV pass		v)	Zobell Sol ID:	14.50	21.0	200.0	200.2
	-10.	-		4.00 Cal	Time	ICV	Time	CCV	Time	L 020893A			-	
Conductivity Meter Ca	MPM08	Standard ID L 019356D	Std Value 1000	1000	8:16	icv	Time	CCV	Time	DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg
		L 020249C		1000	8:10	0745	0.00	0700	14.50		7:59	21.9	8.80	8.761
DEP FT 1200, Units:			10000	10.000		9745	8:22	9730	14:53	Meter ID:				-
urbidity Meter Calibi		Standard ID	Std Value	Acceptabili	1	ICV	Time	CCV	Time	MPM08	15:09	22.7	8.54	8.627
Aeter ID:	TM07	013003	5.56	5.00	6.12	5.66	7:58			Barom. Pres			-	
DEP FT 1600, Units:	NTU	L 019884	52.20	48.81	55.59			52.70	15:02	760		1 315 M 31 82		
Sulfite Info (QC Check	k) (EPA 377.1)		QC Result mg/l	Time	Titrator ID	Na Thio ID	DO 3 Pillow ID	Starch Ind. ID	Iodate/Iodide ID	Therm ID	pH	Conduct.(%)	DO (mg/l)	Redox (mv)
C Std: 5ml (NaThio)/	500ml DI=10mg/L				1.	L	L	L	L	MPM08	0.2	5	0.3	10
ourging Information		Well Capacities (gallo	ns/ ft): 2" = 0.16				n. Capacities Gallons/							
Well #	Diam/ Comp	Screen Interval (ft)	intake Depth (ft)	Well Depth (ft)	Depth to Water (ft)	= Column (ft)	X Capacity (gal) =	1 Well Volume (gal)	(Tubing Capacity (gal/R.)	(ft)	+ Volume + (gal)	(gal)	1 Eqpt. Volume (gal)	
BBS-CCR-1	2	10	17.32	22.32	7.40	14.92	0.16	2.39	0.0026	23.3	0	0.06	0.12	
Purge Meth:	Time	Rate (ml/min)	Volume (gal)	Total Vol. (gal)	Water Depth (It)	pH (SU)	Temp °C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Eqpt. Table
1A	13:07	320	0.85	0.85	7.48	6.83	24.80	4170	0.16	1.57	ph:+/- 0.2	STABLE	Level Meter:	WLM08
urge Start:	13:09	320	0.17	1.02	7.48	6.83	24.84	4166	0.12	4.23	Temp°C+/- 0.2	STABLE	Pump:	PP
12:57	13:11	330	0.17	1.19	7,49	6.83	24,90	4167	0.11	3.76	Cond % +/- 5	STABLE	Tubing:	PE/S
urge End:		1	/		1.000					-	DO % Sat.< 20	STABLE	Dedicated	Yes Yes
13:11					1					1	Turb. NTU < 20	STABLE	Tubing?	No No
urge Complete /	At 12:58	Gallons to Purge	0.12	Stablility	Values =	6.83	24,90	4167	0.11	3.76	1.			
Well #		Screen Interval (ft)	Intake	Well Depth + (ft)	Depth to	Water	X Capacity (gal) =	1 Well Volume (gal)	(Tubing Capacity x (gal/ft.)	Tubing	Pump + Volume + (gal)	Cell Volume = (gal) =	1 Eqpt Volume (gal)	1
BBS-CCR-2	Diam/ Comp 2	10	16.84	21.84	6.89	14.95	0.16	2.39	0.0026	22.84	0	0.06	0.12	
			1.000									Status		Eqpt. Table
Purge Meth: 1A	Time 12:35	Rate (ml/min) 300	Volume (gal) 0.55	Total Vol. (gal) 0.55	Water Depth (ft) 6.95	pH (SU) 6.88	Temp °C 24.50	Cond (uMHOS) 1366	DO (mg/L) 0.36	Turbidity (NTU) 4.62	Purge Criteria ph:+/- 0.2	STABLE	Equipment ID Level Meter:	WLM08
								1360			0.2	STABLE		PP
Purge Start:	12:37	310	0.16	0.71	6.96	6.87	24.54		0.21	3.14	Temp°C+/- 0,2 Cond % +/- 5	1 and which has been all the	Pump:	PF PE/S
12:28	12:39	300	0.16	0.87	6.97	6.86	24.60	1365	0.20	2.96	DO % Sat.< 20	STABLE	Tubing:	And the second s
Purge End:								-		-		STABLE	Dedicated	
12:39								-			Turb. NTU < 20	STABLE	Tubing?	LI No
Purge Complete /	At 12:30	Gallons to Purge	0.12	Stablility	Values =	6.86	24.60	1365	0.20	2.96				

Site:	Big	Ber	nd	Date:	04/13/18	File Name:	041318	_Wells_RAB	Weather:	Clear	& Hot	Initials	RAB /TEC		B
LIMS #	Loction Code	1.00	Time	FE ²	pH (SU)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor	N	IGVD
				mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	SCOLOR-W	SODOR-W	Time	LEVEL
L18D079-03 A	BBS-CCR-3		12:22		6.41	24.06	1811	0.19	3.79	-100.60		Lt Yellow	Mild		
LIMS #	250ml Cyan (3)	100	1L Inorg (1)	500ml Inorg (2)	250ml Inorg (3)	1L Mtis (1)	250ml Mtls (3)	1L Rads (1)	500ml Sulfide (2)	500ml Mtls (2)	250ml Nuts (3)	40ml Vial (6)	500 ml Nuts (2)	1L Rads Diss. (1)	Total Containers
18D079-03 A		-	TE morg (1)	1	250mi morg (5)		2 2 2	✓ 2							1 C 2 C 2 C 2 C 2 C 2 C 2 C 2 C 2 C 2 C
18D079-03 A		-		1	-	6			6	0	ā		6		5
1) 1L plastic (PP)		(2) 6	500ml plastic (PP)	-	(3) 250ml plastic (PR	-	(4) 100ml coliform		(5) 1L amber glass ((6) 40ml VOA vial	(CG)		Samples On Ice	Sample Reciept
SS	0121301C	ESS		0218201Y	ESS	0321301C	ESS	Donie	ESS	,,	ESS	(00)		Yes No	Time 14:43
	Preservation	Esc	,	02102011	Pres ID	00210010	Preservation		1.00	Pres ID	200	Preservation		Pres ID	Temp 1.2
L bottles (rads): 5 ml		_			L 020807M	250ml bottlac (n	ts): 1 ml H2SO4 to	0H <2			500 ml bottles(Sulf	11000110000	Acel Io nH >12		10110 1.2
	: 2 ml HNO3 to pH <2	T					: 0.5 ml H2SO4 to pl								
		-			L 020807M	· · · · · · · · · · · · · · · · · · ·		45um, 5 ml HNO3 to pH	-2		A checked box in			a a nH of <2	
50 ml bottles (metal):	T INFINOS to pH <2		0.000	Dutterstate					<2 ccv	Time	Redox Cal	Time	Temp °C	Reading mv	Theo Value my
H Meter Calibration	MPM08	1	Buffer ID 021961B	Buffer Value 7	Cal 7	Time 8:07	ICV	Time	7.03	14:51	Redox Cal Meter ID:	8:26	21.6	236.2	236.2
leter ID:	MI-MO8	-	021961B 020460B	10	10	8:07	00.444.44		-		Meter ID: MPM08	14:56	21.6	235.5	236.2
DEP FT 1100 Inits: SU		t	020460B	10	10	8:07	Contraction of the second second	Cond +/- 5%) (DO +/- 0.3 dicates ICV / CCV pass		9	Zobell Sol ID:	14.00	21.0	200.0	200.2
		-		4 Std Value	Cal	Time	ICV	Time	CCV	Time	L 93A		-		
Conductivity Meter C	MPM08	1	Standard ID 019356D	1000	1000	8:16	ICV	lime	CUV	Time	DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg
leter ID:		1	019356D 020249C	1000	1000	8:10	9745	8:22	9730	14:53	Meter ID:	7:59	21.9	8.80	8.761
DEP FT 1200, Units:		-		I an annual and							MPM08	15:09	21.5	8.54	8.627
urbidity Meter Calib		1	Standard ID	Std Value	Acceptabili	1	ICV	Time	CCV	Time		15:09	22.1	8.54	8.627
Meter ID:	TM07	1	019883 019884	5.56	5.00	6.12 55.59	5.66	7:58	52.70	15:02	Barom, Pres 760			1	
DEP FT 1600, Units:		L.	019884	52.20	48.81								0		Destau (ma)
Sulfite Info (QC Chec		_		QC Result mg/l	Time	Titrator ID	Na Thio ID	DO 3 Pillow ID	Starch Ind. ID	Iodate/Iodide ID	Therm ID MPM08	рН 0.2	Conduct.(%) 5	DO (mg/l) 0.3	Redox (mv) 10
2C Std: 5ml (NaThio)/	500ml DI=10mg/L	-				1	-		-	-	IVIPIVIUO	0.2	1 3	0.5	10
Purging Information		Wei	Il Capacities (gallor	ns/ ft): 2" = 0.16	4" =0.65	Depth to		m. Capacities Gallons/	1 Well		Tubing	Pump	Cell	1 Eqpt	
Well #	Diam/ Comp	Scr	reen Interval (ft)	Intake Depth (ft)	Depth (ft)	Water (ft)	= Water Column (ft)	X Capacity (gal) =	Volume (gal)	(Tubing X Capacity (gaUff.)	Length)	+ Volume + (gal) +		= Volume (gal)	
BBS-CCR-3	2		10	18.23	23.23	6.63	16.60	0.16	2.66	0.0026	24.23	0	0.06	0.12	
Purge Meth:	Time		Rate (ml/min)	Volume (gal)	Total Vol. (gal)	Water Depth (ft)	pH (SU)	Temp °C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Eqpt. Table
1A	12:09		440	0.70	0.70	7.14	6.42	24.16	1826	0.21	4.19	ph:+/- 0.2	STABLE	Level Meter:	WLM08
urge Start:	12:11		450	0.24	0.94	7.15	6.42	24.15	1821	0.23	4.36	Temp°C+/- 0.2	STABLE	Pump:	PP
12:03	12:13		450	0.24	1.18	7.15	6.41	24.06	1811	0.19	3.79	Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:												DO % Sat.< 20	STABLE	Dedicated	Yes Yes
12:13			11		-							Turb. NTU < 20	STABLE	Tubing?	D No
Purge Complete	At 12:04	4 Ga	allons to Purge	0.12	Stablility	Values =	6.41	24.06	1811	0.19	3.79				
Well #	Discione		reen interval (ft)	Intake Depth (ft)	Well Depth (ft)	Depth to Water (ft)	= Water Column (ft)	X Capacity (gal) =	1 Well Volume (gal)	(Tubing Capacity X (gal/ft.)	Tubing Length)	Pump + Volume (gal) +	Cell Volume (gal =	1 Eqpt. Volume (gal)	
0	Diam/ Comp 2	50	10	14	18	T	18.00	0.16	2.88	0.0026	100	0	0.06	0.32	
Purge Meth:	Time		Rate (ml/min)	Volume (gal)	Total Vol. (gal)	Water Depth (ft	pH (SU)	Temp °C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Eqpt. Table
and a month			. may finanting	and the states of the states o	, our con (gui)	in a second s	Prive-/	tong a				ph:+/- 0.2		Level Meter:	WLM08
Purge Start:							-					Temp*C+/- 0.2	-	Pump:	PP
ange omnin					1							Cond % +/- 5		Tubing:	PE/S
Purge End:		1				1		-			-	DO % Sat.< 20		Dedicated	□ Yes
ange Ella.			1.21	1.00								Turb. NTU < 20		Tubing?	□ No
Purge Complete		10	allons to Purge	0.32	Stablity \					-					

Site:	Big	Bend	Date:	04/13/18	File Name:	041318_	Wells_RAB	Weather:	Clear	r & Hot	Initials	RAB /TEC		ND
LIMS #	Loction Code	Time	FE ²	pH (SU)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor	1	NGVD
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	\$COLOR-W	\$ODOR-W	Time	LEVEL
L18D079-04 A	BBS-CCR-BW-1	11:51		6.51	27.64	4805	0.27	4.26	-10.30		Clear	None		-
L18D079-05 A	BBS-CCR-BW-2	11:02		6.69	24.90	1593	0.61	17.30	-36,30		Lt Yellow	None		
LIMS #	250ml Cyan (3)	1L Inorg (1)	500ml Inorg (2)	250ml Inorg (3)	1L Mtls (1)	250ml Mtls (3)	1L Rads (1)	500ml Sulfide (2)	-36.3	250ml Nuts (3)	40ml Vial (6)	500 ml Nuts (2)		Total Contain
L18D079-04 A			1		Ľ		Y 2			<u> </u>				10
L18D079-05 A			1		μ	2 2	I 2							
(1) 1L plastic (PP)		(2) 500ml plastic (PP)		(3) 250ml plastic (P		(4) 100ml coliform be	ottle	(5) 1L amber glass	(AG)	(6) 40ml VOA vial	(CG)	1	Samples On Ice	Sample Reciept
ESS	0121301C	ESS	0218201Y	ESS	0321301C	ESS		ESS		ESS			Yes No	Time 14:43
	Preservation	and the second		Pres ID		Preservation			Pres ID		Preservation	1	Pres ID	Temp 1.2
1L bottles (rads): 5 ml H	HNO3 to pH <2			L 020807M L	250ml bottles (nu	ts): 1 ml H2SO4 to ph	1 <2			500 ml bottles(Sulf		A ROUTE AND	L	
500 ml bottles (metals)	: 2 ml HNO3 to pH <2	J		L	40 ml Vial (TOC)	0.5 ml H2SO4 to pH	<2			250 ml bottles (Cya	an) 1g NAOH to pH	>12		1
250 ml bottles (metal):	1 ml HNO3 to pH <2		2	L 020807M	1L bottles (diss.	ads): filtered with 0.4	5um, 5 ml HNO3 to pH	<2	L	A checked box in	dicates that the sam	mple was verified t	o a pH of <2	
pH Meter Calibration		Buffer ID	Buffer Value	Cal	Time	ICV	Time	CCV	Time	Redox Cal	Time	Temp °C	Reading mv	Theo Value
Meter ID:	MPM08	L 0219618	3 7	7	8:07	1		7.03	14:51	Meter ID:	8:26	21.6	236.2	236.2
FDEP FT 1100		L 0204608	10	10	8:07	QC: (pH +/- 0.2) (Co	nd +/- 5%) (DO +/- 0.3r	ng/L) (Redox +/- 10m	(v)	MPM08	14:56	21.6	235.5	236.2
Units: SU		L 0208968	4	4	8:07	A checked box indi	cates ICV / CCV passe	d		Zobell Sol ID:		12.27		
Conductivity Meter Ca	alib.	Standard ID	Std Value	Cal	Time	ICV	Time	CCV	Time	L 020893A				
Meter ID:	MPM08	L 0193560	1000	1000	8:16	1				DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value
DEP FT 1200, Units:	uMHOS	L 0202490	10000			9745	8:22	9730	14:53	Meter ID:	7:59	21.9	8.80	8.761
Turbidity Meter Calibr	ration	Standard ID	Std Value	Acceptabil	ity Range	ICV	Time	CCV	Time	MPM08	15:09	22.7	8.54	8.627
Meter ID:	TM07	L 01988:	5.56	5.00	6.12	5.66	7:58			Barom. Pres	1			
FDEP FT 1600, Units:	NTU	L 01988	52.20	48.81	55.59			52.70	15:02	760				
Sulfite Info (QC Check	k) (EPA 377.1)		QC Result mg/	Time	Titrator ID	Na Thio ID	DO 3 Pillow ID	Starch Ind. ID	lodate/lodide ID	Therm ID	pH	Conduct.(%)	DO (mg/l)	Redox (m
QC Std: 5ml (NaThio)/5	500ml DI=10mg/L					L	L	L	L	MPM08	0.2	5	0.3	10
Purging Information		Well Capacities (gall	ons/ ft): 2" = 0.10	4" =0.65		Tubing Inside Diam	. Capacities Gallons/f	t): 1/4" =0.0026 3/8" :	=0.006	1				
				Well	Depth to		Well	1 Well	/ Tubing	Tubing Length	Pump	Cell	1 Eqpt.	1
	1		Intake		Water	= Water x	Capacity (gal) =		County X		+ Volume	Volume	Mahama	
Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Deptn (ft)	Water (ft)	= Water X Column (ft)	Capacity (gal) =	Volume (gal)	(Capacity X (gal/ft.)	(n)	+ Volume + (gal)	(gal) =	Mahama	-
Well # BBS-CCR-BW-1	Diam/ Comp 2	Screen Interval (ft) 10		Deptn =	Water	Column	(Capacity (gal) = 0.16	Volume	(Capacity ^		+ Volume + (gal) +		Volume	1
BBS-CCR-BW-1			Depth (ft)	Deptn (ft)	Water (ft)	Column (ft)		Volume (gal)	(Capacity ^ (gal/ft.)	(ft) /	(gal)	(gal) =	(gal)	Eqpt. Tal
BBS-CCR-BW-1	2	10	Depth (ft) 39.3	Depth (ft) 44.3	Water (ft) 29.37	Column (ft) 14.93	0.16	Volume (gal) 2.39	(Capacity * (gaVff.) 0.0026	(n) /	(gal)	(gal) =	Volume (gal) 0.32	
BBS-CCR-BW-1 Purge Meth: 1A	2 Time	10 Rate (ml/min)	Depth (ft) 39.3 Volume (gal)	Depth (ft) 44.3 Total Vol. (gal)	Water (ft) 29.37 Water Depth (ft)	Column (ft) 14.93 pH (SU)	0.16 Temp °C	Volume (gal) 2.39 Cond (uMHOS)	(Capacity (gal/ft.) 0.0026 DO (mg/L)	(n) 100 Turbidity (NTU)	(gal) O Purge Criteria	(gal) = 0.06 Status	Volume (gal) 0.32 Equipment ID	
BBS-CCR-BW-1 Purge Meth:	2 Time 11:43	10 Rate (ml/min) 930	Depth (ft) 39.3 Volume (gal) 5.90	Depth (ft) 44.3 Total Vol. (gal) 5.90	Water (ft) 29.37 Water Depth (ft) 30.40	Column (ft) 14.93 pH (SU) 6.51	0.16 Temp °C 27.66	Volume (gal) 2.39 Cond (uMHOS) 4770	(Capacity (gaVitt.) 0.0026 DO (mg/L) 0.28	(n) 7 100 Turbidity (NTU) 9.71	(gal) 0 Purge Criteria ph:+/- 0.2	(gal) = 0.06 Status STABLE	Volume (gal) 0.32 Equipment ID Level Meter:	WLMOS
BBS-CCR-BW-1 Purge Meth: 1A Purge Start: 11:19	2 Time 11:43 11:45	10 Rate (ml/min) 930 950	Depth (tt) 39.3 Volume (gal) 5.90 0.50	Depth (ft) - 44.3 Total Vol. (gal) 5.90 6.40	Water (ft) 29.37 Water Depth (ft) 30.40 30.41	Column (ft) 14.93 pH (SU) 6.51 6.51	0.16 Temp °C 27.66 27.64	Volume (gal) 2.39 Cond (uMHOS) 4770 4785	(Capacty (gaVR.) 0.0026 DO (mg/L) 0.28 0.27	(n) 100 Turbidity (NTU) 9.71 7.27	(gal) O Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2	(gal) = 0.06 Status STABLE STABLE	Volume (gal) 0.32 Equipment ID Level Meter: Pump:	
BBS-CCR-BW-1 Purge Meth: 1A Purge Start: 11:19	2 Time 11:43 11:45	10 Rate (ml/min) 930 950	Depth (tt) 39.3 Volume (gal) 5.90 0.50	Depth (ft) - 44.3 Total Vol. (gal) 5.90 6.40	Water (ft) 29.37 Water Depth (ft) 30.40 30.41	Column (ft) 14.93 pH (SU) 6.51 6.51	0.16 Temp °C 27.66 27.64	Volume (gal) 2.39 Cond (uMHOS) 4770 4785	(Capacty (gaVR.) 0.0026 DO (mg/L) 0.28 0.27	(n) 100 Turbidity (NTU) 9.71 7.27	(gal) 0 Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5	(gal) = 0.06 Status STABLE STABLE STABLE	Volume (gal) 0.32 Equipment ID Level Meter: Pump: Tubing:	WLM08 ESP PE
BBS-CCR-BW-1 Purge Meth: 1A Purge Start: 11:19 Purge End: 11:47	2 Time 11:43 11:45 11:47	10 Rate (ml/min) 930 950	Depth (ft) 39.3 Volume (gal) 5.90 0.50 0.50	Depth (ft) - 44.3 Total Vol. (gal) 5.90 6.40	Water (ft) 29.37 Water Depth (ft) 30.40 30.41 30.40	Column (ft) 14.93 pH (SU) 6.51 6.51	0.16 Temp °C 27.66 27.64	Volume (gal) 2.39 Cond (uMHOS) 4770 4785	(Capacty (gaVR.) 0.0026 DO (mg/L) 0.28 0.27	(n) 100 Turbidity (NTU) 9.71 7.27	(gai) Purge Criteria ph:+/- 0.2 Temp*C+/- 0.2 Cond % +/- 5 DO % Sat.< 20	(gai) = 0.06 Status STABLE STABLE STABLE STABLE	Volume (gal) 0.32 Equipment ID Level Meter: Pump: Tubing: Dedicated	WLM08 ESP PE U Yes
BBS-CCR-BW-1 Purge Meth: 1A Purge Start: 11:19 Purge End: 11:47 Purge Complete A	2 Time 11:43 11:45 11:45 11:47 At 11:20	10 Rate (ml/min) 930 950 950 Gallons to Purge	Depth (ft) 39.3 Volume (gal) 5.90 0.50 0.50 0.50	Depth (ft) 44.3 Total Vol. (gal) 5.90 6.40 6.90	Water (ft) 29.37 Water Depth (ft) 30.40 30.41 30.40	Column (ft) 14.93 pH (SU) 6.51 6.51 6.51 6.51	0.16 Temp *C 27.66 27.64 27.64	Volume (gal) Cond (uMHOS) 4770 4785 4805	Capsoly Capsoly (Capsoly (Capsol)	(m) 100 Turbidity (NTU) 9.71 7.27 4.26 4.26 4.26	(gai) Purge Criteria ph:+/- 0.2 Temp*C+/- 0.2 Cond % +/- 5 DO % Sat.< 20	(gai) = 0.06 Status STABLE STABLE STABLE STABLE	Volume (rai) 0.32 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing?	WLM08 ESP PE U Yes
BBS-CCR-BW-1 Purge Meth: 1A Purge Start: 11:19 Purge End: 11:47 Purge Complete A Well #	2 Time 11:43 11:45 11:47	10 Rate (ml/min) 930 950 950	Depth (ft) 39.3 Volume (gal) 5.90 0.50 0.50 0.50	Depth (ff) 44.3 Total Vol. (gal) 5.90 6.40 6.90 Stability Vol	Water 29.37 Water Depth (n; 30.40 30.41 30.40 //alues = Values = Oopht to Water	Column 14.93 pH (SU) 6.51 6.51 6.51 6.51 	0.16 Temp °C 27.66 27.64 27.64 27.64	Volume (gal) 2.39 Cond (uMHOS) 4770 4785 4805 4805 1 Weil Volume	(Capacity × (galW) × 0.0026 DO (mg/L) 0.28 0.27 0.27 0.27	(n) 100 Turbidity (NTU) 9.71 7.27 4.26 4.26	(gai) 0 Purge Criteria ph:+/- 0.2 Temp®C+/- 0.2 Cond % +/- 5 DO % Sat.< 20 Turb. NTU < 20 Pump + Volume +	(gal) = 0.06 Status STABLE STABLE STABLE STABLE STABLE	Volume (gal) 0.32 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing?	WLM0 ESP PE U Yes
BBS-CCR-BW-1 Purge Meth: 1A Purge Start: 11:19 Purge End: 11:47 Purge Complete A Well # BBS-CCR-BW-2	2 Time 11:43 11:45 11:47 At 11:20 Diam/ Comp 2	10 Rate (mt/min) 930 950 950 Gallons to Purge Screen Interval (ft 10	Depth (ft) 39.3 Volume (gal) 5.90 0.50	Depth (ft)	Water (m) 29.37 Water Depth (n) 30.40 30.41 30.40 30.41 30.40 Values = Depth to Water (tt) 8.02	Column 14.93 pH (SU) 6.51 6.51 6.51 6.51 6.51 6.51 1 1 15.82	0.16 Temp °C 27.66 27.64 27.64 27.64 27.64 Vell Capacity (gal) = 0.16	Volume (gal) 2.39 Cond (uMHOS) 4770 4785 4805 4805 1 Well Volume (gal) 2.53	(<u>Capacity</u> (<u>galW1</u>) 0.0026 DO (mg/L) 0.28 0.27 0.27 0.27 0.27 (<u>Capacity</u>) (<u>Capacity</u>) 0.0026	(n) 100 Turbidity (NTU) 9.71 7.27 4.26 4.26 4.26 (Tueing) (n) 24.64	(gai) 0 Purge Criteria ph:+/- 0.2 Temp*C+/- 0.2 Cond % +/- 5 DO % Sat.< 20 Turb. NTU < 20 + Pump + Volume (gai) + 0	(gai) = (gai) = 0.06 Status STABLE STABLE STABLE STABLE STABLE Cell Volume (gai) = 0.06	Volume (gal) 0.32 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? i Eqpl. Volume (gal) 0.12	WLM0 ESP PE Yes No
BBS-CCR-BW-1 Purge Meth: 1A Purge Start: 11:19 Purge End: 11:47 Purge Complete A Well # BBS-CCR-BW-2 Purge Meth:	2 Time 11:43 11:45 11:47 At 11:20 Diam/ Comp 2 Time	10 Rate (mt/min) 930 950 950 Gallons to Purge Screen Interval (ft 10 Rate (mt/min)	Depth (ft) 39.3 Volume (gal) 5.90 0.50 0.50 0.50 0.50 0.50 0.50	Depth (ft) 44.3 Total Vol. (gal) 5.90 6.40 6.90 Stability V Weil Depth (ft) 23.84 Total Vol. (gal)	Water (m) 29.37 Water Depth (n) 30.40 30.41 30.40 Values = Dopth to Water (n) 8.02 Water Depth (n)	Column 14.93 pH (SU) 6.51 6.51 6.51 6.51 6.51 1 1 1 1 5.82 pH (SU)	0.16 Temp °C 27.66 27.64 27.64 27.64 27.64 Vell Capacity (gal) = 0.16 Temp °C	Volume (gal) 2.39 Cond (uMHOS) 4770 4785 4805 4805 1 Well Volume (gal) 2.53 Cond (uMHOS)	(<u>Capacity</u> ∧ (<u>capacity</u> ∧ 0.0026 DO (mg/L) 0.28 0.27 0.27 0.27 0.27 (<u>Capacity</u> ∧ (<u>capacity</u> ∧))	(n) 100 Turbidity (NTU) 9.71 7.27 4.26 4.26 4.26 (Tubing) (n) 24.64 Turbidity (NTU)	(gai) 0 Purge Criteria ph:+/- 0.2 Temp®C+/- 0.2 Cond % +/- 5 DO % Sat.< 20 Turb. NTU < 20 + Volume (gai) +	(gal) = (gal) = 0.06 Status STABLE STABLE STABLE STABLE STABLE Cell Volume (gal) = 0.06 Status	Volume (gal) 0.32 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? Uedicated Tubing? i Eqpt (gal) 0.12 Equipment ID	WLM00 ESP PE Yes Mo Eqpt. Ta
BBS-CCR-BW-1 Purge Meth: 1A Purge Start: 11:19 Purge End: 11:47 Purge Complete A Well # BBS-CCR-BW-2 Purge Meth: 1A	2 Time 11:43 11:45 11:47 At 11:20 Diam/ Comp 2 Time 10:47	10 Rate (mt/min) 930 950 950 Gallons to Purge Screen Interval (ft 10 Rate (mt/min) 330	Depth (ft) 39.3 Volume (gal) 5.90 0.50	Depth (ff) 44.3 Total Vol. (gal) 5.90 6.40 6.90 Stability V Veil Depth (ff) 23.84 Total Vol. (gal) 2.18	Water (m) 29.37 Water Depth (n) 30.40 30.41 30.40 Values = Dopth to Water (n) 8.02 Water Depth (n) 8.19	Column 14.93 PH (SU) 6.51 6.51 6.51 6.51 6.51 15.82 PH (SU) 6.70	0.16 Temp °C 27.66 27.64 27.64 27.64 27.64 Vell Capacity (gal) = 0.16 Temp °C 24.83	Volume (gal) 2.39 Cond (uMHOS) 4770 4785 4805 4805 4805 1Wel Vuel volume (gal) 2.53 Cond (uMHOS) 1593	(<u>Capacity</u> ∧ (<u>Gabacity</u> ∧ 0.0026 DO (mg/L) 0.28 0.27 0.27 0.27 0.27 0.27 0.27 0.27 0.27	(n) 100 Turbidity (NTU) 9.71 7.27 4.26 4.26 4.26 (t) 100 (t) 24.64 Turbidity (NTU) 19.10	(gai) 0 Purge Criteria ph:+/- 0.2 Temp*C+/- 0.2 Cond % +/- 5 DO % Sat.< 20 Turb. NTU < 20 + Volume (gai) + Purge Criteria ph:+/- 0.2	(gal) = (gal) = 0.06 Status STABLE STABLE STABLE STABLE Cell Volume (gal) = 0.06 Status STABLE	Volume (gal) 0.32 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? Unime (gal) 0.12 Equipment ID Level Meter:	WLM00 ESP PE Yes Mo Eqpt. Ta
BBS-CCR-BW-1 Purge Meth: 1A Purge Start: 11:19 Purge End: 11:47 Purge Complete A Well # BBS-CCR-BW-2 Purge Meth: 1A Purge Start:	2 Time 11:43 11:45 11:47 At 11:20 Diam/ Comp 2 Time 10:47 10:49	10 Rate (mt/min) 930 950 950 950 Gallons to Purge Screen Interval (ft 10 Rate (mt/min) 330 320	Depth (ft) 39.3 Volume (gal) 5.90 0.50	Depth (ff) 44.3 Total Vol. (gal) 5.90 6.40 6.90 Stability V Well Depth -(ft) 23.84 Total Vol. (gal) 2.18 2.35	Water (m) 29.37 Water Depth (n) 30.40 30.41 30.40 //alues = Depth to Water Water B.02 Water Depth (n) 8.19 8.18	Column 14.93 PH (SU) 6.51 6.51 6.51 6.51 6.51 6.51 15.82 PH (SU) 6.70 6.69	0.16 Temp *C 27.66 27.64 27.64 27.64 27.64 Vell Capacity (gal) = 0.16 Temp *C 24.83 24.85	Volume (gal) 2.39 Cond (uMHOS) 4770 4785 4805 4805 1Weil Volume (gal) 2.53 Cond (uMHOS) 1593 1595	(^C _{(galin}) ∧ (^C _{(galin}) ∧ 0.0026 DO (mg/L) 0.28 0.27 0.27 0.27 0.27 0.27 0.27 0.27 0.27	(n) 100 Turbidity (NTU) 9.71 7.27 4.26 4.26 4.26 (Dergin) 24.64 Turbidity (NTU) 19.10 14.20	(gai) 0 Purge Criteria ph:+/- 0.2 Temp*C+/- 0.2 Cond % +/- 5 D0 % Sat.< 20 Turb. NTU < 20 + Volume (gai) + 0 Purge Criteria	(gal) = (gal)	Volume (gal) 0.32 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? Unume (gal) 0.12 Equipment ID Level Meter: Pump:	WLM0 ESP PE Yes Mo Eqpt. Ta WLM0 PP
BBS-CCR-BW-1 Purge Meth: 1A Purge Start: 11:19 Purge End: 11:47 Purge Complete A Well # BBS-CCR-BW-2 Purge Meth: 1A Purge Start: 10:22	2 Time 11:43 11:45 11:47 At 11:20 Diam/ Comp 2 Time 10:47	10 Rate (mt/min) 930 950 950 Gallons to Purge Screen Interval (ft 10 Rate (mt/min) 330	Depth (ft) 39.3 Volume (gal) 5.90 0.50	Depth (ff) 44.3 Total Vol. (gal) 5.90 6.40 6.90 Stability V Veil Depth (ff) 23.84 Total Vol. (gal) 2.18	Water (m) 29.37 Water Depth (n) 30.40 30.41 30.40 Values = Dopth to Water (n) 8.02 Water Depth (n) 8.19	Column 14.93 PH (SU) 6.51 6.51 6.51 6.51 6.51 15.82 PH (SU) 6.70	0.16 Temp °C 27.66 27.64 27.64 27.64 27.64 Vell Capacity (gal) = 0.16 Temp °C 24.83	Volume (gal) 2.39 Cond (uMHOS) 4770 4785 4805 4805 4805 1Wel Vuel volume (gal) 2.53 Cond (uMHOS) 1593	(<u>Capacity</u> ∧ (<u>Gabacity</u> ∧ 0.0026 DO (mg/L) 0.28 0.27 0.27 0.27 0.27 0.27 0.27 0.27 0.27	(n) 100 Turbidity (NTU) 9.71 7.27 4.26 4.26 4.26 (t) 100 (t) 24.64 Turbidity (NTU) 19.10	(gai) 0 Purge Criteria ph:+/- 0.2 Temp®C+/- 0.2 Cond % +/- 5 D0 % Sat.< 20 Turb. NTU < 20 4 Purge Criteria ph:+/- 0.2 Temp®C+/- 0.2 Cond % +/- 5	(gal) = (gal)	Volume (rai) 0.32 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? I Uedicated Tubing? 0.12 Equipment ID Level Meter: Pump: Tubing:	WLM0 ESP PE Yes No Eqpt. Ta WLM0 PP PE/S
BBS-CCR-BW-1 Purge Meth: 1A Purge Start: 11:19 Purge End: 11:47 Purge Complete A Well # BBS-CCR-BW-2 Purge Meth: 1A Purge Start:	2 Time 11:43 11:45 11:47 At 11:20 Diam/ Comp 2 Time 10:47 10:49	10 Rate (mt/min) 930 950 950 950 Gallons to Purge Screen Interval (ft 10 Rate (mt/min) 330 320	Depth (ft) 39.3 Volume (gal) 5.90 0.50	Depth (ff) 44.3 Total Vol. (gal) 5.90 6.40 6.90 Stability V Well Depth -(ft) 23.84 Total Vol. (gal) 2.18 2.35	Water (m) 29.37 Water Depth (n) 30.40 30.41 30.40 //alues = Depth to Water B.02 Water Depth (n) 8.19 8.18	Column 14.93 PH (SU) 6.51 6.51 6.51 6.51 6.51 6.51 15.82 PH (SU) 6.70 6.69	0.16 Temp *C 27.66 27.64 27.64 27.64 27.64 Vell Capacity (gal) = 0.16 Temp *C 24.83 24.85	Volume (gal) 2.39 Cond (uMHOS) 4770 4785 4805 4805 1Weil Volume (gal) 2.53 Cond (uMHOS) 1593 1595	(^C _{(galin}) ∧ (^C _{(galin}) ∧ 0.0026 DO (mg/L) 0.28 0.27 0.27 0.27 0.27 0.27 0.27 0.27 0.27	(n) 100 Turbidity (NTU) 9.71 7.27 4.26 4.26 4.26 (Dergin) 24.64 Turbidity (NTU) 19.10 14.20	(gai) 0 Purge Criteria ph:+/- 0.2 Temp®C+/- 0.2 Cond % +/- 5 D0 % Sat.< 20 Turb. NTU < 20 	(gal) = (gal)	Volume (gal) 0.32 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? Unume (gal) 0.12 Equipment ID Level Meter: Pump:	WLM00 ESP PE Ves No Eqpt. Ta WLM0 PP PE/S

GROUNDWATER WELL SAMPLING EQUIPMENT CALIBRATION

				Date:	04/13/18	Sampler(s)	RAB		Initials	RAS			
pH Meter Calibration			Buffer ID	Buffer Value	Cal	Time				CCV	Time	Pass/Fail	
Meter ID:	MPM08	L	021961B	7	7.00	8:07	1			7.03	14:51	Pass	
FDEP FT 1100		L	020460B	10	10.04	8:07	1		QC (pH +/- 0.2)	(Cond +/- 5%) (DC	2 +/- 0.3mg/L) (Redox =	/- 10mv)	
Units; SU		L	020896E	4	4.00	8:07	ICV	Time	Pass/Fail	A checked box li	ndicates ICV / CCV pa	ssed	
	ICV Check	L	020895K	7			7.03	811	Pass				
Conductivity Meter Calib.			Standard ID	Std Value	Cal	Time	ICV	Time	Pass/Fail	CCV	Time	Pass/Fail	
Meter ID:	MPM08	L	019356D	1000	1000	8:16	A		1			T	
FDEP FT 1200, Units: uMH	OS	L	020249C	10000			9745	8:22	Pass	9730	14:53	Pass	
Turbidity Meter Calibratio			Standard ID	Std Value	Acceptability		CCV	Time	Pass/Fail	CCV	Time	Pass/Fail	
Meter ID:	TM07	L	019883	5.56	5.00	6.12	5.66	7:58	Pass				
FDEP FT 1600, Units: NTU		L	019884	52.20	48.81	55.59			1	52.70	15:02	Pass	8
Sulfite Info (QC Check)	(EPA 377.1)			QC Result mg/l	Time	Titrator ID	Na Thio ID	DO 3 Pillow ID	Starch Ind. ID	Iodate/Iodide ID			
QC Std: 5ml (NaThio)/500m	I DI=10mg/L			1	1	l	L	L	L	L			
Redox Cal	Time		Temp ^v C	Reading mv	Theo Value mv	Pass / Fail	DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg/l	Pass / Fall	
							FDEP FT 1500						
Meter ID:	8:26		21.6	236.2	236.2	Pass	Meter ID:	7:59	21.9	8.80	8.761	Pass	
MPM08	14:56		21.6	235.5	236.2	Pass	MPM08	15:09	22.7	8.54	8.627	Pass	8
Zobell Sol ID:		1				-	Barom. Pres						
L 020893A 🔝				1			760				· · · · · · · · · · · · · · · · · · ·		
Therm ID	рH		Conduct. %	DO mg/l	Redox mv	CL2	Calibration	Ferrous Iron					8
MPM08	0.2	-	5	0.3	10	0.2	Criterion	Comparator ID:		Reagent ID:	14 G		
CIO ₂ DPD Check must read	1 +/- 10% of the	Calcu	lated Std. Conce	ntration, multiplie	d by 2.4.	r	Glycene check shou	ld read < 0.10 mg/l Cl	O ₂ .				
							Initial Calibration	on Verification ICV		Continuous Call	bration Verification C	cv	Method 10126*
Chlorine Dlaxide (mg/i)	Std. Conc. (mg/l)	Std.	. Spike Volume (ml)	Cal Sample Volume (ml)	Calc, Std. Conc. (mg/l)	DPD Check (mg/l)	Glycene Check	Time	Pass/Fall	DPD Check (mg/l)	Time	Pass/Fall	*Equivalent to Standard Methods
Meter ID:	N	1 -	1.0	100					1	12.5			4500 CIO2 D.
1 3 1 1 3 3 M 1			1.4	DPD ID: L	****	Glycene ID	n C	A ch	acked hox indicat	es reagent expiratio	on date has been verifie	nd .	

COMMENTS: CL2 Std. ID: L

FACILITY NAME:		Big Be	end			SITE LOCATION:		Apollo I	Beach, FL.		
WELL NO:	В	BS-CCR-1			SAMPLE ID:	L18D0)79-01 A	-	DATE:	4/13/18	
					PURGI	NG DATA					
WELL DIAMETER (inches)	TUBING DIAMETER (inc	hes) 1/4	WELL SCR DEPTH 12.32	EEN INTERV. feet to		STATIC DEP TO WATER (TH feet): 7.40	PURGE PUMP T OR BAILER:	^{YPE} PP	
WELL VOLUME PURGE (only fillout if applicable)		1 WELL VOLU	WE = (TOTAL WE) = (LL DEPTH - STATIC DE	EPTH TO WATE	R) X WELL CAPACI	TY feet) x		gallons/foo		gallons
EQUIPMENT VOLU		1 EQU		. = PUMP VOLUM		CAPACITY X T	,	TH) + FLOW CEL	Ŭ		gailoris
(only fillout if application	able)		=(0	gallons + (0.0026 gallo	ns/foot X	23.3 feet) +	0.06	gallons =	0.12 gallons
INITIAL PUMP OR DEPTH IN WELL (f			FINAL PUMP DEPTH IN WI	ELL (feet): 17	.32	PURGING INITIATED AT:	12:57		13:11	TOTAL VOLUN PURGED (gallo	//E pns): 1.19
TIME	VOLUME PURGED (GALLONS)	CUMUL. VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circle mg/l r % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
13:07	0.85	0.85	0.09	7.48	6.83	24.80	4170	0.16	1.57	Lt. Yellow	None
13:09	0.17	1.02	0.09	7.48	6.83	24.84	4166	0.12	4.23	Lt. Yellow	None
13:11	0.17	1.19	0.09	7.49	6.83	24.90	4167	0.11	3.76	Lt. Yellow	None
WELL CAPACITY (Ga TUBING INSIDE DIA.			1" = 0.04; 1 3/16" = 0.0014;	.25" = 0.06; 2" = 1/4" = 0.0026;	0.16; 3" = 5/16" = 0.004;	0.37; 4 " = 0.6 3/8 " = 0.006;	5; 5" = 1 1/2" = 0.0		12" = 5.88		ł
		<u>j. 170 – 0.00000, </u>	3/10 - 0.0014,	174 - 0.0020,	-	ING DATA	1/2 - 0.0	<u>10, 370 - 0</u>			
SAMPLED BY (PR	INT) / AFFILIATIO RAB		TECO	SAMPLER (S) SIG	GNATURES:			SAMPLING INITIATED AT:	13:11	SAMPLING ENDED AT: 1	3:23
PUMP OR TUBING DEPTH IN WELL (f	; eet): 17.3			SAMPLE PUMP FLOW RATE (mL	. per minute):	3	323	TUBING MATERIAL CODE	: PE	/S	
FIELD DECONTAN	IINATION: Y	N 🗸		FIELD-FILTERED Filtration Equipme			ER SIZE:	μm	DUPLICATE:	Y 🔲 N 🗹	1
	SAMPLE CON SPECIFICA				SAMPLE PRE	SERVATION		INTEI	NDED	SA	MPLING
SAMPLE ID CODE	# CONTAINERS	MATERIAL	VOLUME	PRESERVATIVE USED		AL VOL.	FINAL pH	ANALYSIS MET	s and/or 'Hod		IIPMENT CODE
SAMPLE ID CODE	CONTAINERS	CODE		USED	ADDED IN	FIELD (ml) ₍₁₎	рн				
@Ino-500	1	PE	500ml	NONE	N	ONE	N/A	Inorg	anics		PP
@Met-250	2	PE	250ml	HNO3		1ml	<2	Me	tals		PP
@Rad-1L	2	PE	1L	HNO3		5ml	<2	Radiol	ogicals		PP
REMARKS:	I	L	I	l	1		1	l		I	
(1) Sample bot	ttles pre-pres	erved at lab	oratory prio	r to sample co	llection.						
MATERIAL CODES:			lear Glass;	PE = Polyethylene;					er (Specify)		
SAMPLING/PURGIN EQUIPMENT CODE	IG A S: F	APP = After Perist RFPP = Reverse F	altic Pump; B = low Peristaltic F	= Bailer; BP = Blad Pump; SM = Straw	der Pump; ES Method (tubing	P = Electric Subm Gravity Drain); N	irsable Pump; /T = Vacuum T	PP = Peristaltic Pum rap; O = Other (Spe	ip ecify)		
NOTES:				nformation requi				SEE ES 2212 SE(

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212. SECTION 3)

pH: \pm 0.2 units Temperature: \pm 0.2 °C Specific Conductance: \pm 5% Dissolved Oxygen: all readings \leq 20% saturation (see Table FS 2200-2);

ITE AME: Big Bend					SITE LOCATION: Apollo Beach, FL.						
WELL NO:	BI	BS-CCR-2			SAMPLE ID:	•	079-02 A		DATE:	4/13/18	
					PURGI	NG DATA					
WELL DIAMETER (inches		TUBING DIAMETER (inc	ches) 1/4	WELL SCREEN IN DEPTH 11.84	ITERVAL feet to	21.84 (feet)	STATIC DEPTH TO WATER (fee	t): 6.89	PURGE PUMP T OR BAILER:	PP PP	
WELL VOLUME PL (only fillout if application)		1 WELL VO	LUME = (TOT) = (AL WELL DEPTH -	STATIC DEP feet -	TH TO WATER)	X WELL CA	PACITY	gallons/foo	t =	gallons
EQUIPMENT VOLU	UME PURGE: able)	1 EQU	1	. = PUMP VOLUME			,	,	LL VOLUME		
	TUDINO		=(0	gallons + (, i i i i i i i i i i i i i i i i i i i	ons/foot X		t)+ 0.06	gallons =	0.12 gallon
INITIAL PUMP OR DEPTH IN WELL (f	^{feet):} 16.84		FINAL PUMP DEPTH IN W	ELL (feet): 16.	84	PURGING INITIATED AT:	12:28		12:39	TOTAL VOLUN PURGED (gallo	ons): 0.8
TIME	VOLUME PURGED (GALLONS)	CUMUL. VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circle(mg/))r % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
12:35	0.55	0.55	0.08	6.95	6.88	24.50	1366	0.36	4.62	Lt Yellow	Mild
12:37	0.16	0.71	0.08	6.96	6.87	24.54	1360	0.21	3.14	Lt Yellow	Mild
12:39	0.16	0.87	0.08	6.97	6.86	24.60	1365	0.20	2.96	Lt Yellow	Mild
WELL CAPACITY (Ga	allons Per Foot): 0	0.75" = 0.02;	1" = 0.04;	1.25" = 0.06; 2" = 0	0.16; 3" =	0.37: 4" = 0.6	65; 5" = 1	.02; 6" = 1.47;	12" = 5.88		
TUBING INSIDE DIA.	,		3/16" = 0.0014;	1/4" = 0.0026;	5/16" = 0.004;	3/8" = 0.006; ING DATA	1/2" = 0.0				
SAMPLED BY (PRI	INT) / AFFILIATIO	ON:		SAMPLER (S) SIG	NATURES:	_		SAMPLING INITIATED AT:		SAMPLING ENDED AT:	
	RAB	8	TECO					TUDINO	12:39	9	12:5
PUMP OR TUBING DEPTH IN WELL (fe	; ieet): 16.8			SAMPLE PUMP FLOW RATE (mL			303	TUBING MATERIAL CODE	E PE	/S	
FIELD DECONTAM		/ 🗋 N 🗹		FIELD-FILTERED: Filtration Equipmer	nt Type	N 🗹 FILTE	ER SIZE:	μm	DUPLICATE:	Y 🔲 N 🗹	1
	SAMPLE CON SPECIFICA				SAMPLE PRESERVATION				INTENDED ANALYSIS AND/OR		
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED		al vol. I Field (mi) ₍₁₎	FINAL pH		IS AND/OR THOD		IPMENT ODE
Que . 500	4		5001	NONE	N		N1/A	Incr			PP
@Ino-500	1	PE	500ml	NONE	N	ONE	N/A	Inorg	janics		PP
@Met-250	2	PE	250ml	HNO3		1ml	<2	Me	etals		PP
@Rad-1L	2	PE	1L	HNO3		5ml	<2	Radio	logicals		PP
		1	I	1			I	1		1	
REMARKS:											
(1) Sample bot				or to sample co		- Dahmaran da	c 01	T T - 4	0-04		
	S: AG = Ambe	r Glass; CG	i = Clear Glass	•	/lene; PP der Pump; ES	P = Polypropylene P = Electric Subm g Gravity Drain);	irsable Pump;	PP = Peristaltic Pur	np	ecify)	

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2);

SITE NAME: Big Bend						SITE LOCATION:		Apollo	Beach, FL.		
WELL NO:	В	BS-CCR-3			SAMPLE ID:	L18D	079-03 A	2	DATE:	4/13/18	
					PURGI	NG DATA					
WELL DIAMETER (inches)	TUBING DIAMETER (inc	hes) 1/4	WELL SCREEN IN DEPTH 13.23		23.23 (feet)	STATIC DEP TO WATER (2TH (feet): 6.63	PURGE PUMP T' OR BAILER:	YPE PP	
WELL VOLUME PU (only fillout if application	IRGE: able)	1 WELL VO	LUME = (TOTA = (AL WELL DEPTH -	STATIC DEP feet -	TH TO WATER)	X WELL CA	PACITY	gallons/foo	. + –	gallons
EQUIPMENT VOLU		1 EQL		. = PUMP VOLUM		CAPACITY X T		TH) + FLOW CE		. –	gailons
(only fillout if applica	able)		=(0	gallons + (0.0026 gallo	ns/foot X	24.23 fee	et)+ 0.06	gallons =	0.12 gallons
INITIAL PUMP OR T DEPTH IN WELL (f	TUBING eet): 18.23		-(FINAL PUMP DEPTH IN WI	OR TUBING	.23	PURGING INITIATED AT:		PURGING ENDED AT:	,	TOTAL VOLUN PURGED (gallo	/E
TIME	VOLUME PURGED (GALLONS)	CUMUL. VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circle mg/l pr % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
12:09	0.70	0.70	0.12	7.14	6.42	24.16	1826	0.21	4.19	Lt Yellow	Mild
12:11	0.24	0.94	0.12	7.15	6.42	24.15	1821	0.23	4.36	Lt Yellow	Mild
12:13	0.24	1.18	0.12	7.15	6.41	24.06	1811	0.19	3.79	Lt Yellow	Mild
12.10	0.21		0.12	1.10	0.11	21.00		0.10			
WELL CAPACITY (Ga TUBING INSIDE DIA. SAMPLED BY (PRI	CAPACITY (Gal./Ft	.): 1/8" = 0.00006;	1" = 0.04; 1 3/16" = 0.0014;	.25" = 0.06; 2" = 1/4" = 0.0026; SAMPLER (S) SIG	5/16" = 0.004; SAMPL	3/8" = 0.006; ING DATA	35; 5" = - 1/2" = 0.0		12" = 5.88	SAMPLING ENDED AT:	
	RAE	3	TECO						:13	1	2:22
PUMP OR TUBING DEPTH IN WELL (fe	eet): 18.2	2		SAMPLE PUMP FLOW RATE (mL	per minute):	2	147	TUBING MATERIAL CODE	E PE	/S	
FIELD DECONTAM	INATION:	Y 🗖 N 🗹		FIELD-FILTERED Filtration Equipme	nt Type	N 🗹 🛛 FILTE	ER SIZE:	μm	DUPLICATE:	Y 🗖 N 🗖	•
	SAMPLE CON SPECIFICA				SAMPLE PRE	SERVATION		INTE	NDED		MPLING
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED		al vol. I field (mi) ₍₁₎	FINAL pH		S AND/OR HOD		IIPMENT CODE
@Ino-500	1	PE	500ml	NONE	N	ONE	N/A	Inorg	janics		PP
@Met-250	2	PE	250ml	HNO3		1ml	<2	Me	tals		PP
@Rad-1L	2	PE	1L	HNO3		5ml	<2		logicals		PP
WRad-TL	2					Jilli	~2	Tadioi	ogicals		
REMARKS:			•							•	
(1) Sample bot	tles pre-pres	erved at lab	oratory prio	r to sample co	llection.						
MATERIAL CODES			= Clear Glass			= Polypropylene			· · · ·	cify)	
SAMPLING/PURGIN EQUIPMENT CODES	6: F	RFPP = Reverse F	low Peristaltic F	= Bailer; BP = Blad Pump; SM = Straw	Method (tubing	Gravity Drain);	/T = Vacuum T	PP = Peristaltic Purr rap; O = Other (Spe	np ecify)		

NOTES: 1. The above do not constitute all of the information requierd by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212. SECTION 3)

 $\textbf{pH:} \pm 0.2 \text{ units } \textbf{Temperature:} \pm 0.2 \text{ °C } \textbf{Specific Conductance:} \pm 5\% \textbf{ Dissolved Oxygen:} all readings \leq 20\% \text{ saturation (see Table FS 2200-2);} \textbf{readings} = 100\% \text{ saturation} \text{$

SITE NAME:		Big Be	end			SITE LOCATION:		Apollo I	Beach, FL.		
WELL NO:	BBS	-CCR-BW	/-1		SAMPLE ID:	L18D0	79-04 A		DATE:	4/13/18	
						NG DATA					
WELL DIAMETER (inches	s)	TUBING DIAMETER (inc	, ., .	WELL SCREEN IN DEPTH 34.30	feet to			TH feet): 29.37	PURGE PUMP T' OR BAILER:	ESP	
WELL VOLUME P (only fillout if applic		1 WELL VO	LUME = (TOTA = (AL WELL DEPTH -	STATIC DEP feet -	TH TO WATER)	X WELL CA	PACITY	gallons/foo	t =	gallons
EQUIPMENT VOL (only fillout if applic	UME PURGE: cable)	1 EQU	JIPMENT VOL	= PUMP VOLUM	E + (TUBING	CAPACITY X T 0.0026 gallo		TH)+ FLOW CEI 100 fee	LL VOLUME et) + 0.06	gallons =	0.32 gallons
INITIAL PUMP OR DEPTH IN WELL (1		1	FINAL PUMP DEPTH IN WI	OR TUBING	.30	PURGING INITIATED AT:		PURGING ENDED AT:	11:47	TOTAL VOLUN	ИЕ
TIME	VOLUME PURGED (GALLONS)	VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circle mg/l pr % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
11:43	5.90	5.90	0.25	30.40	6.51	27.66	4770	0.28	9.71	Clear	None
11:45	0.50	6.40	0.25	30.41	6.51	27.64	4785	0.27	7.27	Clear	None
11:47	0.50	6.90	0.25	30.40	6.51	27.64	4805	0.27	4.26	Clear	None
WELL CAPACITY (TUBING INSIDE DI	,	0.75" = 0.02; //Ft.): 1/8" = 0.00	1" = 0.0 006; 3/16" =	4; 1.25 " = 0.0 = 0.0014; 1/4 " =	0.0026;	0.16; 3" = 0.3 5/16" = 0.004; NG DATA	37; 4 " = 3/8 " = 0.006	,	: 1.02; 6" = 1 10; 5/8	.47; 12" = " = 0.016	= 5.88
SAMPLED BY (PR	RINT) / AFFILIATIO	ON:		SAMPLER (S) SIG	NATURES:			SAMPLING INITIATED AT:		SAMPLING ENDED AT:	
	RAB		TECO	SAMPI E PLIMP					:47	1	1:51
PUMP OR TUBING DEPTH IN WELL (1 FIELD DECONTAN				SAMPLE PUMP FLOW RATE (mL FIELD-FILTERED			43 R SIZE:	TUBING MATERIAL CODE µm	DUPLICATE:	<u>=</u> Y 🗖 N 🖪	7
	SAMPLE CON	TAINER		FIELD-FILTERED Filtration Equipme	nt Type.			INTE	NDED		
SAMPLE ID CODE	SPECIFICA # CONTAINERS	TION MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOT	AL VOL. FIELD (ml) (1)	FINAL pH	ANALYSI	S AND/OR HOD	EQU	JIPMENT CODE
@Ino-500	1	PE	500ml	NONE	N	ONE	N/A	Inorg	anics	I	ESP
@Met-250	2	PE	250ml	HNO3		1ml	<2	Mo	tals		ESP
@Rad-1L	2	PE	1L	HNO3		5ml	<2		ogicals		ESP
REMARKS:	ttles pro proc	erved at lab		r to sample or	llection					1	
(1) Sample bo MATERIAL CODE			= Clear Glass	•		= Polypropylene	S = Silico	one; T = Teflon;	O = Other (Spe	cify)	
SAMPLING/PURGIN	NG A	PP = After Perist	altic Pump; B	= Bailer; BP = Blad	der Pump; ES	P = Electric Submi	rsable Pump;	PP = Peristaltic Pum rap; 0 = Other (Spe	1p		
NOTES:				formation requi					sony)		
	2. STABILIZATIO	N CRITERIA FOR	RANGE OF VA	RIATION OF LAST	THREE CONS	ECUTIVE READIN	GS (SEE FS 2	212. SECTION 3) on (see Table FS 22)	00.2).		

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2);

WELL NO:	BBS	-CCR-BW	1-2		SAMPLE ID:	L18D0)79-05 A		DATE:	4/13/18	
							/ J J J J J J J J J J J J J J J J J J J				
					PURGI	NG DATA			1		
DIAMETER (inche		TUBING DIAMETER (inc		WELL SCREEN IN DEPTH 13.64		23.34 ^(feet)	STATIC DEP TO WATER (TH feet): 8.02	PURGE PUMP T OR BAILER:	^{YPE} PP	
WELL VOLUME P (only fillout if applic		1 WELL VO	LUME = (TOT) = (AL WELL DEPTH -	STATIC DEP feet -	TH TO WATER)	X WELL CA	PACITY	gallons/foo	t =	gallons
EQUIPMENT VOL (only fillout if applic	UME PURGE: ;able)	1 EQU	JIPMENT VOL	. = PUMP VOLUME	,	CAPACITY X T 0.0026 gallo		TH) + FLOW CE 24.64 fee		gallons =	0.12 gallons
INITIAL PUMP OR DEPTH IN WELL (FINAL PUMP DEPTH IN W	OR TUBING	.49	PURGING INITIATED AT:		PURGING ENDED AT:	10:51	TOTAL VOLU	ИЕ
TIME	VOLUME PURGED (GALLONS)	VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circlerng/lor % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
10:47	2.18	2.18	0.09	8.19	6.70	24.83	1593	0.71	19.10	Lt Yellow	None
10:49	0.17	2.35	0.09	8.18	6.69	24.85	1595	0.65	14.20	Lt Yellow	None
10:51	0.17	2.52	0.09	8.17	6.69	24.90	1593	0.61	17.30	Lt Yellow	None
WELL CAPACITY (411 0.0	1.05"	06; 2" = 0			= 0.65; 5 " =	= 1.02: 6" = 1	17 10	5.00
`	A. CAPACITY (Gal./	0.75" = 0.02; /Ft.): 1/8" = 0.00		04; 1.25 " = 0.0 = 0.0014; 1/4 " = 1	0.0026;	0.16; 3" = 0.3 <u>5/16" = 0.004;</u> ING DATA	3/8 " = 0.006		- /	" = 0.016	= 5.88
SAMPLED BY (PF	RINT) / AFFILIATIO	DN:		SAMPLER (S) SIG	-			SAMPLING INITIATED AT:		SAMPLING ENDED AT:	
	RAB		TECO					10	:51	1	1:02
PUMP OR TUBINO DEPTH IN WELL (feet): 18.5			SAMPLE PUMP FLOW RATE (mL			323	TUBING MATERIAL CODE	E PE	/S	
FIELD DECONTA		r 🗖 n 🗹		FIELD-FILTERED Filtration Equipme	nt Type		R SIZE:	μm	DUPLICATE:	Y 🔲 N	~
	SAMPLE CONT SPECIFICAT				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR		SAMPLING EQUIPMENT	
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED		AL VOL. FIELD (ml) ₍₁₎	FINAL pH		S AND/OR THOD		CODE
		DE	5001	NONE	NI		N1/A	Inora	ranica		PP
@Ino-500	1	PE	500ml	NONE		ONE	N/A	inorg	janics		PP
@Met-250	2	PE	250ml	HNO3		1ml	<2	Ме	etals		PP
@Rad-1L	2	PE	1L	HNO3	į	5ml	<2	Radio	logicals		PP
	 										
REMARKS:	<u> </u>		<u> </u>	<u> </u>	<u> </u>						
(1) Sampla hr	ottles pre-prese			•		- Dehmannede		T T C	0 -04+	-: 6. ()	
· / ·	a		= Clear Glass	; PE = Polyeth	yiene; PP	= Polypropylene	; S = Silico	one; T = Teflon;	; 0 = Other (Spe	CITV)	
(1) Sample DC MATERIAL CODE SAMPLING/PURGII EQUIPMENT CODE	NG AI	PP = After Perist	altic Pump; B	= Bailer; BP = Blad Pump; SM = Straw	der Pump; ES Method (tubing	P = Electric Submi Gravity Drain); ∖	rsable Pump; /T = Vacuum T	PP = Peristaltic Pun rap; 0 = Other (Spe	np ecify)		

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2);



DOH Certification #E84025 DEP COMPQAP # 870251

Report Date: May 2, 2018

Field Custody:

TECO 5012 Causeway Blvd. Tampa, FL 33619

Attn: Peggy Penner

Client/Field ID: Sample Collection: Lab ID No: Lab Custody Date: Sample description: Client L18D079-01 BBS-CCR-1 04-13-18/1323 18.3632 04-13-18/1520 Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Re	sul	ts	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	34.0	±	1.6	Calc	Calc	0.7
Radium-226	pCi/l	29.3	±	1.6	4-25-18/1208	EPA 903.0	0.5
Radium-228 Alpha Standard: Th-230	pCi/l	4.7	±	0.8	4-27-18/1146	EPA Ra-05	0.7

James W. Hages

James W. Hayes Laboratory Manager

Test results meet all requirements of the NELAC standards. Statement of estimated uncertainty available upon request. Test results refer only to sample(s) listed. Contact person: Jim Hayes (813) 229-2879.

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QC Summary: Radium 228 Analysis Client Project #: $_ L180079-01$ Analysis Completion Date: $\underline{4}$ / $\underline{27}$ / $\underline{18}$

Precision Data:	Sampl	le #: 18.3649	-
Sample Analysis (pCi/l) 3.7	Duplicate Analysis (pC 4,]	<u>Ci/l)</u> <u>Range (pCi/l)</u> 	RPD (%) 10.26
Spike Data:	Samp	le #: 18.3649	_
Sample Analysis (pCi/l)	Spike Added (pCi/l)	Analytical Result (pCi/l) <u>Spike Rec (%)</u>
0.0	3.94	4.1	104
LCS Data:			
Analytical Result (pCi/l)	True Value (pC	<u>2i/l) 9</u>	6 Recovery
4.0	3.94		102
Lab Blank:	Analytical Rest	ılt (pCi/l)	Analysis Date
Lab Blank	<u>0.0</u> +/-		1,27,18



QC Summary: Total Radium Analysis Client Project #: (280079.01)Analysis Completion Date: (4/25/18)

Precision Data:	Sample #	#: 18.3633	
Sample Analysis (pCi/l)	Duplicate Analysis (pCi/l)	Range (pCi/l)	<u>RPD (%)</u> <u>S.44</u>
Spike Data:	Sample #	#: <u>18.3633</u>	
Sample Analysis (pCi/l)	Spike Added (pCi/l) Ana 4.5	lytical Result (pCi/l)) ん	<u>Spike Rec (%)</u> _/04
LCS Data:			
Analytical Result (pCi/l)	True Value (pCi/l)	<u>% R</u>	ecovery
10.2	9.1		112
Lab Blank:	Applicational Descript (lucia Data
Lab Blank	Analytical Result (0.4 + 0.4		Iysis Date 1 251 18



DOH Certification #E84025 DEP COMPQAP # 870251

Report Date: May 2, 2018

Field Custody:

TECO 5012 Causeway Blvd. Tampa, FL 33619

Attn: Peggy Penner

Client/Field ID: L180 BBS-Sample Collection: 04-1 Lab ID No: 18.3 Lab Custody Date: 04-1 Sample description: Wate

Client L18D079-03 BBS-CCR-3 04-13-18/1222 18.3634 04-13-18/1520 Water

CERTIFICATE OF ANALYSIS

					Analysis		Detection
Parameter	Units	Re	sul	ts	Date	Method	Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	19.9	±	1.4	Calc	Calc	0.7
Radium-226	pCi/l	19.3	±	1.4	4-26-18/1220	EPA 903.0	0.5
Radium-228 Alpha Standard: Th-230	pCi/l	0.6	±	0.5	4-26-18/1132	EPA Ra-05	0.7

James W. Hages

James W. Hayes Laboratory Manager

Test results meet all requirements of the NELAC standards. Statement of estimated uncertainty available upon request. Test results refer only to sample(s) listed. Contact person: Jim Hayes (813) 229-2879.

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QC Summary: Total Radium Analysis

Client Project #: L180079-03Analysis Completion Date: 4/26/18

Precision Data:	Sample #: _	18.3650	
Sample Analysis (pCi/l)	Duplicate Analysis (pCi/l) 6.Ο	Range (pCi/l)	RPD (%) 20.12
Spike Data:	Sample #: _	18.3650	
Sample Analysis (pCi/l) 0.4	Spike Added (pCi/l) Analyti 4.5	cal Result (pCi/l)	<u>Spike Rec (%)</u> _/00
LCS Data:			
Analytical Result (pCi/l)	True Value (pCi/l)	<u>% R</u>	ecovery
10.1	9.1	1	11
Lab Blank:	Analytical Result (pCi	<u>i/l) Ana</u>	lysis Date
Lab Blank	0.) +/- 0.1	4	126,18



QC Summary: Radium 228 Analysis

Client Project # : _______ L180079-03

Analysis Completion Date: 4 / 26 / 18

Precision Data:	Sample #:	536
Sample Analysis (pCi/l)	Duplicate Analysis (pCi/l)Range4.60.	(pCi/l) <u>RPD (%)</u> 2 <u>4.44</u>
Spike Data:	Sample #:	536
Sample Analysis (pCi/l)	Spike Added (pCi/l) Analytical Res 3.99 4.4	ult (pCi/l) Spike Rec (%)
LCS Data:		
Analytical Result (pCi/l)	True Value (pCi/l)	% Recovery
4.0	3.94	102
Lab Blank:	Analytical Result (pCi/l)	Analysis Date
Lab Blank	0.0 +/- 0.2	4,25,18



DOH Certification #E84025 DEP COMPQAP # 870251

Report Date: May 2, 2018

TECO 5012 Causeway Blvd. Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client/Field ID: Sample Collection

Sample Collection: Lab ID No: Lab Custody Date: Sample description: Client L18D079-04 BBS-CCR-BW1 04-13-18/1151 18.3635 04-13-18/1520 Water

CERTIFICATE OF ANALYSIS

Parameter	Units Results				Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	36.3	±	1.8	Calc	Calc	0.7
Radium-226	pCi/l	32.2	±	1.8	4-26-18/1220	EPA 903.0	0.5
Radium-228 Alpha Standard: Th-230	pCi/l	4.1	±	0.7	4-26-18/1132	EPA Ra-05	0.7

James W. Hayes

James W. Hayes Laboratory Manager

Test results meet all requirements of the NELAC standards. Statement of estimated uncertainty available upon request. Test results refer only to sample(s) listed. Contact person: Jim Hayes (813) 229-2879.

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QC Summary: Total Radium Analysis

Analysis Completion Date: 4 / 26 / 18

Precision Data:	Samp	le #: 18.3650	-
Sample Analysis (pCi/l) 	Duplicate Analysis (pC	Ci/l) Range (pCi/l) / , /	RPD (%) 20.18
Spike Data:	Samp	le #: 18.3000	_
Sample Analysis (pCi/l)	Spike Added (pCi/l) 4.5	Analytical Result (pCi/l 4. 9) <u>Spike Rec (%)</u> _/ひし
LCS Data:			
Analytical Result (pCi/l)	True Value (po	<u>2i/l) 9</u>	<u> Recovery</u> 11γ
Lab Blank: Lab Blank	<u>Analytical Res</u>		Analysis Date 4 , 26 , 18



QC Summary: Radium 228 Analysis

Client Project # : _________

Analysis Completion Date: 4 / 26 / 18

Precision Data:	Sampl	e#: 18.3636		
Sample Analysis (pCi/l)	Duplicate Analysis (pC	<u>i/l) Range (pCi/ľ</u> <u>0.2</u>		
Spike Data:	Sampl	e#: <u>18</u> 3636		
Sample Analysis (pCi/l)	Spike Added (pCi/l)	Analytical Result (pC	Ci/l) Spike Rec (%)	
0.0	3,94	4.4	112	
LCS Data:				
Analytical Result (pCi/l)	True Value (pC	<u>i/l)</u>	% Recovery	
4.0	3.94		102	
Lab Blank:	Analytical Rest	ult (pCi/l)	Analysis Date	
Lab Blank	0.0 +/		4,25,18	

SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Services

L18D079

SENDING LABORATORY:

Tampa Electric Company, Laboratory Services 5012 Causeway Blvd Tampa, FL 33619 Phone: (813) 630-7490 Fax: (813) 630-7360 Project Manager: Peggy Penner

RECEIVING LABORATORY:

KNL Laboratory Services 3202 N. Florida Ave. Tampa, FL 33603 Phone :(813) 229-2879 Fax: -

04/20/18 16:00 **Due Date:**

Analysis	Expires		Laboratory ID	Comments
Sample ID: L18D079-01 BBS-CCR-1	2	Water	18. 3632	
Sampled: 04/13/18 13:23				
Radium 226+228, Total	10/10/18 13:23		Level 2 Data requred	
Radium 226 EPA 903.0	10/10/18 13:23		Level 2 Data requred	
Radium 228 Ra-05	10/10/18 13:23		Level 2 Data requred	
Containers Supplied:				
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000)mL (D)		
Sample ID: L18D079-02 BBS-CCR-2 Sampled: 04/13/18 12:51		Water	18.3633	SAMPLE
Radium 228 Ra-05	10/10/18 12:51		Level 2 Data requred	1 2001 2
Radium 226+228, Total	10/10/18 12:51		Level 2 Data requred	
Radium 226 EPA 903.0	10/10/18 12:51		Level 2 Data requred	
Containers Supplied:				
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000)mL (D)		
Sample ID: L18D079-03 BBS-CCR-3		Water	18:3634	
Sampled: 04/13/18 12:22			n-m	
Radium 228 Ra-05	10/10/18 12:22		Level 2 Data requred	
Radium 226+228, Total	10/10/18 12:22		Level 2 Data requred	
Radium 226 EPA 903.0	10/10/18 12:22		Level 2 Data requred	
Containers Supplied:				
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000)mL (D)		
Sample ID: L18D079-04 BBS-CCR-B Sampled: 04/13/18 11:51	W1	Water	18.3635	
Radium 228 Ra-05	10/10/18 11:51		Level 2 Data requred	
Radium 226+228, Total	10/10/18 11:51		Level 2 Data requred	
Radium 226 EPA 903.0	10/10/18 11:51		Level 2 Data requred	
Containers Supplied:				
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000	mL (D)		

Released By Ubum 13-Time Date

Received By

20

Date & Time

Released By



DOH Certification #E84025 DEP COMPQAP # 870251

Report Date: May 2, 2018

Field Custody:

TECO 5012 Causeway Blvd. Tampa, FL 33619

Attn: Peggy Penner

Client/Field ID: L18 BBS Sample Collection: 04-Lab ID No: 18. Lab Custody Date: 04-Sample description: Wat

Client L18D079-05 BBS-CCR-BW2 04-13-18/1102 18.3636 04-13-18/1520 Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Re	sul	ts	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	4.7	±	0.7	Calc	Calc	0.7
Radium-226	pCi/l	4.6	±	0.7	4-26-18/1220	EPA 903.0	0.4
Radium-228 Alpha Standard: Th-230	pCi/l	0.0	±	0.4	4-26-18/1132	EPA Ra-05	0.7

James W. Hayes

James W. Hayes Laboratory Manager

Test results meet all requirements of the NELAC standards. Statement of estimated uncertainty available upon request. Test results refer only to sample(s) listed. Contact person: Jim Hayes (813) 229-2879.

Page 1 of 1

KNL ENVIROMENTAL TESTING, INC. | 3202 NORTH FLORIDA AVENUE | TAMPA, FLORIDA 33603 813.229.2879 | KNLENVIRONMENTAL.COM



QC Summary: Total Radium Analysis

Client Project # : ______ LB 0079-05

Analysis Completion Date: 4 / 26 / 18

Precision Data:	Sample #:	650
Sample Analysis (pCi/l)	Duplicate Analysis (pCi/l) Range (pCi/l) 6.0 1.	$\frac{\text{pCi/l})}{1} \qquad \frac{\text{RPD}(\%)}{20.18}$
Spike Data:	Sample #:	50
Sample Analysis (pCi/l)	Spike Added (pCi/l) Analytical Result 4.5 4.9	lt (pCi/l) Spike Rec (%) /00
LCS Data:		
Analytical Result (pCi/l)	True Value (pCi/l)	% Recovery
10.1	9.1	171
Lab Blank:	Analytical Result (pCi/l)	Analysis Date
Lab Blank	0.1 _{+/-} 0.1	4,26,18

KNL-Total Radium Analysis - FL DOH Certification QC Data sheet – Form #140 Revised 6/30/16



FL DOH Certification # E84025

QC Summary: Radium 228 Analysis Analysis Completion Date: 4 / 26 / 18 Sample #: 18.3636 Precision Data: RPD (%) Range (pCi/l) Sample Analysis (pCi/l) Duplicate Analysis (pCi/l) 4.6 0.2 4.44 44 Sample #: 18.3636 Spike Data: Spike Added (pCi/l) Analytical Result (pCi/l) Spike Rec (%) Sample Analysis (pCi/l) 4.4 112 3.94 00 LCS Data: % Recovery True Value (pCi/l) Analytical Result (pCi/l) 102 4.0 3.94 Lab Blank: Analysis Date Analytical Result (pCi/l) 4,25,18 0.0 +/- 0.2 Lab Blank

SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Services

L18D079

Analysis	Expires		Laboratory ID Comments
Sample ID: L18D079-05 BBS-CCR Sampled: 04/13/18 11:02	-BW2	Vater	18-3636
Radium 228 Ra-05	10/10/18 11:02		Level 2 Data requred
Radium 226+228, Total	10/10/18 11:02		Level 2 Data requred
Radium 226 EPA 903.0	10/10/18 11:02		Level 2 Data requred
Containers Supplied: RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000mL (D)	

En Warm Co Time Released By

KAK E Date & Time Received By

64-13-1e 1520

Released By

Date & Time



THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

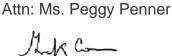
TestAmerica Laboratories, Inc.

TestAmerica Tampa 6712 Benjamin Road Suite 100 Tampa, FL 33634 Tel: (813)885-7427

TestAmerica Job ID: 660-86743-1 Client Project/Site: L18D079

For:

Tampa Electric Company 5012 Causeway Boulevard Tampa, Florida 33619



Authorized for release by: 4/20/2018 7:11:19 PM

Keaton Conner, Project Manager I (813)885-7427 keaton.conner@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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Lab Sample ID	Client Sample ID	Matrix	Collected Received
660-86743-1	L18D079-01	Water	04/13/18 13:23 04/16/18 12:00
660-86743-2	L18D079-02	Water	04/13/18 12:51 04/16/18 12:00
660-86743-3	L18D079-03	Water	04/13/18 12:22 04/16/18 12:00
660-86743-4	L18D079-04	Water	04/13/18 11:51 04/16/18 12:00
660-86743-5	L18D079-05	Water	04/13/18 11:02 04/16/18 12:00

Qualifiers

Metals

Metals		4 5
Qualifier	Qualifier Description	
Ι	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.	5
U	Indicates that the compound was analyzed for but not detected.	J

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.	
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis	_
%R	Percent Recovery	8
CFL	Contains Free Liquid	
CNF	Contains No Free Liquid	9
DER	Duplicate Error Ratio (normalized absolute difference)	
Dil Fac	Dilution Factor	
DL	Detection Limit (DoD/DOE)	
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample	
DLC	Decision Level Concentration (Radiochemistry)	
EDL	Estimated Detection Limit (Dioxin)	
LOD	Limit of Detection (DoD/DOE)	
LOQ	Limit of Quantitation (DoD/DOE)	
MDA	Minimum Detectable Activity (Radiochemistry)	13
MDC	Minimum Detectable Concentration (Radiochemistry)	
MDL	Method Detection Limit	
ML	Minimum Level (Dioxin)	
NC	Not Calculated	
ND	Not Detected at the reporting limit (or MDL or EDL if shown)	
PQL	Practical Quantitation Limit	
QC	Quality Control	
RER	Relative Error Ratio (Radiochemistry)	
RL	Reporting Limit or Requested Limit (Radiochemistry)	
RPD	Relative Percent Difference, a measure of the relative difference between two points	
TEF	Toxicity Equivalent Factor (Dioxin)	

TEQ Toxicity Equivalent Quotient (Dioxin)

Job ID: 660-86743-1

Laboratory: TestAmerica Tampa

Narrative

CASE NARRATIVE

Client: Tampa Electric Company

Project: L18D079

Report Number: 660-86743-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 4/16/2018 12:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.8° C.

TOTAL METALS (ICP)

Samples L18D079-01 BBS-CCR-1 (660-86743-1), L18D079-02 BBS-CCR-2 (660-86743-2), L18D079-03 BBS-CCR-3 (660-86743-3), L18D079-04 BBS-CCR-BW1 (660-86743-4) and L18D079-05 BBS-CCR-BW2 (660-86743-5) were analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010B. The samples were prepared on 04/18/2018 and analyzed on 04/19/2018.

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

Detection Summary

		Detec	tion Sur	nmary	/			
Client: Tampa Electric C Project/Site: L18D079	ompany					TestA	merica Job I	D: 660-86743-1
Client Sample ID: L	.18D079-01					Lab S	ample ID:	660-86743-1
Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D Method	Prep Type
Lithium	0.022	Ι	0.050	0.0010	mg/L	1	6010B	Total/NA
Client Sample ID: L	.18D079-02					Lab S	ample ID:	660-86743-2
Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D Method	Prep Type
Lithium	0.017	Ī	0.050	0.0010	mg/L	1	6010B	Total/NA
Client Sample ID: L	.18D079-03					Lab S	ample ID:	660-86743-3
Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D Method	Prep Type
Lithium	0.015	I	0.050	0.0010	mg/L	1	6010B	Total/NA
Client Sample ID: L	.18D079-04					Lab S	ample ID:	660-86743-4
Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D Method	Prep Type
Lithium	0.026	I	0.050	0.0010	mg/L	1	6010B	Total/NA
Client Sample ID: L	.18D079-05					Lab S	ample ID:	660-86743-5
Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D Method	Prep Type
Lithium	0.0099	·	0.050	0.0010	ma/l	1		Total/NA

Client Sample Results

Client: Tampa Electric Company Project/Site: L18D079

Client Sample ID: L18D079-01 Date Collected: 04/13/18 13:23 Date Received: 04/16/18 12:00						L	.ab Sample	e ID: 660-80 Matrix	6743-1 : Water
Method: 6010B - Metals (ICP) Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.022	I	0.050	0.0010	mg/L		04/18/18 11:28	04/19/18 14:32	1
Client Sample ID: L18D079-02 Date Collected: 04/13/18 12:51 Date Received: 04/16/18 12:00						L	.ab Sample	e ID: 660-80 Matrix	6743-2 : Water
Method: 6010B - Metals (ICP) Analyte		Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.017	I	0.050	0.0010	mg/L		04/18/18 11:28	04/19/18 14:36	1
Client Sample ID: L18D079-03 Date Collected: 04/13/18 12:22 Date Received: 04/16/18 12:00						L	ab Sample	e ID: 660-80 Matrix	6743-3 : Water
Method: 6010B - Metals (ICP) Analyte		Qualifier	PQL		Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.015	I	0.050	0.0010	mg/L		04/18/18 11:28	04/19/18 14:39	1
Client Sample ID: L18D079-04 Date Collected: 04/13/18 11:51 Date Received: 04/16/18 12:00						L	ab Sample	e ID: 660-80 Matrix	6743-4 : Water
Method: 6010B - Metals (ICP) Analyte	Result	Qualifier	PQL		Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.026	I	0.050	0.0010	mg/L		04/18/18 11:28	04/19/18 14:42	1
Client Sample ID: L18D079-05 Date Collected: 04/13/18 11:02 Date Received: 04/16/18 12:00						L	ab Sample	e ID: 660-80 Matrix	6743-5 : Water
Method: 6010B - Metals (ICP) Analyte	Result	Qualifier	PQL		Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.0099	I	0.050	0.0010	mg/L		04/18/18 11:28	04/19/18 14:46	1

Method:	6010B -	Metals	(ICP)

Lab Sample ID: MB 400-3943	328/1-A						Cli	ent Sam	ple ID: Me	thod	Blank
Matrix: Water									Prep Typ	e: To	tal/NA
Analysis Batch: 394603									Prep Ba	ch: 3	94328
-		MB MB									
Analyte	Re	sult Qualifier	Р	QL I	MDL Unit		DF	Prepared	Analyze	ed	Dil Fac
Lithium	0.0	0010 U	0.0	0.00 0.0	0010 mg/L		04/	18/18 11:2	8 04/19/18 1	3:37	1
Lab Sample ID: LCS 400-394	328/2-A					Clie	ent Sa	mple ID	: Lab Cont	rol S	ample
Matrix: Water									Prep Typ		
Analysis Batch: 394603									Prep Ba		
			Spike	LCS	LCS				%Rec.		
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits		
Lithium			1.00	1.05		mg/L		105	80 - 120		
Lab Sample ID: 400-152010- Matrix: Water Analysis Batch: 394603	J-2-K 1VIS						U U	lient Sa	mple ID: N Prep Typ Prep Bat	e: To	tal/NA
	Sample	Sample	Spike	MS	MS				%Rec.		
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits		
Lithium	0.30		1.00	1.40		mg/L		110	75 - 125		
_ Lab Sample ID: 400-152010-	J-2-L MSI	C				Client	Sam	ole ID: M	atrix Spik	e Dup	olicate
Matrix: Water									Prep Typ		
Analysis Batch: 394603									Prep Ba		
•	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
			1.00	1.41							

QC Association Summary

Metals

Prep Batch: 394328

_ab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
60-86743-1	L18D079-01	Total/NA	Water	3010A	
60-86743-2	L18D079-02	Total/NA	Water	3010A	
60-86743-3	L18D079-03	Total/NA	Water	3010A	
60-86743-4	L18D079-04	Total/NA	Water	3010A	
60-86743-5	L18D079-05	Total/NA	Water	3010A	
IB 400-394328/1-A	Method Blank	Total/NA	Water	3010A	
CS 400-394328/2-A	Lab Control Sample	Total/NA	Water	3010A	
00-152010-J-2-K MS	Matrix Spike	Total/NA	Water	3010A	
00-152010-J-2-L MSD	Matrix Spike Duplicate	Total/NA	Water	3010A	
alysis Batch: 3946 ab Sample ID	03 Client Sample ID	Prep Type	Matrix	Method	Prep Batch
60-86743-1		Total/NA	Water	6010B	394328
60-86743-2	L18D079-02	Total/NA	Water	6010B	394328
60-86743-3	L18D079-03	Total/NA	Water	6010B	394328
60-86743-4	L18D079-04	Total/NA	Water	6010B	394328
60-86743-5	L18D079-05	Total/NA	Water	6010B	394328
IB 400-394328/1-A	Method Blank	Total/NA	Water	6010B	394328
CS 400-394328/2-A	Lab Control Sample	Total/NA	Water	6010B	394328
	Materia Onilla	Total/NA	Water	6010B	394328
400-152010-J-2-K MS	Matrix Spike	TOtal/INA			001020

Initial

Amount

50 mL

Initial

Amount

50 mL

Batch

Number

394328

394603

Batch

Number

394328

394603

Final

Amount

50 mL

Final

Amount

50 mL

Dil

1

Dil

1

Factor

Factor

Run

Run

Date Collected: 04/13/18 13:23

Date Received: 04/16/18 12:00

Prep Type

Total/NA

Total/NA

Prep Type

Total/NA

Total/NA

Client Sample ID: L18D079-01

Batch

Туре

Prep

Client Sample ID: L18D079-02

Batch

Туре

Prep

Client Sample ID: L18D079-03

Date Collected: 04/13/18 12:22

Date Received: 04/16/18 12:00

Analvsis

Date Collected: 04/13/18 12:51

Date Received: 04/16/18 12:00

Analysis

Batch

Method

3010A

6010B

Instrument ID: 6500 ICP Duo

Batch

Method

3010A

6010B

Instrument ID: 6500 ICP Duo

Lab Sample ID: 660-86743-1

Analyst

Lab

Lab

TAL PEN

TAL PEN

Matrix: Water

Matrix: Water

TAL PEN

TAL PEN

Prepared

or Analyzed

Prepared

or Analyzed

04/18/18 11:28 KWN

04/19/18 14:36 GESP

04/18/18 11:28 KWN

04/19/18 14:32 GESP

Matrix: Water Lab Sample ID: 660-86743-2 Matrix: Water

10

Lab Sample ID: 660-86743-3 Matrix: Water

Lab Sample ID: 660-86743-4

Lab Sample ID: 660-86743-5

Analyst

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	394328	04/18/18 11:28	KWN	TAL PEN
Total/NA	Analysis	6010B		1			394603	04/19/18 14:39	GESP	TAL PEN
	Instrumer	nt ID: 6500 ICP Du	ю							

Client Sample ID: L18D079-04 Date Collected: 04/13/18 11:51 Date Received: 04/16/18 12:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	394328	04/18/18 11:28	KWN	TAL PEN
Total/NA	Analysis	6010B		1			394603	04/19/18 14:42	GESP	TAL PEN
	Instrumen	nt ID: 6500 ICP D	uo							

Client Sample ID: L18D079-05 Date Collected: 04/13/18 11:02 Date Received: 04/16/18 12:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	394328	04/18/18 11:28	KWN	TAL PEN
Total/NA	Analysis	6010B		1			394603	04/19/18 14:46	GESP	TAL PEN
	Instrumer	t ID: 6500 ICP Du	o							

Laboratory References:

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

Laboratory: TestAmerica Tampa

The accreditations/certifications listed below are applicable to this report.

		Authority Florida	Program	EPA Region	Identification Number	Expiration Date
--	--	----------------------	---------	------------	-----------------------	-----------------

Laboratory: TestAmerica Pensacola

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Florida	NELAP	4	E81010	06-30-18

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL PEN
3010A	Preparation, Total Metals	SW846	TAL PEN

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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

SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Services

L18D079

SENDING LABORATORY:	RECEIVING LABORATORY:
Tampa Electric Company, Laboratory Services	TestAmerica Laboratories, Inc Tampa
5012 Causeway Blvd	6712 Benjamin Rd., Suite 100
Tampa, FL 33619	Tampa, FL 33634
Phone: (813) 630-7490	Phone :(813) 885-7427
Fax: (813) 630-7360	Fax: -
Project Manager: Peggy Penner	

Due Date: 04/20/18 16:00

Analysis		Expires		Laboratory ID	Comments
Sample ID: L18D079-01	BBS-CCR-1		Water		
Sampled: 04/13/18 13:23					
Lithium, Total EPA 6010		10/10/18 13:23			
Containers Supplied:					
Poly HNO3 - 250mL (A)					
Sample ID: L18D079-02	BBS-CCR-2		Water		
Sampled: 04/13/18 12:51					
Lithium, Total EPA 6010		10/10/18 12:51			
Containers Supplied:					
Poly HNO3 - 250mL (A)					
Sample ID: L18D079-03	BBS-CCR-3		Water		
Sampled: 04/13/18 12:22					
Lithium, Total EPA 6010		10/10/18 12:22			
Containers Supplied:					
Poly HNO3 - 250mL (A)					
Sample ID: L18D079-04	BBS-CCR-BW1		Water		
Sampled: 04/13/18 11:51					
Lithium, Total EPA 6010		10/10/18 11:51			
Containers Supplied:					
Poly HNO3 - 250mL (A)					
Sample ID: L18D079-05	BBS-CCR-BW2		Water		
Sampled: 04/13/18 11:02			and a second second second second		
Lithium, Total EPA 6010		10/10/18 11:02			
Containers Supplied:					
Poly HNO3 - 250mL (A)					Loc: 660
			660-86743	Chain of Custody	86743
Released By	413-18 Date & T	lime	At /C	9921 4-16- Dat	-18@ 1200 e&Time
Released By	Date & T	îime	Received By	/	e & Time Page 1 of 1
		Pa	ge 13 of 16	1.2/1.80	WO9 4/20/20

TestAmerica Tampa 6712 Benjamin Road Suite 100

Tampa, FL 33634

Chain of Custody Record



TestAmerica

Phone (813) 885-7427 Fax (813) 885-7049							_											VIRONMENTAL TESTIN
Client Information (Sub Contract Lab)	Sampler:			Co	ab PM: onner, Keaton						Carrier Tracking No(s):					COC No: 660-104271.1		
Client Contact: Shipping/Receiving	Phone:						-	tameric				State of Florid	of Origin a	2			Page: Page 1 of 1	
Company: TestAmerica Laboratories, Inc.													Job #: 660-86743-1					
Address: 3355 McLemore Drive,	Due Date Requeste 4/19/2018	ed:				Analysis Requested									Preservation Cod	es:		
City:	TAT Requested (da	ays):			100												A - HCL B - NaOH	M - Hexane N - None
Pensacola																	C - Zn Acetate	O - AsNaO2
State, Zip: FL, 32514																	D - Nitric Acid E - NaHSO4	P - Na2O4S Q - Na2SO3
Phone:	PO #.																F - MeOH G - Amchlor	R - Na2S2O3 S - H2SO4
350-474-1001(Tel) 850-478-2671(Fax) Email:	WO #:				or No)	0											H - Ascorbic Acid	T - TSP Dodecahydrate U - Acetone
Project Name:	Project #:				es	ST No										Iers	J - DI Water K - EDTA	V - MCAA W - pH 4-5
_18A	66004821				le (Y	Ves										ntain	L - EDA	Z - other (specify)
Site:	SSOW#:				Samp	(MSD ()										of con		
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time		Matrix (W=water, S=solid, O=waste/oll BT=Tissue, A=	Field Filte	Portorn MS/M										Total Number		structions/Note:
	_><	×	Preserva	ation Code		X										X		
L18D079-01 BBS-CCR-1 (660-86743-1)	4/13/18	13:23 Eastern	-	Water)	×									1		*
L18D079-02 BBS-CCR-2 (660-86743-2)	4/13/18	12:51 Eastern		Water)	x									1		
L18D079-03 BBS-CCR-3 (660-86743-3)	4/13/18	12:22 Eastern		Water)	x									1		
L18D079-04 BBS-CCR-BW1 (660-86743-4)	4/13/18	11:51 Eastern		Water)	×									1		
L18D079-05 BBS-CCR-BW2 (660-86743-5)	4/13/18	11:02 Eastern		Water)	×						_			1		
					++	-	+	-			+	\square	-	-				
					+	-	-	-		_	+	\square	-			-		
					+	-	+	-		-	-	+	-	-				
Note: Since laboratory accreditations are subject to change, TestAmer currently maintain accreditation in the State of Origin listed above for a Laboratories, Inc. attention immediately. If all requested accreditations	analysis/tests/matrix being anal	yzed, the sam	ples must be	shipped back	to the T	TestAm	erica I	aborator	y or ot	her instru	uctions							
Possible Hazard Identification	and the second se	And And				Samp	7	-							es are i		ned longer than 1	month)
Unconfirmed	Deletere Del	able Deel	0			Carrie	-	Irn To				Dispos	sal By	Lab		Arc	hive For	Months
Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliver	able Rank:	2				ial Ins	structio	ns/Q	C Requ	lireme							
Empty Kit Relinquished by:		Date:			Tin	_							Method	of Shipr				
Relinquisher by	Date/Time: 4-16-18	en	00	JA	TA	179	Pceive	_		1					/Time:			Company
Reinquished by:	Date/Time:			Company			eceive	1		1	1	0			/Time:			Company
Relinquished by:	Date/Time:			Company			ecejv	rell	28	fe	C	_	-	Date	/Time:			Company
Custody Seals Intact: Custody Seal No.:		1.1.0		3		C	cooler '	Tempera	iture(s))°C and	Other F	Remarks	s: (0.5	- ~	1	R7	
A 105 A 110	and the second					_	-		-	-		-				/		Ver: 09/20/2016

13

4/20/2018

Client: Tampa Electric Company

Login Number: 86743 List Number: 1 Creator: Redding, Charles S

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.	True	
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	
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?	N/A	
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.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Job Number: 660-86743-1

List Source: TestAmerica Tampa

Client: Tampa Electric Company

Login Number: 86743 List Number: 2 Crea

List Source: TestAmerica Pensacola

List Number: 2		List Creation: 04/17/18 04:30 PM
Creator: Johnson, Jeremy N		
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	0.0°C IR7
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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5012 Causeway Blvd Tampa Fl. 33619 * Ph (813)630-7490 * Fax (813)630-7360 * DOH #E54272

Case Narrative

1 sample(s) were received on 04/25/18 10:38.

There were no issues noted with the sample(s) associated with this workorder unless noted below.

Resample of well BBS-CCR-2 for Radiological analysis.



5012 Causeway Blvd Tampa Fl. 33619 * Ph (813)630-7490 * Fax (813)630-7360 * DOH #E54272

		Sam	ple Info	rmatio	n				
Client: Big Bend	Power Station								
Lab Sample ID: L18D116-	01				S	Sampled	By: Robert Bart	helette	
Sample Description: BBS-CCR	2-2					Date and	Time Collected:	4/25/18	9:43
	rab				Da	ate of Sa		/25/18 10	
		Lab	oratory	Results			intro i construit i i	20/10/10	
Sample Qualifier:					-				
					Qualifier		Test		Analysis
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time
		Tampa Elec	tric Comp	any, Labo	oratory Ser	vices			
General Chemistry Parameters									
Specific Conductance	1390	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	4/25/18 9:43
Dissolved Oxygen	0.680	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	4/25/18 9:43
pH	6.93	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	4/25/18 9:43
Turbidity	5.19	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	4/25/18 9:43
			KNL L	aborator	y				
<u> Radium - 226</u>									
Rad - 226	14.8	pCi/L	0.4	0.4		1	EPA 903.0	KL1	4/30/18 12:4
Rad - 226 Counting Error +/-	1.1	pCi/L				1	EPA 903.0	KL1	4/30/18 12:4
<u> Radium - 228</u>									
Rad - 228	2.6	pCi/L	0.7	0.7		1	EPA Ra-05	KL1	5/1/18 11:09
Rad - 228 Counting Error +/-	0.6	pCi/L				1	EPA Ra-05	KL1	5/1/18 11:09
Radium-226/228									
Rad-226/228	17.4	pCi/L	0.7	0.7		1	Calc	KL1	5/1/18 11:09
Rad-226/228 Counting Error +/-	1.1	pCi/L				1	Calc	KL1	5/1/18 11:09
		(Commen	ts					

Subcontract Laboratories:

KNL Laboratory

E84025

Tampa Electric Company, Laboratory Services

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Peggy Penner, Manager, Laboratory Services

Site:	Leating Code	1	Date: FE ²	04/25/18	File Name:		Wells_RAB	Weather:		oudy & Mild	Initials	RAB /TEC	-	IGVD
LIMS #	Loction Code	Time	And the second second	pH (SU)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor		1
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	\$COLOR-W	\$ODOR-W	Time	LEVEL
L18D116-01	BBS-CCR-2	9:43	-	6.93	23.65	1389	0.68	5.19			Lt. Yellow	Mild		
LIMS #			500ml lease (0)	states and so in the second			1L Rads (1)	500ml Sulfide (2)	500ml Mtls (2)	250ml Nuts (3)	40ml Vial (6)	500 ml Nuts (2)	1L Rads Diss. (1)	Total Contain
	250ml Cyan (3)	1L Inorg (1)	500ml Inorg (2)	250ml Inorg (3)	1L Mtls (1)	250ml Mtls (3)								Total Contain
				-		<u> </u>	<u>9</u> 1		ā	6	ā	<u> </u>		1
) 1L plastic (PP)			(00)	(3) 250ml plastic (Pl		(4) 100ml coliform b		(5) 1L amber glass ((6) 40ml VOA vial			Samples On Ice	Sample Reciept
	0121301C	(2) 500ml plastic ESS	s (PP)	ESS	-)	ESS	ottie	ESS	AG)	ESS	(00)		Yes No	Time 10:38
SS		ESS	-					255	0	E33			Pres ID	Temp 23.5
	Preservation			Pres ID		Preservation	4.2		Pres ID	600 ml halllas/Cull	Preservation ide) 2ml NAOH/Zinc	Anat in pli 512		
L bottles (rads): 5 ml H		1				ts): 1 ml H2SO4 to pl								
00 ml bottles (metals):						0.5 ml H2SO4 to pH			L L		in) 1g NAOH to pH >			
50 ml bottles (metal): 1	ml HNO3 to pH <2	And and a second	A Country of the		The bounds (alos) i		5um, 5 ml HNO3 to pH <	1	L		licates that the san		1	1. 2
H Meter Calibration		Buffer ID	Buffer Value	Cal	Time	ICV	Time	CCV	Time	Redox Cal	Time	Temp °C	Reading mv	Theo Value
leter ID:	MPM08	L 021961D	7	7.01	8:13			7.02	10:40	Meter ID:	_			
DEP FT 1100		L 021107A	10	10.04 4.00	8:13		ond +/- 5%) (DO +/- 0.3r			0	-			1.0
Inits: SU		- 020030L			8:13		icates ICV / CCV passe	10	1	Zobell Sol ID:				
Conductivity Meter Ca	MPM08	Standard ID L 020700B	Std Value 1000	Cai 1001	Time 8:01	ICV	Time	CCV	Time	DO Meter Cal	Torr	Temp °C	Reading mg/l	Theo Value n
feter ID:		L 020249D		1001	8:01	0700	0.05	0007	10.10	and the second se	Time		8,83	8.777
DEP FT 1200, Units: u			10000	-	1	9780	8:05	9807	10:42	Meter ID:	7:57	21.8		
urbidity Meter Calibra		Standard ID	Std Value	Acceptabil	T	ICV	Time	CCV	Time	MPM08	10:34	22.7	8.70	8.644
leter ID:	TM07	010000	5.56	5.00	6.12	5.64	7:52	5.62	10:36	Barom. Pres				
DEP FT 1600, Units: N		L 0						-		760		C. PROVENING		a transferra
sulfite Info (QC Check			QC Result mg/l	Time	Titrator ID	Na Thio ID	DO 3 Pillow ID	Starch Ind. ID	Iodate/Iodide ID	Therm ID	pH	Conduct.(%)	DO (mg/l)	Redox (my
C Std: 5ml (NaThio)/5	00ml DI=10mg/L		1.1			L	L	L	L	MPM08	0.2	5	0.3	10
Purging Information		Well Capacities	s (gallons/ ft): 2'	'= 0.16 4'' = 0.65			n. Capacities Gallons/f				-			1. 1.
Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Well Depth (ft)	Depth to Water (ft)	= Column (ft)	X Capacity (gal) =	1 Well Volume (gal)	(Tubing Capacity (gal/ft.)	x Length)	+ Volume + (gal)	Cell Volume (gal)	= Volume (gal)	
0	2	10	17.32	22.32	1	22.32	0.16	3.57	0.0026	23.3	0	0.06	0.12	
Purge Meth:	Time	Rate (ml/min)	Volume (gal)	Total Vol. (gal)	Water Depth (ft)	pH (SU)	Temp °C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Eqpt. Tab
						4.1					ph:+/- 0.2		Level Meter:	
urge Start:		1.1.1							-		Temp ^o C+/- 0.2		Pump:	PP
											Cond % +/- 5		Tubing:	PE/S
urge End:	i and the second			11	1			1			DO % Sat.< 20	2	Dedicated	Yes Yes
							1				Turb. NTU < 20		Tubing?	D No
	at .	Gallons to P	Purge 0.12	Stablility	Values =		121000	1						
Purge Complete A		Screen	Intake Depth (ft)	Well Depth - (ft)	Depth to Water (ft)	= Water Column (ft)	x Capacity (gal) =	1 Well Volume (gal)	(Tubing Capacity x (gal/It.) x	Length)	+ Volume + (gal)	Cell Volume (gal) =	1 Eqpt Volume (gal)	
	Diam/ Comp	Interval (ft)		21.84	6.92	14.92	0.16	2.39	0.0026	22.84	0	0.06	0.12	
Well # BBS-CCR-2	Diam/ Comp	Interval (ft) 10	16.84				Temp °C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Eqpt. Tat
Well # BBS-CCR-2	2	10	16.84		Water Depth (m)	pH (SU)					ph:+/- 0.2	STABLE		and the second s
Well # BBS-CCR-2 Purge Meth:	2 Time	10 Rate (ml/min)	16.84 Volume (gal)	Total Vol. (gal)	Water Depth (n) 7.08	pH (SU) 6.94		1377	0.87	4.51		SIABLE	Level Meter:	
Well # BBS-CCR-2 Purge Meth: 1A	2 Time 9:35	10 Rate (ml/min) 600	16.84 Volume (gal) 1.27	Total Vol. (gal) 1.27	7.08	6.94	23.71	1377	0.87	4.51	0.2			PP
Well # BBS-CCR-2 Purge Meth: 1A Purge Start:	2 Time 9:35 9:37	10 Rate (ml/min) 600 610	16.84 Volume (gal) 1.27 0.32	Total Vol. (gal) 1.27 1.59	7.08 7.08	6.94 6.92	23.71 23.71	1378	0.67	6.53		STABLE	Pump:	
BBS-CCR-2 Purge Meth: 1A Purge Start: 9:27	2 Time 9:35	10 Rate (ml/min) 600	16.84 Volume (gal) 1.27	Total Vol. (gal) 1.27	7.08	6.94	23.71				Temp*C+/. 0.2	STABLE STABLE	Pump: Tubing:	PE/S
Weil # BBS-CCR-2 Purge Meth: 1A Purge Start: 9:27 Purge End:	2 Time 9:35 9:37	10 Rate (ml/min) 600 610	16.84 Volume (gal) 1.27 0.32	Total Vol. (gal) 1.27 1.59	7.08 7.08	6.94 6.92	23.71 23.71	1378	0.67	6.53	Temp⁰C+/. 0.2 Cond % +/- 5 DO % Sat.<	STABLE STABLE STABLE	Pump: Tubing: Dedicated	PE/S
Weil # BBS-CCR-2 Purge Meth: 1A Purge Start: 9:27	2 Time 9:35 9:37 9:40	10 Rate (ml/min) 600 610	16.84 Volume (gal) 1.27 0.32 0.48	Total Vol. (gal) 1.27 1.59 2.07	7.08 7.08 7.09	6.94 6.92	23.71 23.71	1378	0.67	6.53	Temp®C+/. 0.2 Cond % +/- 5	STABLE STABLE	Pump: Tubing:	PE/S

DEP-SOP-001/01 FS 2200 Groundwater Sampling Form FD 9000-24 GROUNDWATER SAMPLING LOG

SITE NAME:		Big Be	end			SITE LOCATION:		Apollo Beach, FL.			
WELL NO:	B	BS-CCR-2			SAMPLE ID:	L180	0116-01		DATE:	4/25/18	
						NG DATA					
WELL DIAMETER (inches)	TUBING DIAMETER (inc	hes) 1/4	WELL SCREEN IN DEPTH 11.84	ITERVAL feet to	21.84 (feet)	STATIC DEPTH TO WATER (feet	^{():} 6.92	PURGE PUMP T OR BAILER:	PP PP	
WELL VOLUME PL (only fillout if applica		1 WELL VO	LUME = (TOT) = (AL WELL DEPTH -	STATIC DEP feet -	TH TO WATER)	X WELL CA	PACITY	gallons/foot	:=	gallons
EQUIPMENT VOLU (only fillout if applica	JME PURGE: able)	1 EQU		. = PUMP VOLUME	E + (TUBING		UBING LENG	, 	t)+ 0.06	gallons =	0.12 gallons
INITIAL PUMP OR T DEPTH IN WELL (fe			=(FINAL PUMP DEPTH IN W	OR TUBING	<u> </u>	PURGING INITIATED AT:		PURGING ENDED AT:	-,	TOTAL VOLUN PURGED (gallo	/F
TIME	VOLUME PURGED (GALLONS)	CUMUL. VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circlemg/) r % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
9:35	1.27	1.27	0.16	7.08	6.94	23.71	1377	0.87	4.51	Lt. Yellow	Mild
9:37	0.32	1.59	0.16	7.08	6.92	23.71	1378	0.67	6.53	Lt. Yellow	Mild
9:40	0.48	2.07	0.16	7.09	6.93	23.65	1389	0.68	5.19	Lt. Yellow	Mild
WELL CAPACITY (Ga	,			1.25" = 0.06; 2" =		0.37; 4 " = 0.6			12" = 5.88		
TUBING INSIDE DIA.	CAPACITY (Gal./Ft.	.): 1/8 " = 0.00006;	3/16" = 0.0014;	1/4" = 0.0026;	5/16" = 0.004;	3/8" = 0.006; ING DATA	1/2 " = 0.01	10; 5/8 " =	0.016		
SAMPLED BY (PRI	INT) / AFFILIATIO	ON:		SAMPLER (S) SIG	-			SAMPLING INITIATED AT:		SAMPLING ENDED AT:	
	RAB	8	TECO						9:40		9:43
PUMP OR TUBING DEPTH IN WELL (fe	eet): 16.8	}		SAMPLE PUMP FLOW RATE (mL			603	TUBING MATERIAL CODE	E PE	/S	
FIELD DECONTAM		(🗋 N 🗹		FIELD-FILTERED: Filtration Equipment	nt Type	N 🗹 FILTE	ER SIZE:	μm	DUPLICATE:	Y 🔲 N 🗹	•
	SAMPLE CON SPECIFICA	TION			SAMPLE PRE				INDED IS AND/OR		MPLING IIPMENT
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED		al vol. I field (mi) ₍₁₎	FINAL pH		THOD		CODE
@Rad-1L	1	PE	1L	HNO3	:	5ml	<2	Radio	logicals		PP
REMARKS:	ttles pre-pres	erved at lab	I oratory pric	r to sample co	llection			<u> </u>		1	
			- acci y pric	. to sample co							
(1) Sample bot		r Glass; CG	= Clear Glass	; PE = Polyethy	/lene; PP	= Polypropylene	; S = Silico	one; T = Teflon	; 0 = Other (Spe	cify)	
(1) Sample bot	S: AG = Ambe	APP = After Perist	altic Pump; B	; PE = Polyethy = Bailer; BP = Blade Pump; SM = Straw	der Pump; ES	P = Electric Subm	irsable Pump; I	PP = Peristaltic Pur	np	ecify)	

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2);

optionally, ± 0.2 mg/L or ± 10% (whichever is greater) Turbidity: all readings ≤ 20 NTU; optionally ± 5 NTU or 10% (whichever is greater)



DOH Certification #E84025 DEP COMPQAP # 870251

Report Date: May 2, 2018

TECO 5012 Causeway Blvd. Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client/Field ID: Sample Collection: Lab ID No: Lab Custody Date:

Sample description:

Client L18D116-01 BBS-CCR-2 04-25-18/0943 18.4111 04-25-18/1140 Water

CERTIFICATE OF ANALYSIS

Parameter	Units	nits Results			Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	17.4	±	1.1	Calc	Calc	0.7
Radium-226	pCi/l	14.8	±	1.1	4-30-18/1247	EPA 903.0	0.4
Radium-228 Alpha Standard: Th-230	pCi/l	2.6	±	0.6	5-1-18/1109	EPA Ra-05	0.7

James W. Hages

James W. Hayes Laboratory Manager

Test results meet all requirements of the NELAC standards. Statement of estimated uncertainty available upon request. Test results refer only to sample(s) listed. Contact person: Jim Hayes (813) 229-2879.

Page 1 of 1

KNL ENVIROMENTAL TESTING, INC. | 3202 NORTH FLORIDA AVENUE | TAMPA, FLORIDA 33603 813.229.2879 | KNLENVIRONMENTAL.COM



FL DOH Certification # E84025

QC Summary: Total Radium Analysis

Client Project # : <u>L190116-01</u>

Analysis Completion Date: 4 1 30 1 18

Precision Data:	Sample #:	18.3839	
Sample Analysis (pCi/l)	Duplicate Analysis (pCi/l)	<u>Range (pCi/l)</u> 0. て	<u>RPD (%)</u> 308
Spike Data:	Sample #:	18.3839	
Sample Analysis (pCi/l) 2.0	Spike Added (pCi/l) Analy	tical Result (pCi/l) ら.	Spike Rec (%) _/つし
LCS Data:			
Analytical Result (pCi/l)	True Value (pCi/l)		ecovery 76
Lab Blank:	Analytical Result (pC	Ci/l) Anal	ysis Date
Lab Blank	0.4 +/- 0.2		,1,18

KNL-Total Radium Analysis - FL DOH Certification QC Data sheet – Form #140 Revised 6/30/16



QC Summary: Radium 228 Analysis

FL DOH Certification # E84025

Client Project #: LIBDIIG-01 Analysis Completion Date: 5 / 1 / 18 Sample #: 18.3661 Precision Data: Sample Analysis (pCi/l) Duplicate Analysis (pCi/l) Range (pCi/l) **RPD (%)** 3.4 1.0 4.4 25.64 Spike Data: Sample #: 18.3661 Spike Added (pCi/l) Analytical Result (pCi/l) Sample Analysis (pCi/l) Spike Rec (%) 44 3.9 0.0 113 LCS Data: Analytical Result (pCi/l) True Value (pCi/l) % Recovery 105 41 3.9 Lab Blank: Analysis Date Analytical Result (pCi/l) 0.0 +/- 0.2 5,1,18 Lab Blank

SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Services

L18D116

RECEIVING LABORATORY: SENDING LABORATORY: Tampa Electric Company, Laboratory Services KNL Laboratory Services 5012 Causeway Blvd 3202 N. Florida Ave. Tampa, FL 33619 Tampa, FL 33603 Phone: (813) 630-7490 Phone :(813) 229-2879 Fax: (813) 630-7360 Fax: -Project Manager: **Peggy Penner** 18.411) **Due Date:** 05/02/18 16:00 Analysis Expires Laboratory D Comments Sample ID: L18D116-01 **BBS-CCR-2** Water esample 18.3633 04/25/18 09:43 Sampled: Radium 228 Ra-05 10/22/18 09:43 Level 2 Data requred Radium 226+228, Total 10/22/18 09:43 Level 2 Data requred Radium 226 EPA 903.0 10/22/18 09:43 Level 2 Data requred Containers Supplied:

Poly HNO3 - 1000mL (A)

10 425-1 Received B Date & Time

Released By

APPENDIX B

Laboratory Analytical Data Report – Third Detection Monitoring Event (September 2018)



5012 Causeway Blvd Tampa Fl. 33619 * Ph (813)630-7490 * Fax (813)630-7360 * DOH #E54272

Report Date:

11/15/18 11:34

Big Bend Power Station Terry Eastley 13031 Wyandott Rd Apollo Beach, FL 33572 tleastley@tecoenergy.com

Work Order - L18I055

Project - CCR Wells Economizer Ash Pond

Case Narrative

Report Revised 11/15/2018 to correct a typographical error on BBS-CCR-1 Rad-226/228 resutls and BBS-CCR-3 Rad 226/228 Counting Error.

5 sample(s) were received on 09/12/18 14:28.

There were no issues noted with the sample(s) associated with this workorder unless noted below.

EPA 6010

The recovery of the matrix spike and spike duplicate for several analytes are below the contorl limits due to matrix interference. The parent sample is flagged with a J qualifier.



5012 Causeway Blvd Tampa Fl. 33619 * Ph (813)630-7490 * Fax (813)630-7360 * DOH #E54272

Sample Information Client: Big Bend Power Station Lab Sample ID: L18I055-01 Sampled By: Robert Barthelette Sample Description: BBS-CCR-1 Date and Time Collected: 9/12/18 12:30 Sample Collection Method: Grab Date of Sample Receipt: 9/12/18 14:28 Laboratory Results Sample Qualifier: **Oualifier** Test Analysis Result Units MDL POL Code Dil Method Analyst Date & Time Parameter Tampa Electric Company, Laboratory Services **General Chemistry Parameters** Chloride 10 TMH 9/26/18 21:21 674 mg/L 1.00 5.00 EPA 300.0 Specific Conductance 4120 FDEP SOP FT 1200 100 100 1 RAB 9/12/18 12:30 umhos/cm Dissolved Oxygen 0.200 1 FDEP SOP FT 1500 RAB 9/12/18 12:30 mg/L 0.100 0.100 Fluoride 0.235 0 100 0 500 I.V 10 EPA 300.0 TMH 9/26/18 21:21 mg/L pН 6.80 pH Units 1.00 1.00 1 FDEP SOP FT 1100 RAB 9/12/18 12:30 **REDOX Potential** 9/12/18 12:30 -74.9 mV -999 -999 1 SM 2580B RAB Total Dissolved Solids 3250 4 NLT 9/17/18 14:42 mg/L 40.0 40.0 SM 2540C Sulfate 1220 50.0 100 EPA 300.0 TMH 9/26/18 21:31 mg/L 200 Turbidity 9.47 NTU 0.100 1 FDEP SOP FT 1600 RAB 9/12/18 12:30 0.100 Total Mercury by SW846 Method 7470/7471 0.0500 9/19/18 11:00 Mercury ug/L 0.0500 0.200 U 1 EPA 7470A MCR **Total Recoverable Metals by 200 Series** U 1 MCR 9/14/18 11:10 Antimony 0.600 0.600 2.00 EPA 200.8 ug/L Arsenic 9.80 1 EPA 200.8 MCR 9/14/18 11:10 0.320 2.00 ug/L Cadmium 0.100 0.100 0 500 U 1 EPA 200.8 MCR 9/14/18 11:10 ug/L Cobalt 0.556 2.00 I 1 EPA 200.8 MCR 9/14/18 11:10 ug/L 0.136 Lead 0.0800 0.0800 2.00 U 1 EPA 200.8 MCR 9/14/18 11:10 ug/L 9/14/18 11:10 Selenium 0.721 0.509 2.00 I 1 EPA 200.8 MCR ug/L Thallium 0.100 ug/L 0.100 0 500 U 1 EPA 200.8 MCR 9/14/18 11:10 **Total Recoverable Metals by SW846 Method 6010B** Barium 9/17/18 14:10 0.114 0.0200 1 EPA 6010B RC mg/L 0.000500 Beryllium 0.500 U 1 EPA 6010B RC 9/17/18 14:10 ug/L 0 500 2.00 Boron 19.9 0.0100 0.0500 V 1 EPA 6010B RC 9/17/18 14:10 mg/L 549000 Calcium ug/L 30.0 1000 1 EPA 6010B RC 9/14/18 13:20 Chromium 1.60 1.60 12.0 U 1 EPA 6010B RC 9/17/18 14:10 ug/L Molybdenum 73.4 1 EPA 6010B RC 9/17/18 14:10 ug/L 2.50 20.0 **KNL** Laboratory **Radium - 226** Rad - 226 33.2 pCi/L 0.6 1 EPA 903.0 KL1 9/24/18 13:00 0.6 Rad - 226 Counting Error +/-1.8 pCi/L 1 EPA 903.0 KL1 9/24/18 13:00 Radium - 228 Rad - 228 1.5 1 9/24/18 11:24 pCi/L 0.7 0.7 EPA Ra-05 KL1 Rad - 228 Counting Error +/-0.5 1 KL1 9/24/18 11:24 pCi/L EPA Ra-05



5012 Causeway Blvd Tampa Fl. 33619 * Ph (813)630-7490 * Fax (813)630-7360 * DOH #E54272

Sample Information

		~	-p00		-						
Client:	Big Bend Power Station										
Lab Sample ID:	L18I055-01					Sampled	By: Robert Ba	arthelette			
Sample Description:	BBS-CCR-1					Date and	Time Collected:	9/12/18 1	2:30		
Sample Collection Method: Grab			Date of Sample Receipt: 9						9/12/18 14:28		
		Lab	ooratory	Results	5						
Sample Qualifier:											
					Qualifier		Test		Analysis		
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time		
Radium-226/228											
Rad-226/228	34.7	pCi/L	0.7	0.7		1	Calc	KL1	9/24/18 13:00		
Rad-226/228 Counting Error	+/- 1.8	pCi/L				1	Calc	KL1	9/24/18 13:00		
			TestAmer	ica Pensa	cola						
Metals (ICP)											
Lithium	0.016	mg/L	0.0010	0.050	Ι	1	200.7 Rev 4.4 Z01	I GESP	9/21/18 21:01		



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Sample Information

Client:	Big Bend Power Station	
Lab Sample ID:	L18I055-02	Sampled By: Robert Barthelette
Sample Description:	BBS-CCR-2	Date and Time Collected: 9/12/18 12:00
Sample Collection Me	thod: Grab	Date of Sample Receipt: 9/12/18 14:28

Laboratory Results

Sample Qualifier:

D. (D L'	T T •/	MDI		Qualifier	D ''	Test		Analysis
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time
		Tampa Elec	tric Compa	ny, Labo	ratory Sei	rvices			
General Chemistry Paramete	<u>rs</u>								
Chloride	88.7	mg/L	1.00	5.00		10	EPA 300.0	TMH	9/26/18 21:4
Specific Conductance	1520	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	9/12/18 12:0
Dissolved Oxygen	0.240	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	9/12/18 12:0
Fluoride	0.298	mg/L	0.100	0.500	I,V	10	EPA 300.0	TMH	9/26/18 21:4
pH	6.29	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	9/12/18 12:0
REDOX Potential	-38.8	mV	-999	-999		1	SM 2580B	RAB	9/12/18 12:0
Total Dissolved Solids	1060	mg/L	20.0	20.0		2	SM 2540C	NLT	9/17/18 14:4
Sulfate	375	mg/L	5.00	20.0		10	EPA 300.0	TMH	9/26/18 21:4
Turbidity	3.43	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	9/12/18 12:0
Total Mercury by SW846 Me	thod 7470/7471								
Mercury	0.0500	ug/L	0.0500	0.200	U	1	EPA 7470A	MCR	9/19/18 11:04
Fotal Recoverable Metals by	200 Series								
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	9/14/18 11:14
Arsenic	1.34	ug/L	0.320	2.00	Ι	1	EPA 200.8	MCR	9/14/18 11:14
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/14/18 11:14
Cobalt	0.136	ug/L	0.136	2.00	U	1	EPA 200.8	MCR	9/14/18 11:14
Lead	0.102	ug/L	0.0800	2.00	Ι	1	EPA 200.8	MCR	9/14/18 11:14
Selenium	0.509	ug/L	0.509	2.00	U	1	EPA 200.8	MCR	9/14/18 11:14
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/14/18 11:14
Total Recoverable Metals by S	SW846 Method	6010B							
Barium	0.0652	mg/L	0.000500	0.0200	J-	1	EPA 6010B	RC	9/17/18 14:1
Beryllium	0.500	ug/L	0.500	2.00	J-, U	1	EPA 6010B	RC	9/17/18 14:1
Boron	0.177	mg/L	0.0100	0.0500	J-,V	1	EPA 6010B	RC	9/17/18 14:1
Calcium	218000	ug/L	30.0	1000		1	EPA 6010B	RC	9/14/18 13:2
Chromium	1.60	ug/L	1.60	12.0	J-, U	1	EPA 6010B	RC	9/17/18 14:1
Molybdenum	2.50	ug/L	2.50	20.0	J-, U	1	EPA 6010B	RC	9/17/18 14:1
			KNL La	boratory					
<u> Radium - 226</u>									
Rad - 226	15.3	pCi/L	0.6	0.6		1	EPA 903.0	KL1	9/24/18 13:0
Rad - 226 Counting Error +/-	1.3	pCi/L				1	EPA 903.0	KL1	9/24/18 13:0
Radium - 228									
Rad - 228	0.7	pCi/L	0.7	0.7	U	1	EPA Ra-05	KL1	9/24/18 11:24
Rad - 228 Counting Error +/-	0.4	pCi/L				1	EPA Ra-05	KL1	9/24/18 11:24



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Sample Information

			-p		-						
Client:	Big Bend Power Station										
Lab Sample ID:	L18I055-02					Sampled I	By: Robert Ba	rthelette			
Sample Description:	BBS-CCR-2					Date and	Time Collected:	9/12/18 1	2:00		
Sample Collection Method: Grab			Date of Sample Receipt:						9/12/18 14:28		
		Lat	oratory	Results	5						
Sample Qualifier:											
					Qualifie	r	Test		Analysis		
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time		
Radium-226/228											
Rad-226/228	15.3	pCi/L	0.7	0.7		1	Calc	KL1	9/24/18 13:00		
Rad-226/228 Counting Error	+/- 1.3	pCi/L				1	Calc	KL1	9/24/18 13:00		
			TestAmer	ica Pensa	cola						
Metals (ICP)											
Lithium	0.013	mg/L	0.0010	0.050	Ι	1	200.7 Rev 4.4 Z02	1 GESP	9/21/18 21:04		



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Sample Information

Client:	Big Bend Power Station	
Lab Sample ID:	L18I055-03	Sampled By: Robert Barthelette
Sample Description:	BBS-CCR-3	Date and Time Collected: 9/12/18 11:08
Sample Collection Me	thod: Grab	Date of Sample Receipt: 9/12/18 14:28

Laboratory Results

Sample Qualifier:

					Qualifier		Test		Analysis
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time
	,	Tampa Elec	tric Compa	ny, Labo	ratory Sei	rvices			
General Chemistry Paramete	rs								
Chloride	132	mg/L	1.00	5.00		10	EPA 300.0	TMH	9/26/18 22:0
Specific Conductance	1690	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	9/12/18 11:0
Dissolved Oxygen	0.520	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	9/12/18 11:0
Fluoride	0.309	mg/L	0.100	0.500	I,V	10	EPA 300.0	TMH	9/26/18 22:0
рН	6.41	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	9/12/18 11:03
REDOX Potential	-105	mV	-999	-999		1	SM 2580B	RAB	9/12/18 11:03
Total Dissolved Solids	1200	mg/L	20.0	20.0		2	SM 2540C	NLT	9/17/18 14:42
Sulfate	469	mg/L	5.00	20.0		10	EPA 300.0	TMH	9/26/18 22:12
Turbidity	3.47	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	9/12/18 11:03
Total Mercury by SW846 Me	thod 7470/7471								
Mercury	0.0500	ug/L	0.0500	0.200	U	1	EPA 7470A	MCR	9/19/18 11:0
Fotal Recoverable Metals by	<u>200 Series</u>								
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	9/14/18 11:13
Arsenic	0.613	ug/L	0.320	2.00	Ι	1	EPA 200.8	MCR	9/14/18 11:13
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/14/18 11:13
Cobalt	0.136	ug/L	0.136	2.00	U	1	EPA 200.8	MCR	9/14/18 11:13
Lead	0.0800	ug/L	0.0800	2.00	U	1	EPA 200.8	MCR	9/14/18 11:13
Selenium	0.509	ug/L	0.509	2.00	U	1	EPA 200.8	MCR	9/14/18 11:13
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/14/18 11:13
Fotal Recoverable Metals by	SW846 Method	6010B							
Barium	0.0628	mg/L	0.000500	0.0200		1	EPA 6010B	RC	9/17/18 14:1
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RC	9/17/18 14:1
Boron	0.398	mg/L	0.0100	0.0500	V	1	EPA 6010B	RC	9/17/18 14:1
Calcium	191000	ug/L	30.0	1000		1	EPA 6010B	RC	9/14/18 13:20
Chromium	1.60	ug/L	1.60	12.0	U	1	EPA 6010B	RC	9/17/18 14:1
Molybdenum	3.99	ug/L	2.50	20.0	Ι	1	EPA 6010B	RC	9/17/18 14:1
			KNL La	boratory					
<u> Radium - 226</u>									
Rad - 226	14.1	pCi/L	0.6	0.6		1	EPA 903.0	KL1	9/24/18 13:0
Rad - 226 Counting Error +/-	1.3	pCi/L				1	EPA 903.0	KL1	9/24/18 13:0
<u>Radium - 228</u>									
Rad - 228	0.7	pCi/L	0.7	0.7		1	EPA Ra-05	KL1	9/24/18 11:24
Rad - 228 Counting Error +/-	0.5	pCi/L				1	EPA Ra-05	KL1	9/24/18 11:24



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Sample Information

		2.11	-p		-						
Client:	Big Bend Power Station										
Lab Sample ID:	L18I055-03					Sampled	By: Robert Ba	arthelette			
Sample Description:	BBS-CCR-3					Date and	Time Collected:	9/12/18	1:08		
Sample Collection Method: Grab			Date of Sample Receipt:						9/12/18 14:28		
		Lab	oratory	Results	5						
Sample Qualifier:											
					Qualifier	r	Test		Analysis		
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time		
Radium-226/228											
Rad-226/228	14.8	pCi/L	0.7	0.7		1	Calc	KL1	9/24/18 13:00		
Rad-226/228 Counting Error	+/- 1.3	pCi/L				1	Calc	KL1	9/24/18 13:00		
			TestAmer	ica Pensa	cola						
Metals (ICP)											
Lithium	0.011	mg/L	0.0010	0.050	Ι	1	200.7 Rev 4.4 Z0	1 GESP	9/21/18 21:08		



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Sample Information

Client:	Big Bend Power Station		
Lab Sample ID:	L18I055-04	Sampled By: Robert Barthelette	
Sample Description:	BBS-CCR-BW1	Date and Time Collected: 9/12/18 10:26	
Sample Collection Met	nod: Grab	Date of Sample Receipt: 9/12/18 14:28	

Laboratory Results

Sample Qualifier:

					Qualifier		Test		Analysis
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time
	,	Tampa Elec	tric Compa	ny, Labo	ratory Sei	vices			
General Chemistry Paramete	ers								
Chloride	737	mg/L	1.00	5.00		10	EPA 300.0	TMH	10/3/18 2:32
Specific Conductance	4410	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	9/12/18 10:2
Dissolved Oxygen	0.550	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	9/12/18 10:2
Fluoride	0.818	mg/L	0.100	0.500	V	10	EPA 300.0	TMH	10/3/18 2:32
pH	6.51	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	9/12/18 10:2
REDOX Potential	-11.1	mV	-999	-999		1	SM 2580B	RAB	9/12/18 10:20
Total Dissolved Solids	3740	mg/L	50.0	50.0		5	SM 2540C	NLT	9/17/18 14:42
Sulfate	1290	mg/L	50.0	200		100	EPA 300.0	TMH	10/3/18 9:07
Turbidity	2.62	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	9/12/18 10:20
Fotal Mercury by SW846 Met	thod 7470/7471								
Mercury	0.0500	ug/L	0.0500	0.200	U	1	EPA 7470A	MCR	9/19/18 11:1
Total Recoverable Metals by 2	<u>200 Series</u>								
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	9/14/18 11:2
Arsenic	10.1	ug/L	0.320	2.00		1	EPA 200.8	MCR	9/14/18 11:2
Cadmium	0.203	ug/L	0.100	0.500	Ι	1	EPA 200.8	MCR	9/14/18 11:2
Cobalt	1.88	ug/L	0.136	2.00	Ι	1	EPA 200.8	MCR	9/14/18 11:2
Lead	0.141	ug/L	0.0800	2.00	Ι	1	EPA 200.8	MCR	9/14/18 11:2
Selenium	1.83	ug/L	0.509	2.00	Ι	1	EPA 200.8	MCR	9/14/18 11:2
Thallium	0.126	ug/L	0.100	0.500	Ι	1	EPA 200.8	MCR	9/14/18 11:2
Fotal Recoverable Metals by	SW846 Method	6010B							
Barium	0.0515	mg/L	0.000500	0.0200		1	EPA 6010B	RC	9/17/18 14:24
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RC	9/17/18 14:24
Boron	33.2	mg/L	0.0100	0.0500	V	1	EPA 6010B	RC	9/17/18 14:24
Calcium	664000	ug/L	30.0	1000		1	EPA 6010B	RC	9/14/18 13:2
Chromium	1.60	ug/L	1.60	12.0	U	1	EPA 6010B	RC	9/17/18 14:24
Molybdenum	22.5	ug/L	2.50	20.0		1	EPA 6010B	RC	9/17/18 14:24
			KNL La	aboratory					
<u> Radium - 226</u>									
Rad - 226	20.6	pCi/L	0.4	0.4		1	EPA 903.0	KL1	9/24/18 13:0
Rad - 226 Counting Error +/-	1.3	pCi/L				1	EPA 903.0	KL1	9/24/18 13:0
<u>Radium - 228</u>									
Rad - 228	3.0	pCi/L	0.7	0.7		1	EPA Ra-05	KL1	9/25/18 9:59
Rad - 228 Counting Error +/-	0.6	pCi/L				1	EPA Ra-05	KL1	9/25/18 9:59



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Sample Information

		Sull		mation	•				
Client:	Big Bend Power Station								
Lab Sample ID:		Sampled By: Robert Barthelette							
Sample Description:		Date and Time Collected: 9/12/18 10:26						0:26	
Sample Collection Meth			Date of Sample Receipt: 9/12/18 14:28						
		Lab	oratory	Results	5				
Sample Qualifier:									
					Qualifier		Test		Analysis
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time
Radium-226/228									
Rad-226/228	23.6	pCi/L	0.7	0.7		1	Calc	KL1	9/25/18 9:59
Rad-226/228 Counting Error	+/- 1.3	pCi/L				1	Calc	KL1	9/25/18 9:59
			TestAmer	ica Pensa	cola				
Metals (ICP)									
Lithium	0.017	mg/L	0.0010	0.050	Ι	1	200.7 Rev 4.4 Z01	GESP	9/21/18 21:11



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Sample Information

Client:	Big Bend Power Station		
Lab Sample ID:	L181055-05	Sampled By: Robert B	arthelette
Sample Description:	BBS-CCR-BW2	Date and Time Collected:	9/12/18 9:54
Sample Collection Met	hod: Grab	Date of Sample Receipt:	9/12/18 14:28

Laboratory Results

Sample Qualifier:

					Qualifier		Test		Analysis
Parameter	Result	Units	MDL	PQL	Code	Dil	Method	Analyst	Date & Time
	,	Tampa Elec	tric Compa	ny, Labo	ratory Sei	vices			
General Chemistry Paramete	ers								
Chloride	148	mg/L	1.00	5.00		10	EPA 300.0	TMH	9/26/18 22:53
Specific Conductance	1960	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	9/12/18 9:54
Dissolved Oxygen	0.830	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	9/12/18 9:54
Fluoride	0.338	mg/L	0.100	0.500	I,V	10	EPA 300.0	TMH	9/26/18 22:53
pH	6.60	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	9/12/18 9:54
REDOX Potential	-44.2	mV	-999	-999		1	SM 2580B	RAB	9/12/18 9:54
Total Dissolved Solids	1500	mg/L	20.0	20.0		2	SM 2540C	NLT	9/17/18 14:42
Sulfate	638	mg/L	5.00	20.0		10	EPA 300.0	TMH	9/26/18 22:53
Turbidity	4.34	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	9/12/18 9:54
Total Mercury by SW846 Me	thod 7470/7471								
Mercury	0.0500	ug/L	0.0500	0.200	U	1	EPA 7470A	MCR	9/19/18 11:14
Total Recoverable Metals by 1	200 Series								
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	9/14/18 11:25
Arsenic	5.01	ug/L	0.320	2.00		1	EPA 200.8	MCR	9/14/18 11:25
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/14/18 11:25
Cobalt	0.285	ug/L	0.136	2.00	Ι	1	EPA 200.8	MCR	9/14/18 11:25
Lead	0.0800	ug/L	0.0800	2.00	U	1	EPA 200.8	MCR	9/14/18 11:25
Selenium	0.563	ug/L	0.509	2.00	Ι	1	EPA 200.8	MCR	9/14/18 11:25
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/14/18 11:25
Total Recoverable Metals by	SW846 Method	6010B							
Barium	0.0636	mg/L	0.000500	0.0200		1	EPA 6010B	RC	9/17/18 14:29
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RC	9/17/18 14:29
Boron	2.64	mg/L	0.0100	0.0500	V	1	EPA 6010B	RC	9/17/18 14:29
Calcium	344000	ug/L	30.0	1000		1	EPA 6010B	RC	9/14/18 13:32
Chromium	1.60	ug/L	1.60	12.0	U	1	EPA 6010B	RC	9/17/18 14:29
Molybdenum	2.50	ug/L	2.50	20.0	U	1	EPA 6010B	RC	9/17/18 14:29
			KNL La	boratory					
<u>Radium - 226</u>									
Rad - 226	3.5	pCi/L	0.4	0.4		1	EPA 903.0	KL1	9/24/18 13:00
Rad - 226 Counting Error +/-	0.6	pCi/L				1	EPA 903.0	KL1	9/24/18 13:00
Radium - 228									
Rad - 228	0.7	pCi/L	0.7	0.7	U	1	EPA Ra-05	KL1	9/25/18 9:59
Rad - 228 Counting Error +/-	0.4	pCi/L				1	EPA Ra-05	KL1	9/25/18 9:59



5012 Causeway Blvd Tampa Fl. 33619 * Ph (813)630-7490 * Fax (813)630-7360 * DOH #E54272

		Sam	ple Info	rmatio	n				
Client: Big B	Bend Power Station								
Lab Sample ID: L1810	55-05				5	Sampled	By: Robert Bar	thelette	
Sample Description: BBS-0	CCR-BW2					Date and	Time Collected:	9/12/18	9:54
Sample Collection Method:	Grab				Da	ate of Sai	nple Receipt:	9/12/18 14	:28
		Lab	oratory	Result	8				
Sample Qualifier:									
Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
	Result	Units	MDL	TQL	Coue	Dii	Methou	Analyst	
Radium-226/228 Rad-226/228	3.7	pCi/L	0.7	0.7		1	Calc	KL1	9/25/18 9:59
Rad-226/228 Counting Error +/-	0.6	pCi/L	017	017		1	Calc	KL1	9/25/18 9:59
			TestAmer	ica Pensa	cola				
Metals (ICP)									
Lithium	0.0062	mg/L	0.0010	0.050	Ι	1	200.7 Rev 4.4 Z01	GESP	9/21/18 21:14
		(Commen	ts					
U Indicates that the com	npound was analyzed fo	or but not det	tected.						
J- The reported value is	an estimated value, see	e the case nar	rrative for spe	cifics.					
I Estimated value									
I The reported value is	between the laboratory	method det	ection limit an	d the labor	atory practica	l quantita	tion limit.		
V Analyte detected in th	ne method blank								
Subcontract Laboratories:									
KNL Laboratory		E84025							
FestAmerica Pensacola		E81010							



Total Recoverable Metals by SW846 Method 6010B - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
-											
Batch 1810068 - EPA 6010B											
Blank (1810068-BLK1)					Prepared: (09/11/18 Ar	nalyzed: 09	/17/18			
Barium	0.000500	0.000500	0.0200	mg/L							U
Beryllium	0.500	0.500	2.00	ug/L							U
Boron	0.0217	0.0100	0.0500	mg/L							Ι
Calcium	30.0	30.0	1000	ug/L							U
Chromium	1.60	1.60	12.0	ug/L							U
Molybdenum	2.50	2.50	20.0	ug/L							U
LCS (1810068-BS1)					Prepared: (09/11/18 Ar	nalyzed: 09	/17/18			
Barium	0.996	0.000500	0.0200	mg/L	1.0000		99.6	80-120			
Beryllium	996	0.500	2.00	ug/L	1000.0		99.6	80-120			
Boron	1.03	0.0100	0.0500	mg/L	1.0000		103	80-120			V
Chromium	996	1.60	12.0	ug/L	1000.0		99.6	80-120			
Molybdenum	2040	2.50	20.0	ug/L	2000.0		102	80-120			
Matrix Spike (18I0068-MS2)		Sourc	ce: L18105	5-02	Prepared: (09/13/18 Ar	nalyzed: 09	/17/18			
Barium	0.364	0.000500	0.0200	mg/L	1.0000	0.0652	29.9	75-125			J-
Beryllium	296	0.500	2.00	ug/L	1000.0	U	29.6	75-125			J-
Boron	0.511	0.0100	0.0500	mg/L	1.0000	0.177	33.3	75-125			J-,V
Chromium	297	1.60	12.0	ug/L	1000.0	U	29.7	75-125			J-
Molybdenum	1780	2.50	20.0	ug/L	1000.0	U	178	75-125			J-
Matrix Spike Dup (18I0068-MSD2)		Sourc	ce: L18105	5-02	Prepared: (09/13/18 Ar	nalyzed: 09	/17/18			
Barium	0.357	0.000500	0.0200	mg/L	1.0000	0.0652	29.2	75-125	2.09	20	J-
Beryllium	292	0.500	2.00	ug/L	1000.0	U	29.2	75-125	1.57	20	J-
Boron	0.492	0.0100	0.0500	mg/L	1.0000	0.177	31.5	75-125	3.63	20	J-,V
Chromium	293	1.60	12.0	ug/L	1000.0	U	29.3	75-125	1.46	20	J-
Molybdenum	1770	2.50	20.0	ug/L	1000.0	U	177	75-125	0.732	20	J-



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Total Mercury by SW846 Method 7470/7471 - Quality Control

					Spike	Source		%Rec		RPD	
Analyte	Result	MDL	PQL	Units	Level	Result	%Rec	Limits	RPD	Limit	Qualifier
Batch 1810091 - EPA 7470A											
Blank (1810091-BLK1)					Prepared: 0	9/18/18 Ar	alyzed: 09	0/19/18			
Mercury	0.0500	0.0500	0.200	ug/L							U
LCS (18I0091-BS1)					Prepared: 0	9/18/18 Ar	alyzed: 09	0/19/18			
Mercury	0.972	0.0500	0.200	ug/L	1.0000		97.2	80-120			
Matrix Spike (1810091-MS1)		Sour	ce: L181055	5-03	Prepared: 0	9/18/18 Ar	alyzed: 09	0/19/18			
Mercury	0.959	0.0500	0.200	ug/L	1.0000	U	95.9	75-125			
Matrix Spike Dup (18I0091-MSD1)		Sour	ce: L18I055	5-03	Prepared: 0	9/18/18 Ar	alyzed: 09	0/19/18			
Mercury	0.949	0.0500	0.200	ug/L	1.0000	U	94.9	75-125	1.10	20	
Matrix Spike Dup (18I0091-MSD2)		Sour	ce: L18I081	-01	Prepared: 0	9/18/18 Ar	alyzed: 09	0/19/18			
Mercury	0.752	0.0500	0.200	ug/L	1.0000	U	75.2	75-125	4.77	20	
Post Spike (18I0091-PS1)		Sour	ce: L181081	-01	Prepared: 0	9/18/18 Ar	alyzed: 09	0/19/18			
Mercury	0.887			ug/L	1.0000	-0.0159	88.7	0-200			
Post Spike (18I0091-PS2)		Sour	ce: L181081	-01	Prepared: 0	9/18/18 Ar	alyzed: 09	0/19/18			
Mercury	0.845			ug/L	1.0000	-0.0159	84.5	0-200			



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Total Recoverable Metals by 200 Series - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
Batch 1810070 - EPA 200.8			~								-
					Duon ou o de ()9/13/18 Ar	alvzadi 00	/1//10			
Blank (18I0070-BLK1) Antimony	0.600	0.600	2.00	ug/L	Prepared: (19/13/18 AI	laryzed: 09	/14/10			U
Arsenic	0.320	0.320	2.00	ug/L ug/L							U
Cadmium	0.320	0.100	0.500	ug/L							U
Cobalt	0.136	0.136	2.00	ug/L							U
Lead	0.0800	0.0800	2.00	ug/L							U
Selenium	0.509	0.509	2.00	ug/L							U
Thallium	0.100	0.100	0.500	ug/L							U
LCS (1810070-BS1)				0	Draparad: (09/13/18 Ar	alvzed 00	/1//18			
Antimony	99.3	0.600	2.00	ug/L	100.00	09/13/18 AI	99.3	85-115			
Arsenic	99.1	0.320	2.00	ug/L ug/L	100.00		99.1	85-115			
Cadmium	103	0.100	0.500	ug/L	100.00		103	85-115			
Cobalt	97.0	0.136	2.00	ug/L	100.00		97.0	85-115			
Lead	99.1	0.0800	2.00	ug/L	100.00		99.1	85-115			
Selenium	103	0.509	2.00	ug/L	100.00		103	85-115			
Thallium	99.0	0.100	0.500	ug/L	100.00		99.0	85-115			
Matrix Spike (1810070-MS1)			ce: L18I055	-		09/13/18 Ar	nalvzed · 09				
Antimony	97.7	0.600	2.00	ug/L	100.00	U	97.7	70-130			
Arsenic	97.4	0.320	2.00	ug/L	100.00	9.80	87.5	70-130			
Cadmium	78.4	0.100	0.500	ug/L	100.00	U	78.4	70-130			
Cobalt	81.8	0.136	2.00	ug/L	100.00	0.556	81.2	70-130			
Lead	83.6	0.0800	2.00	ug/L	100.00	U	83.6	70-130			
Selenium	85.7	0.509	2.00	ug/L	100.00	0.721	85.0	70-130			
Thallium	86.2	0.100	0.500	ug/L	100.00	U	86.2	70-130			
Matrix Spike (1810070-MS2)		Sour	ce: L181055	5-05	Prepared: (09/13/18 Ar	nalvzed: 09	/14/18			
Antimony	95.9	0.600	2.00	ug/L	100.00	U	95.9	70-130			
Arsenic	98.5	0.320	2.00	ug/L	100.00	5.01	93.5	70-130			
Cadmium	85.3	0.100	0.500	ug/L	100.00	U	85.3	70-130			
Cobalt	87.7	0.136	2.00	ug/L	100.00	0.285	87.4	70-130			
Lead	86.8	0.0800	2.00	ug/L	100.00	U	86.8	70-130			
Selenium	88.0	0.509	2.00	ug/L	100.00	0.563	87.5	70-130			
Thallium	89.5	0.100	0.500	ug/L	100.00	U	89.5	70-130			



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Total Recoverable Metals by 200 Series - Quality Control

					Spike	Source		%Rec		RPD	
Analyte	Result	MDL	PQL	Units	Level	Result	%Rec	Limits	RPD	Limit	Qualifier
Batch 18I0070 - EPA 200.8											
Matrix Spike Dup (1810070-MSD1)		Sour	ce: L181055	5-01	Prepared: 0	09/13/18 Ar	nalyzed: 09	0/14/18			
Antimony	102	0.600	2.00	ug/L	100.00	U	102	70-130	4.76	20	
Arsenic	98.7	0.320	2.00	ug/L	100.00	9.80	88.9	70-130	1.36	20	
Cadmium	82.0	0.100	0.500	ug/L	100.00	U	82.0	70-130	4.42	20	
Cobalt	87.0	0.136	2.00	ug/L	100.00	0.556	86.5	70-130	6.23	20	
Lead	86.1	0.0800	2.00	ug/L	100.00	U	86.1	70-130	2.91	20	
Selenium	85.9	0.509	2.00	ug/L	100.00	0.721	85.1	70-130	0.158	20	
Thallium	88.5	0.100	0.500	ug/L	100.00	U	88.5	70-130	2.66	20	
Matrix Spike Dup (1810070-MSD2)		Sour	ce: L181055	5-05	Prepared: 0	09/13/18 Ar	nalyzed: 09	0/14/18			
Antimony	99.2	0.600	2.00	ug/L	100.00	U	99.2	70-130	3.42	20	
Arsenic	99.1	0.320	2.00	ug/L	100.00	5.01	94.1	70-130	0.643	20	
Cadmium	87.4	0.100	0.500	ug/L	100.00	U	87.4	70-130	2.39	20	
Cobalt	89.3	0.136	2.00	ug/L	100.00	0.285	89.1	70-130	1.87	20	
Lead	87.1	0.0800	2.00	ug/L	100.00	U	87.1	70-130	0.292	20	
Selenium	88.9	0.509	2.00	ug/L	100.00	0.563	88.3	70-130	0.939	20	
Thallium	89.3	0.100	0.500	ug/L	100.00	U	89.3	70-130	0.233	20	



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General Chemistry Parameters - Quality Control

	D I	MDI	DOI	T T '4	Spike	Source	0/ D	%Rec	DDD	RPD	0.110
Analyte	Result	MDL	PQL	Units	Level	Result	%Rec	Limits	RPD	Limit	Qualifier
Batch 1810094 - SM 2540C											
Blank (1810094-BLK1)					Prepared &	Analyzed:	09/17/18				
Total Dissolved Solids	10.0	10.0	10.0	mg/L							U
LCS (18I0094-BS1)					Prepared &	Analyzed:	09/17/18				
Total Dissolved Solids	990	10.0	10.0	mg/L	1000.0		99.0	80-120			
Duplicate (1810094-DUP1)		Sour	ce: L18I055	5-01	Prepared &	Analyzed:	09/17/18				
Total Dissolved Solids	3310	40.0	40.0	mg/L		3250			1.83	10	J-
Batch 18I0170 - EPA 300.0											
Blank (1810170-BLK1)					Prepared &	Analyzed:	09/26/18				
Chloride	0.100	0.100	0.500	mg/L							U
Fluoride	0.0127	0.0100	0.0500	mg/L							Ι
Sulfate	0.500	0.500	2.00	mg/L							U
LCS (18I0170-BS1)					Prepared &	Analyzed:	09/26/18				
Chloride	5.26	0.100	0.500	mg/L	5.0000		105	90-110			
Fluoride	5.09	0.0100	0.0500	mg/L	5.0000		102	90-110			V
Sulfate	4.98	0.500	2.00	mg/L	5.0000		99.6	90-110			
Matrix Spike (18I0170-MS1)		Sour	ce: L18I054	4-04	Prepared &	Analyzed:	09/26/18				
Chloride	512	1.00	5.00	mg/L	50.000	464	95.8	90-110			
Fluoride	53.0	0.100	0.500	mg/L	50.000	0.874	104	90-110			V
Sulfate	468	5.00	20.0	mg/L	50.000	416	104	90-110			
Matrix Spike (18I0170-MS2)		Sour	ce: L181092	2-04	Prepared &	Analyzed:	09/27/18				
Chloride	23.3	0.100	0.500	mg/L	5.0000	18.7	91.3	90-110			
Fluoride	5.20	0.0100	0.0500	mg/L	5.0000	0.0252	104	90-110			V
Sulfate	7.12	0.500	2.00	mg/L	5.0000	2.29	96.6	90-110			



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General Chemistry Parameters - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
Batch 18I0170 - EPA 300.0											
Matrix Spike Dup (1810170-MSD1)		Sour	ce: L18I054	4-04	Prepared &	Analyzed:	09/26/18				
Chloride	508	1.00	5.00	mg/L	50.000	464	89.1	90-110	0.656	20	J-
Fluoride	52.7	0.100	0.500	mg/L	50.000	0.874	104	90-110	0.577	20	V
Sulfate	464	5.00	20.0	mg/L	50.000	416	95.5	90-110	0.942	20	
Matrix Spike Dup (18I0170-MSD2)		Sour	ce: L18I092	2-04	Prepared &	Analyzed:	09/27/18				
Chloride	23.7	0.100	0.500	mg/L	5.0000	18.7	99.2	90-110	1.69	20	
Fluoride	5.28	0.0100	0.0500	mg/L	5.0000	0.0252	105	90-110	1.57	20	V
Sulfate	7.26	0.500	2.00	mg/L	5.0000	2.29	99.4	90-110	1.96	20	



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Metals (ICP) - Quality Control

Analyte Batch 412052 - 200.7 Rev 4.4 Z01	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
Blank (412553-83)					Prepared: (09/19/18 Ar	nalyzed: 09	/21/18			
Lithium	0.0010	0.0010	0.050	mg/L				-			U
LCS (412553-84)					Prepared: (09/19/18 Ar	nalyzed: 09	/21/18			
Lithium	1.05	0.0010	0.050	mg/L	1.00		105	85-115			

Tampa Electric Company, Laboratory Services

Peggy Penner, Manager, Laboratory Services

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Site:	Big Be	end	Date:	09/12/18	File Name:	091218_	Wells_RAB	Weather:	Partly Clo	oudy & Hot	Initials	RAB /TEC		12D
LIMS #	Loction Code	Time	FE ²	pH (SU)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor	N	GVD
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	\$COLOR-W	\$ODOR-W	Time	LEVEL
L181055-01 A	BBS-CCR-1	12:30		6.80	26.10	4118	0.20	9.47	-74.9		Lt. Yellow	Mild	1.2.2.2.4	
L181055-02 A	BBS-CCR-2	12:00		6.29	26.74	1516	0.24	3.43	-38.8	41	Lt. Yellow	Mild		
LIMS #	250ml Cyan (3)	1L Inorg (1)	500ml Inorg (2)	250ml Inorg (3)	1L Mtls (1)	250ml Mtls (3)	1L Rads (1)	500ml Sulfide (2)	500ml Mtls (2)	250ml Nuts (3)	40ml Vial (6)	500 ml Nuts (2)	1L Rads Diss. (1)	Total Containe
L181055-01 A			1			2 2	I 2							10
L181055-02 A			1			2 2	2 2							10
1) 1L plastic (PP)		(2) 500ml plastic	: (PP)	(3) 250ml plastic (I	PP)	(4) 100ml coliform be	ottle	(5) 1L amber glass ((AG)	(6) 40ml VOA vial	(CG)		Samples On Ice	Sample Reciept
ESS	0115801D	ESS	0221301C	ESS	0321301C	ESS		ESS		ESS			Yes No	Time 14:28
	Preservation	1		Pres ID		Preservation			Pres ID		Preservation		Pres ID	Temp 1.8
L bottles (rads): 5 ml					250ml bottles (nu	ts): 1 ml H2SO4 to pH	1<2		L	500 ml bottles(Sulfi	de) 2ml NAOH/Zinc	Acet. to pH >12	L	
): 2 ml HNO3 to pH <2	1				0.5 ml H2SO4 to pH			h - C	250 ml bottles (Cva	n) 1g NAOH to pH >	12	L	
250 ml bottles (metal):				L 020807L			5um, 5 ml HNO3 to pH <	:2	L D		dicates that the sam		a pH of <2	
		Dufferin	Duffection			1		CCV	Time	Redox Cal	Time	Temp °C	Reading mv	Theo Value n
oH Meter Calibration	MEHAA	Buffer ID L 023378B	Buffer Value	Cal	Time	ICV	Time	7.03	14:09		8:11	22.2	234.0	234.9
Meter ID:	MPM08	L 022376B	7	7.01	8:03 8:03	00. (-111.0.01.12)		11122		Meter ID: MPM08	14:16	22.2	234.0	234.9
DEP FT 1100		L 022447B	10	4.01	8:03	and the second se	and +/- 5%) (DO +/- 0.3)	7.0.00	()	Zobell Sol ID:	14,10	22.0	2.91.1	204.0
Units: SU							icates ICV / CCV passe	CCV	Time	L 0224058				-
Conductivity Meter C	Yester and the second second second	Standard ID	Std Value 1000	Cal	Time 9:1E	ICV	Time	CUV	time	DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value n
Meter ID:	MPM08	L 022463D		1000	8:15	0075	0.04	10005	14.40		7:56	22.5	8.70	8.660
FDEP FT 1200, Units:			10000			9875	8:21	10025	14:13	Meter ID:				
Turbidity Meter Calib		Standard ID	Std Value	Acceptabi	1	ICV	Time	CCV	Time	MPM08	13:58	28.5	7.76	7.759
Meter ID:	TM07	L 019883	5.56	5.00	6.12	5.64	7:44			Barom. Pres				
FDEP FT 1600, Units:	NTU	L 019884	52.20	48.81	55.59			52.60	14:15	760	CONSTRACTOR OF			
Sulfite Info (QC Chec	(EPA 377.1)		QC Result mg/l	Time	Titrator ID	Na Thio ID	DO 3 Pillow ID	Starch Ind. ID	Iodate/Iodide ID	Therm ID	pH	Conduct.(%)	DO (mg/l)	Redox (m
QC Std: 5ml (NaThio)/	500ml DI=10mg/L					L	L	L	L	MPM08	0.2	5	0.3	10
Purging Information		Well Capacities	(gallons/ ft): 2	'= 0.16 4" =0.65		Tubing Inside Dian	n. Capacities Gallons/f							
Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Well Depth (ft)	Water (ft)	= Column (ft)	X Capacity (gal) =	1 Well Volume (gal)	(Tubing Capacity (gal/ft.)	X Length)	+ Volume + (gal)	Cell Volume (gal)	1 Eqpt Volume (gal)	
BBS-CCR-1	2	10	17.32	22.32	6.75	15.57	0.16	2.49	0.0026	23.3	0	0.06	0.12	
Purge Meth:	Time	Rate (ml/min)	Volume (gal)	Total Vol. (gal)	Water Depth (ft)	pH (SU)	Temp °C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Eqpt. Tab
1A	12:18	760	1.20	1.20	6.97	6.82	26.01	4115	0.23	17.10	ph:+/- 0.2	STABLE	Level Meter:	WLMOS
Purge Start:	12:20	750	0.40	1.60	6.98	6.80	26.06	4117	0.22	10.60	Temp°C+/- 0.2	STABLE	Pump:	PP
12:12	12:22	750	0.40	2.00	6.98	6.80	26.10	4118	0.20	9.47	Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:	16,66	100	0.40	2.00	0.00	0.00	20.10	4119	0.20		00 % Sat.< 20	STABLE	Dedicated	Yes
12:22											Turb. NTU < 20	STABLE	Tubing?	D No
Purge Complete	At 12-15	Gallons to P	urge 0.12	Stablility	Values =	6.80	26.10	4118	0.20	9.47			1	
		Screen	Intake	Well Depth (ft)	Depth to Water (ft)	Water	x Capacity (gal) =	1 Well Volume	(Tubing Capacity) (gal/ft.)	Tubing	Pump + Volume + (gal)	Cell Volume = (gal)	t Eqpt Volume (gal)	
Well #	Diam/ Comp	Interval (ft)	Depth (ft)	-		1	0.40	(gal)			1	-		
BBS-CCR-2	2	10	16.84	21.84	6.23	15.61	0.16	2.50	0.0026	22.84	0	0.06	0.12	Evel T
Purge Meth:	Time	Rate (ml/min)	Volume (gal)	Total Vol. (gal)	Water Depth (ft)		Temp °C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Eqpt. Ta
1A	11:41	480	0.76	0.76	6.29	6.69	26.76	1515	0.31	3.93	ph:+/- 0.2		Level Meter:	WLMO
Purge Start:	11:43	500	0.26	1.02	6.30	6.69	26.82	1517	0.27	3.63	Temp ^o C+/- 0.2	STABLE	Pump:	PP
11:35	11:45	500	0.26	1.28	6.29	6.69	26.74	1516	0.24	3.43	Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:					11		11. COL.				DO % Sat.< 20	STABLE	Dedicated	Yes Yes
11:45									1	1	Turb, NTU < 20	STABLE	Tubing?	No
Purge Complete	A4 44.00	Gallons to F	Quran 0 12	Ctoblille	Values =	6.69	26.74	1516	0.24	3.43	1			

Site:	Big Be	nd	Date:	09/12/18	File Name:	091218_	Wells_RAB	Weather:	Partly Cl	oudy & Hot	Sampler(s) / Initials	RAB /TEC		RAS_
LIMS #	Loction Code	Time	FE ²	pH (SU)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor	1	IGVD
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	SCOLOR-W	\$ODOR-W	Time	LEVEL
L181055-03 A	BBS-CCR-3	11:08		6.41	26.88	1694	0.52	3.47	-105		Yellow	Moderate		
LIMS #	250ml Cyan (3)	1L Inorg (1)	500ml Inorg (2)) 250ml Inorg (3)	1L Mtis (1)	250ml Mtls (3)	1L Rads (1)	500ml Sulfide (2)	500ml Mtls (2)	250ml Nuts (3)	40ml Vial (6)	500 ml Nuts (2)	1L Rads Diss. (1)	Total Containers
L181055-03 A		1	1	11. ———————————————————————————————————		Y 2	1							4
(1) 1L plastic (PP)		(2) 500ml plast	ic (PP)	(3) 250ml plastic ((PP)	(4) 100ml coliform b	oottle	(5) 1L amber glass	(AG)	(6) 40ml VOA vial	(CG)		Samples On Ice	Sample Reciept
ESS	0115801D	ESS	0221301C	ESS	0321301C	ESS		ESS		ESS			Yes No	Time 14:28
	Preservation			Pres ID		Preservation			Pres ID		Preservation		Pres ID	Temp 1.8
1L bottles (rads): 5 ml	HNO3 to pH <2			L 020807L	250ml bottles (nu	ts): 1 ml H2SO4 to p	H <2		L	500 ml bottles(Sulf	ide) 2ml NAOH/Zinc	Acet. to pH >12	L	1
): 2 ml HNO3 to pH <2			L	40 ml Vial (TOC):	0.5 ml H2SO4 to pH	1<2		L	250 ml bottles (Cya	n) 1g NAOH to pH >	12	L	1
	1 ml HNO3 to pH <2			L 020807L			5um, 5 ml HNO3 to pH	<2	L	A checked box in	dicates that the san	ple was verified to	a pH of <2	
pH Meter Calibration		Buffer ID	Buffer Value	Cal	Time	ICV	Time	CCV	Time	Redox Cal	Time	Temp °C	Reading my	Theo Value mv
Meter ID:	MPM08	L 023378		7	8:03	101		7.03	14:09	Meter ID:	8:11	22.2	234.0	234.9
FDEP FT 1100		L 0224471		10	8:03	OC: (0H +/- 0 2) /C	ond +/- 5%) (DO +/- 0.3	and the second sec	1	MPM08	14:16	22.6	231.7	234.9
Units: SU		L 0221420		4	8:03		licates ICV / CCV pass		•/	Zobell Sol ID:				
Conductivity Meter C	Callb	Standard ID	Std Value	Cal	Time	ICV	Time	ccv	Time	L 05B			1. The second se	
Meter ID:	MPM08	L 0224630		1000	8:15	101	Title			DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg/l
		L 0224640	-	1000	0.15	9875	8:21	10025	14:13	Meter ID:	7:56	22.5	8.70	8.660
FDEP FT 1200, Units:	C. State of the second s				1					MPM08	13:58	28.5	7.76	7.759
Turbidity Meter Calib	TM07	Standard ID	Std Value 3 5.56	Acceptab 5.00	ility Range 6.12	ICV 5.64	Time 7:44	CCV	Time	Barom. Pres	15.56	20.5	1.10	1.105
Meter ID:		L 01988	19192	48.81	55.59	5.04	7.44	52.60	14:15	760	-			
FDEP FT 1600, Units:	A CARLES COMPANY	L 01900			-	11-11-11						Conduct.(%)	DO (mall)	Redox (mv)
Sulfite Info (QC Chee			QC Result mg	/I Time	Titrator ID	Na Thio ID	DO 3 Pillow ID	Starch Ind. ID	Iodate/Iodide ID	Therm ID MPM08	рН 0.2	5	DO (mg/l) 0.3	10
QC Std: 5ml (NaThio)				1	1	-			-	INF INIOS	0.2	-	0.0	1 10
Purging Information		Well Capacitie	es (gallons/ ft): 2	2" = 0.16 4" =0.65 Well	Double to	Man	m. Capacities Gallons/ Well	1 Well		Tubing	Pump	Cell	1 Eqpt	
Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Depth (ft)	Depth to Water (ft)	= Column (ft)	X Capacity (gal) =	Volume (gal)	(Capacity) (gal/ft.)	Length) (ft)	+ Volume + (gal) +	Malana	= Volume (gal)	
BBS-CCR-3	2	10	18.23	23.23	5.79	17.44	0.16	2.79	0.0026	24.23	0	0.06	0.12	
Purge Meth:	Time	Rate (ml/min) Volume (gal)	Total Vol. (gal)	Water Depth (ft)	pH (SU)	Temp °C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Egpt. Table
1A	10:54	480	0.89	0.89	6.40	6.41	26.94	1745	0.27	4.01	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	10:56	500	0.26	1.15	6.41	6.41	26.92	1717	0.46	3.58	Temp*C+/- 0.2	STABLE	Pump:	PP
10:47	10:58	500	0.26	1.41	6.39	6.41	26.88	1694	0.52	3.47	Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:											DO % Sat.< 20	STABLE	Dedicated	Yes Yes
10:58		1	1					1 2 m	1	1.5	Turb. NTU < 20	STABLE	Tubing?	D No
Purge Complete	At 10:48	Gallons to	Purge 0.12	2 Stablility	Values =	6.41	26.88	1694	0.52	3.47				
Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Well Depth (ft)	Depth to Water (ft)	= Water Column (ft)	X Capacity (gal) =	1 Weli Volume (gal)	(Tubing Capacity (gal/ft)	(Length)	Pump + Volume (gal) +	Cell Volume (ga) =	1 Eqpt. Volume (gal)	
Purge Meth:	Time	Rate (ml/min) Volume (gal)	Total Vol. (gal)	Water Depth (#)	pH (SU)	Temp °C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Eqpt. Table
									-		ph:+/- 0.2	1	Level Meter:	WLM08
Purge Start:			-								Temp°C+/- 0.2		Pump:	PP
1.							-				Cond % +/- 5		Tubing:	PE/S
Purge End:			-			1	1.1				DO % Sat.< 20	12	Dedicated	□ Yes
		1				01			11.11	5	Turb. NTU < 20		Tubing?	☑ No
Purge Complete	At	Gallons to	Purge 0.0	0 Stablity	Values =							-		

Site:	Big Be	nd	Date:	09/12	2/18	File Name:	091218_	Wells_RAB	Weather:	Partly Clo	oudy & Hot	Sampler(s) / Initials	RAB /TEC	O Initials	243
LIMS #	Loction Code	Tim	e FE ²	pH (5U)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor	1	IGÝD
		1	mg/l	Pł	1	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	SCOLOR-W	SODOR-W	Time	LEVEL
L181055-04 A	BBS-CCR-BW-1	10:2	6	6.5	1	27.71	4407	0.6	2.62	-11.1	()	Clear	None		
L181055-05 A	BBS-CCR-BW-2	9:5	4	6.6	0	27.46	1958	0.8	4.34	-44.2		Lt. Yellow	Mild		
LIMS #	250ml Cyan (3)	1L Inor	a (1) 500ml Inor	(2) 250ml In	org (3)	1L Mtls (1)	250ml Mtls (3)	1L Rads (1)	500ml Sulfide (2)	500ml Mtls (2)	250ml Nuts (3)	40ml Vial (6)	500 ml Nuts (2)	1L Rads Diss. (1)	Total Container
181055-04 A			1				2 2	2 2							10
			1				2 2	2 2							
) 1L plastic (PP)		(2) 500m	plastic (PP)	(3) 250ml	plastic ((PP)	(4) 100ml coliform t	pottle	(5) 1L amber glass	(AG)	(6) 40ml VOA vial	(CG)		Samples On Ice	Sample Reciept
S	0115801D	ESS	022130			0321301C	ESS		ESS		ESS			Yes No	Time 14:28
	Preservation			Pres	ID		Preservation		1	Pres ID		Preservation		Pres ID	Temp 1.8
bottles (rads): 5 ml H					07L	250ml bottles (nu	its): 1 ml H2SO4 to p	H <2			500 ml bottles(Sulf		Acet to pH >12	LE	
				1			: 0.5 ml H2SO4 to pH				250 ml bottles (Cya			L	
	2 ml HNO3 to pH <2	-	-	1 0000	071				-2		A checked box in				
0 ml bottles (metal):	1 mi HNO3 to pH <2	100000	and income	-			1	5um, 5 ml HNO3 to pH			The second second		T	1	These Makes
H Meter Calibration	7.12.9.1.2	Buffe				Time	ICV	Time	CCV	Time	Redox Cal	Time	Temp °C	Reading mv	Theo Value m
eter ID:	MPM08		3378B 7	7		8:03	Constant and an		7.03	14:09	Meter ID:	8:11	22.2	234.0	234.9
DEP FT 1100			2447B 10	1		8:03		ond +/- 5%) (DO +/- 0.3		v)	MPM08	14:16	22.6	231.7	234.9
nits: SU			2142D 4	4	_	8:03		licates ICV / CCV pass	1	1	Zobell Sol ID:				
onductivity Meter Ca		Standa				Time	ICV	Time	CCV	Time	L 0224058	-	- A-	1	
eter ID:	MPM08		2463D 1000	10	00	8:15			1.000		DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg
DEP FT 1200, Units: u	MHOS	L 02	2464D 1000				9875	8:21	10025	14:13	Meter ID:	7:56	22.5	8.70	8.660
urbidity Meter Calibr	ation	Standa	rd ID Std Val	e A	cceptab	ility Range	ICV	Time	CCV	Time	MPM08	13:58	28.5	7.76	7.759
eter ID:	TM07	L	19883 5.56	5.0	00	6.12	5.64	7:44			Barom. Pres				
DEP FT 1600, Units: I	UTU	L	19884 52.2	48.	81	55.59			52.60	14:15	760				
ulfite Info (QC Check	k) (EPA 377.1)		QC Result	mg/I Tir	10	Titrator ID	Na Thio ID	DO 3 Pillow ID	Starch Ind. ID	lodate/lodide ID	Therm ID	pH	Conduct.(%)	DO (mg/l)	Redox (mv)
C Std: 5ml (NaThio)/5	500ml DI=10mg/L	_		- 1			L	L	L	L	MPM08	0.2	5	0.3	10
urging Information		Well Cap	acities (gallons/	t): 2" = 0.16 4	" =0.65		Tubing Inside Dia	m. Capacities Gallons/	ft): 1/4" =0.0026 3/8" =	=0.006					
Well #	Diam/ Comp	Scre		We Dept (1)	h =	Depth to Water (ft)	= Water Column (ft)	X Capacity (gal) =	1 Well Volume (gal)	(Tubing X Capacity X (gal/ft.)	(Length)	+ Volume + (gal)	Cell Volume (gal) =	1 Eqpt. Volume (gal)	
BBS-CCR-BW-1	2	10		44	3	28.42	15.88	0.16	2.54	0.0026	100	0	0.06	0.32	
Purge Meth:	Time	Rate (m		-		Water Depth (n)		Temp °C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Eqpt. Tabl
		Rate (m 300	A	al) Total V 6.1		29.74	6.49	27.71	4215	0.40	8.64	ph:+/- 0.2	STABLE	Level Meter:	WLM08
1A	10:18					29.74	6.50	27.73	4345	0.40	3.03	Temp ^o C+/- 0.2	STABLE	Pump:	ESP
urge Start:	10:20	300		7.						0.46		Cond % +/- 5	STABLE	Tubing:	PE
10:10	10:22	300	00 1.59	9.	52	29.74	6.51	27.71	4407	0.55	2.62	DO % Sat.< 20	STABLE	Dedicated	Ves
urge End:	-	-		-	-		-					Turb. NTU < 20	STABLE	Tubing?	☑ No
10:22	40.40	Calle	n to Durmo	20	- L 101	1				0.55	0.00	1010.1410 \$ 20	STABLE	rubing?	
urge Complete /	10:10	Gallon	s to Purge (Values =	6.51	27.71	4407	0.55	2.62	1		1	1
Well #	Diam/ Comp	Scre		U) (ft	th -	Depth to Water (ft)	= Water Column (ft)	X Capacity (gal) =	1 Weli Volume (gal)	(Capacity (gal/ft.)	X Length)	+ Volume + (gal)	Cell Volume (gal)	= Volume (gal)	
BBS-CCR-BW-2	2	1) 18.4	23	84	7.05	16.79	0.16	2.69	0.0026	24.64	0	0.06	0.12	
urge Meth:	Time	Rate (n	l/min) Volume	gal) Total V	ol. (gal)	Water Depth (n) pH (SU)	Temp °C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Eqpt. Tabl
1A	9:39	60			43	7.36	6.60	27.44	1958	0.86	5.63	ph:+/- 0.2	STABLE	Level Meter:	WLM08
urge Start:	9:41	62			76	7.35	6.60	27.47	1960	0.88	4.04	Temp ^o C+/- 0.2	STABLE	Pump:	PP
9:30	9:43	60			_	7.35	6.60	27.46	1958	0.83	4.34	Cond % +/- 5	STABLE	Tubing:	PE/S
	0.40	1	0.02			1.00	5.00	LING	1000	0.00		DO % Sat.< 20	STABLE	Dedicated	Yes
									-	-	-				
Purge End: 9:43	1								7			Turb. NTU < 20	STABLE	Tubing?	No No

GROUNDWATER WELL SAMPLING EQUIPMENT CALIBRATION

			Date:	09/12/18	Sampler(s):	RAB		Initials	KAD			
pH Meter Calibration		Buffer ID	Buffer Value	Gal	Time				CCV	Time	Pass/Fail	
Meter ID:	MPM08	L 023378B	3 7	7.01	8:03				7.03	14:09	Pass	
FDEP FT 1100		L 022447B	10	10.03	8:03			QC:(pH +/- 0.2)	(Cond +/- 5%) (DC) +/- 0,3mg/L) (Redox =	/- 10mv)	
Units: SU		L 022142D	<u> </u>	4.01	8:03	ICV	Time	Pass/Fail	A checked box in	ndicates ICV / CCV pa	ssed	
i ma nite and a second	ICV Check	L 022603J	ž 7			7.05	8:05	Pass				
Conductivity Meter Calib.		Standard ID	Std Value	Gal	Time	ICV	Time	Pass/Fail	CCV	Time	Pass/Fail	2000
Meter ID:	MPM08	L 022463D	3 1000	1000	8:15							
FDEP FT 1200, Units: uMH	OS	L 022464D	3 10000			9875	8:21	Pass	10025	14:13	Pass	8
Turbidity Meter Calibratio		Standard ID	Std Value	Acceptability		CCV	Time	Pass/Fail	CCV	19884	Pass/Fail	8
Meter ID:	TM07	L 019883	5.56	5.00	6.12	5.64	7:44	Pass		1		
FDEP FT 1600, Units: NTU		L 019884	52.20	48.81	55.59			-	52.60	14:15	Pass	8
Sulfite Info (QC Check)	(EPA 377 1)		QC Result mg/l	Time	Titrator ID	Na Thio ID	DO 3 Pillow ID	Starch Ind. ID	Iodate/Iodide ID			
QC Std: 5ml (NaThio)/500m	nl DI=10mg/L					L	L	L	L			8
Redox Cal	Time	Temp "C	Reading mv.	Theo Value mv	Pass / Fail	DO Meter Cal	Time	Temp °G	Reading mg/l	Theo Value mg/l	Pass / Fall	
						FDEP FT 1500						
Meter ID:	8:11	22.23	234.0	234.9	Pass	Meter ID:	7:56	22.5	8.70	8.660	Pass	
MPM08	14:16	22.60	231.7	234.9	Pass	MPM08	13:58	28.5	7.76	7.759	Pass	2
Zobell Sol ID:	-				_	Barom, Pres				14		
L 022405B						760						
Therm ID	pH	Conduct %	DO mg/l	Redox mv	CL2	Calibration	Ferrous Iron			:		8
MPM08	0.2	5	0.3	10	0.2	Criterion	Comparator ID:	10	Reagent ID:	L- 17		-
CIO ₂ DPD Check must read	1 +/- 10% of the	Calculated Std. Con	centration, multiplie	ed by 2.4.		Glycene check shou	Id read < 0.10 mg/l C	10 ₂ .				
						Initial Calibrati	on Verification ICV		Continuous Call	bration Verification C	cv	Method 10126
Chiorine Dioxide (mg/i)	Std. Conc. (mg/l)	Std. Spike Volum (ml)	e Cal Sample Volume (mi)	Calc. Std. Conc. (mg/l)	DPD Check (mg/l)	Glycene Check	Time	Pass/Fall	DPD Check (mg/l)	Time	Pass/Fail	*Equivalent to Standard Method
Meter ID:		1.0	100	K 221				The second second			OF MELLINE	4500 CIO ₂ D.
Construction of the second sec			DPD ID: L	1.00	Glycene ID:	1 62	A ab	a cheed to an health a	too reagant ounirati	on date has been verifi	ad	

COMMENTS: CL2 Std. ID: L

FACILITY NAME:		Big Be	end			SITE LOCATION:		Apollo	Beach, FL.		
WELL NO:	BE	BS-CCR-1			SAMPLE ID:	L181	055-01 A		DATE:	9/12/18	
					and the second se	NG DATA	S		1		
WELL DIAMETER (inches		TUBING DIAMETER (inc	thes) 1/4	WELL SCR DEPTH 12.32	REEN INTERV 2 feet to	AL (NGVD) 22.32 (feet)	STATIC DEP TO WATER (TH feet) 6.75	PURGE PUMP T OR BAILER:	PP PP	
WELL VOLUME PURGE (only fillout if applicable)		1 WELL VOLU		LL DEPTH - STATIC (gallons/foo		gallons
EQUIPMENT VOLU (only fillout if application)	IME PURGE: ible)	1 EQ	UIPMENT VOL	= PUMP VOLUN 0	1E + (TUBING	CAPACITY X		23.3 feet) +		gallons =	0.12 gallons
INITIAL PUMP OR DEPTH IN WELL (1	rubing et): 17.32	1.7.1.1.1	-	OR TUBING	7.32	PURGING INITIATED AT:		PURGING ENDED AT:	12:22	TOTAL VOLUN	1E ons); 2.00
TIME	VOLUME PURGED (GALLONS)	CUMUL. VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circle(mg/l))r % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
12:18	1.20	1.20	0.20	6.97	6.82	26.01	4115	0.23	17.10	Lt. Yellow	Mild
12:20	0.40	1.60	0.20	6.98	6.80	26.06	4117	0.22	10.60	Lt. Yellow	Mild
12:22	0.40	2.00	0.20	6.98	6.80	26.10	4118	0.20	9.47	Lt. Yellow	Mild
WELL CAPACITY (Ga TUBING INSIDE DIA, SAMPLED BY (PRI PUMP OR TUBING	CAPACITY (Gal.FL NT) / AFFILIATIC RAB		A.C. 1977 You Law	1/4" = 0.0026;	SAMPL GNATURES:	ING DATA	1/2" = 0.0	10; 5/8" = SAMPLING INITIATED AT: TUBING	12:22	SAMPLING ENDED AT: 1	2:30
DEPTH IN WELL (eet): 17.3		_	FLOW RATE (m	and the second second		753	MATERIAL CODE	195 Construction		
FIELD DECONTAN	INATION: Y SAMPLE CON			FIELD-FILTERE	ent Typ	14 144	ER SIZE:	μm	DUPLICATE:	YONZ	Victoria -
	SPECIFICA	TION		DDCOED WATN'S	CIMMORTON C	ESERVATION	FINAL		INDED IS AND/OR	EQU	IPMENT
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE		TAL VOL. N FIELD (ml) (1)	pH	ME	THOD	c	ODE
@lno-500	1	PE	500ml	NONE	N	IONE	N/A	Inorg	ganics		PP
@Met-250	2	PE	250ml	HNO3	-	1ml	<2	Me	etals		PP
@Rad-1L	2	PE	1L	HNO3		5ml	<2	Radio	logicals		PP
					-						
REMARKS: (1) Sample bol	tles pre-pres			or to sample c	ollection.						
MATERIAL CODES:			Clear Glass;	PE = Polyethylene		the second s	And and a state of the state of		her (Specify)		
SAMPLING/PURGIN	G A S: R	PP = After Peris FPP = Reverse	taltic Pump; B Flow Peristaltic	= Bailer; BP = Bla Pump; SM = Strav	dder Pump; Es v Method (tubin	SP = Electric Subri g Gravity Drain);	nirsable Pump; VT = Vacuum T	PP = Peristallic Pur rap; O = Olher (Sp	np ecify)		
NOTES:				nformation requ				(SEE FS 2212, SE	CTION 3)		

2: STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3) pH: \pm 0.2 units Temperature: \pm 0.2 °C Specific Conductance: \pm 5% Dissolved Oxygen: all readings \leq 20% saturation (see Table FS 2200-2); optionally, \pm 0.2 mg/L or \pm 10% (whichever is greater) Turbidity: all readings \leq 20 NTU; optionally \pm 5 NTU or 10% (whichever is greater)

		Big Be	and		_	SITE LOCATION:		Apollo	Beach, FL.		
VELL NO:	В	BS-CCR-2	2		SAMPLE ID:	L1810)55-02 A		DATE:	9/12/18	
						NG DATA	_				
VELL IAMETER (inches)	TUBING DIAMETER (inc		DEPTH 11.84	feet to	21.84 (feet)	STATIC DEPTH TO WATER (feet	0180	PURGE PUMP T OR BAILER:	PP PP	
VELL VOLUME PL only fillout if applica	JRGE: able)	1 WELL VO	LUME = (TOT)	AL WELL DEPTH -	STATIC DEF	PTH TO WATER)	feet) x	PACITY	gallons/foo	L #	gallons
QUIPMENT VOLU		1 EQU	JIPMENT VOL	. = PUMP VOLUM	E + (TUBING	CAPACITY X 1	TUBING LENG	TH) + FLOW C	ELL VOLUME		
only fillout if applica	abie)		=(0	gallons + (0.0026 gall	lons/foot X	22.84 fee	i)+ 0.06	gallons =	0.12 gallo
EPTH IN WELL (TUBING eet): 16.84		FINAL PUMP DEPTH IN W	10	.84	PURGING INITIATED AT:	11:35	PURGING ENDED AT:	11:45	TOTAL VOLUM PURGED (gallo	E ns): 1.3
TIME	VOLUME PURGED (GALLONS)	CUMUL. VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circle(mg/l))r % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
11:41	0.76	0.76	0.13	6.29	6.69	26.76	1515	0.31	3.93	Lt. Yellow	Mild
11:43	0.26	1.02	0.13	6.30	6.69	26.82	1517	0.27	3.63	Lt, Yellow	Mild
11:45	0.26	1.28	0.13	6.29	6.69	26.74	1516	0.24	3.43	Lt. Yellow	Mild
									-		_
VELL CAPACITY (Ga	lons Par Foot)	0.75" = 0.02;	1 ^m = 0,04;	1.25" = 0.06, 2" =	0.16: 3"=	0.37; 4"=0.	65: 5 ⁴ = 1	.02: 6" = 1.47	12" = 5.88		
UBING INSIDE DIA.			3/16" = 0.0014;		5/16" = 0.004		1/2" = 0.0	10; 5/8" =	0.016		
SAMPLED BY (PR		ON		SAMPLER (S) SIC	arte areas	ING DATA		SAMPLING INITIATED AT:		SAMPLING ENDED AT:	
SAMPLED DT (PA	RAE		TECO	RA	Bette	24		INITIATED AT:	11:45		12:0
PUMP OR TUBING	eet): 16.8	2		SAMPLE PUMP	per minute):	V	493	TUBING MATERIAL COD	E: PE	/S	
IELD DECONTAN				FIELD-FILTERED Filtration Equipme			ER SIZE:	μm	DUPLICATE:	Y D N 2	1
ELD DEGONTAN	SAMPLE COM	a day a farmer of the second second second		Filtration Equipme	and the second se	11.8.8					
	SPECIFICA					ESERVATION		INT	INDED	SAM	
	#	MATERIAL		PRESERVATIVE		ESERVATION	FINAL	ANALYS	ENDED IS AND/OR	EQU	IPLING IPMENT
SAMPLE ID CODE	The second se		VOLUME	PRESERVATIVE USED	то		FINAL pH	ANALYS		EQU	PLING
SAMPLE ID CODE	#	MATERIAL	VOLUME	USED	TO ADDED I	TAL VOL. N FIELD (ml) ())	pН	ANALYS	IS AND/OR THOD	EQU	IPLING IPMENT ODE
SAMPLE ID CODE @Ino-500	#	MATERIAL	VOLUME 500ml		TO ADDED I	TAL VOL.		ANALYS	IS AND/OR	EQU	IPLING IPMENT
@lno-500	# CONTAINERS	PE	500ml		TO ADDED I	TAL VOL. N FIELD (ml) (n)	pН	ANALYS ME Inor	IS AND/OR THOD		IPLING IPMENT ODE
@Ino-500 @Met-250	1 2	PE PE	500ml	USED NONE HNO3	TO ADDED I	TAL VOL. N FIELD (ml) (n) NONE	pH N/A	ANALYS ME Inor M	IS AND/OR THOD ganics		APLING IPMENT ODE
@lno-500	# CONTAINERS	PE	500ml		TO ADDED I	TAL VOL. N FIELD (ml) (n)	рН N/A <2	ANALYS ME Inor M	IS AND/OR THOD ganics etals		PPING IPMENT ODE PP
@Ino-500 @Met-250	1 2	PE PE	500ml	USED NONE HNO3	TO ADDED I	TAL VOL. N FIELD (ml) (n) NONE	рН N/A <2	ANALYS ME Inor M	IS AND/OR THOD ganics etals		PPING IPMENT ODE PP
@Ino-500 @Met-250	1 2	PE PE	500ml	USED NONE HNO3	TO ADDED I	TAL VOL. N FIELD (ml) (n) NONE	рН N/A <2	ANALYS ME Inor M	IS AND/OR THOD ganics etals		PPING IPMENT ODE PP
@Met-250	1 2	PE PE	500ml	USED NONE HNO3	TO ADDED I	TAL VOL. N FIELD (ml) (n) NONE	рН N/A <2	ANALYS ME Inor M	IS AND/OR THOD ganics etals		PPING IPMENT ODE PP
@Ino-500 @Met-250 @Rad-1L	1 2	PE PE	500ml	USED NONE HNO3	TO ADDED I	TAL VOL. N FIELD (ml) (n) NONE	рН N/A <2	ANALYS ME Inor M	IS AND/OR THOD ganics etals		PPING IPMENT ODE PP
@Ino-500 @Met-250 @Rad-1L	1 2 2	PE PE PE PE	500ml 250ml 1L	USED NONE HNO3	N	TAL VOL. N FIELD (ml) (n) NONE 1ml 5ml	рН N/A <2 <2 <2	ANALYS ME Inor M Radio	IS AND/OR THOD ganics etals ologicals		PPING IPMENT ODE PP
@Ino-500 @Met-250 @Rad-1L REMARKS: (1) Sample bo MATERIAL CODE:	ttles pre-pres	PE PE PE PE Served at lab	500ml 250ml 1L 1L poratory price	USED NONE HNO3 HNO3 Or to sample co	N	TAL VOL. N FIELD (ml) (n) NONE 1ml 5ml P = Polypropylen	рН N/A <2 <2 <2	ANALYS ME Inor M Radio	IS AND/OR THOD ganics etals ologicals		PPING IPMENT ODE PP
@Ino-500 @Met-250 @Rad-1L REMARKS: (1) Sample bo	ttles pre-pres	PE PE PE PE Served at lab	500ml 250ml 1L 1L poratory price	USED NONE HNO3 HNO3 OT to sample co	N	TAL VOL. N FIELD (ml) (n) NONE 1ml 5ml P = Polypropylen	рН N/A <2 <2 <2	ANALYS ME Inor M Radio	IS AND/OR THOD ganics etals ologicals		PPING IPMENT ODE PP

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212. SECTION 3)

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2);

optionally, ± 0.2 mg/L or ± 10% (whichever is greater) Turbidity: all readings ≤ 20 NTU; optionally ± 5 NTU or 10% (whichever is greater)

SITE NAME:		Big Be	end			SITE LOCATION:		Apollo	Beach, FL.		
WELL NO:	В	BS-CCR-3			SAMPLE ID:	L1810	55-03 A	Carl Carl 1	DATE	9/12/18	
		<u> </u>		1	PURGI	NG DATA					
WELL DIAMETER (inches)	TUBING DIAMETER (inc	thes) 1/4	WELL SCREEN IN DEPTH 13.23	ITERVAL feet to	23.23 (feet)	STATIC DEP TO WATER	TH (feet): 5.79	PURGE PUMP T OR BAILER:	YPE PP	
WELL VOLUME PL (only fillout if application)	IRGE:	1 WELL VO	LUME = (TOT	AL WELL DEPTH -	STATIC DEP	TH TO WATER)	X WELL CA	APACITY			
			= (feet -		feet) x		gallons/fo	ot =	gallons
EQUIPMENT VOLU (only fillout if application)	IME PURGE: able)	1 EQI	UIPMENT VOL					GTH) + FLOW CE			0.12
	TUBING		EINAL PLIME	0 OR TUBING	gallons + (0.0026 galle		24.23 fee PURGING	et)+ 0.06	TOTAL VOLU	0.12 gallons ME
INITIAL PUMP OR DEPTH IN WELL (f	eet): 18.23	3 1 CUMUL.	DEPTH IN W	OR TUBING ELL (feel): 18.	23	PURGING INITIATED AT:	1	ENDED AT:	10:58		ons): 1.41
TIME	VOLUME PURGED (GALLONS)	VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	OXYGEN (circle mg/Lar % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
10:54	0.89	0.89	0.13	6.40	6.41	26.94	1745	0.27	4.01	Yellow	Moderate
10:56	0.26	1.15	0.13	6.41	6.41	26.92	1717	0.46	3.58	Yellow	Moderate
10:58	0.26	1.41	0.13	6.39	6.41	26.88	1694	0.52	3.47	Yellow	Moderate
	1				11.201	1.					
					-	-					
		-			-						
					-						
			-		-						
					-				-		
WELL CAPACITY (Ga	llons Per Foot)	0.75" = 0.02;	1" = 0.04;	1.25" = 0.06; 2" =	0.16; 3" =	0,37; 4" = 0.0			12" = 5.88		
TUBING INSIDE DIA.	CAPACITY (Gal./F	t.): 1/8" = 0.00006;	3/16" = 0.0014	1/4" = 0.0026;	5/16" = 0.004	3/8" = 0.006; ING DATA	1/2" = 0.0	5/8" = 0	0.016	1.000	
SAMPLED BY (PR	NT) / AFFILIATI	ON:		SAMPLER (S) SIG		/		SAMPLING INITIATED AT:	5.00	SAMPLING ENDED AT:	7.0
11.44.54	RA	3	TECO		atty	-		10	:58		1:08
PUMP OR TUBING DEPTH IN WELL (F	eet): 18.3	2		SAMPLE PUMP FLOW RATE (mL	per minute):		493	TUBING MATERIAL CODE	E PE	:/S	
FIELD DECONTAN	INATION:	YOND		FIELD-FILTERED: Filtration Equipme	п Туре	N I FILTI	ER SIZE:	μm	DUPLICATE:	YDNE	2
	SAMPLE CON SPECIFIC			the second second	I BUR ALLER ALLER ALL AN	ESERVATION			NDED		MPLING
SAMPLE ID CODE	# CONTAINERS	MATERIAL	VOLUME	PRESERVATIVE		TAL VOL. N FIELD (ml) (1)	FINAL pH		S AND/OR THOD		CODE
					10000	··· · ······ (1)					
@Ino-500	1	PE	500ml	NONE	N	IONE	N/A	Inorg	anics		PP
									_		
@Met-250	2	PE	250ml	HNO3		1ml	<2	Me	tals	1	PP
@Rad-1L	2	PE	1L	HNO3	1000	5ml	<2	Radio	logicals	-	PP
								-	_		
			-		_						
			-								
			-	-						-	
REMARKS:								L			
(1) Sample bol	tles pre-pres	served at lab	oratory pric	or to sample co	llection.	A				£	
MATERIAL CODES	: AG = Amb	er Glass; CG	i = Clear Glass	; PE = Polyethy	lene; PF	= Polypropylene		a sea a second a s		ecify)	
SAMPLING/PURGIN EQUIPMENT CODE:	G 5:	APP = After Perist RFPP = Reverse I	taltic Pump; B Flow Peristaltic	= Bailer; BP = Blade Pump; SM = Straw	der Pump; ES Method (tubin	<pre>FP = Electric Subm g Gravity Drain);</pre>	irsable Pump; VT = Vacuum	PP = Peristaltic Pur Trap; O = Other (Spe	np ecify)		
NOTES.	d The should	do not constitu	to all of the l	oformation requir	ord by Char	tor 62-160 E A	C.				

The above do not constitute all of the information requierd by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212. SECTION 3)

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2);

optionally, ± 0.2 mg/L or ± 10% (whichever is greater) Turbidity: all readings ≤ 20 NTU; optionally ± 5 NTU or 10% (whichever is greater)

SITE NAME:		Big Be	end			SITE LOCATION:		Apollo	Beach, FL.		
VELL NO:	BBS	-CCR-BW	/-1		SAMPLE ID:	L1810	055-04 A		DATE:	9/12/18	
						NG DATA					
VELL DIAMETER (inche:	s)	TUBING DIAMETER (inc	hes) 1/4	WELL SCREEN IN DEPTH 34.30	feet to		STATIC DEP TO WATER (f		PURGE PUMP T OR BAILER:	ESP	
VELL VOLUME P only fillout if applic	URGE: able)	1 WELL VO	LUME = (TOTA = (AL WELL DEPTH -	STATIC DEF	TH TO WATER	feet) x	PACITY	gallons/foo	l =	gallons
QUIPMENT VOL only fillout if applic	UME PURGE: able)	1 EQU	JIPMENT VOL.	. = PUMP VOLUM 0	E + (TUBING gallons + (CAPACITY X 0.0026 gall			LL VOLUME	gallons =	0.32 gallons
NITIAL PUMP OR EPTH IN WELL (TUBING feet): 39.30		FINAL PUMP DEPTH IN WI	OR TUBING	.30	PURGING INITIATED AT:		PURGING ENDED AT:	10:22	TOTAL VOLU PURGED (gall	VIE ons): 9.5
TIME	VOLUME PURGED (GALLONS)	VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circle/mg/l or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
10:18	6.34	6.34	0.79	29.74	6.49	27.71	4215	0.40	8.64	Clear	None
10:20	1.59	7.93	0.80	29.73	6.50	27.73	4345	0.46	3.03	Clear	None
10:22	1.59	9.52	0.80	29.74	6.51	27.71	4407	0.55	2.62	Clear	None
		-	-						1.0		
UBING INSIDE DI	Gallons Per Fool): A. CAPACITY (Gal	1000 and 1000	1" = 0,0 0006; 3/16" =		SAMPL	0.16; 3" = 0 5/16" = 0.004; ING DATA	3/8" = 0.006	3: 1/2" = 0.0	1.02; 6" = 1 110; 5/8	* = 0.016	= 5,86
1	A. CAPACITY (Gal	/Ft.): 1/8" = 0.00 DN:		SAMPLER (S) SH	SAMPL	5/16" = 0.004;	3/8" = 0.006	3: 1/2" = 0.0 SAMPLING INITIATED AT: 10	197 - 197 - 19 - 19 - 19 - 19 - 19 - 19	SAMPLING	0:26
UBING INSIDE DI	A, CAPACITY (Gal RINT) / AFFILIATIO RAB	/Ft.): 1/8" = 0.00 DN:	006; 3/16" :	= 0.0014; 1/4" =		5/16" = 0.004: ING DATA	3/8" = 0.006	3: 1/2" = 0.0 SAMPLING INITIATED AT:	110; 5/8 1:22	SAMPLING ENDED AT:	
UBING INSIDE DI SAMPLED BY (PF PUMP OR TUBINO SEPTH IN WELL (A, CAPACITY (Gal RINT) / AFFILIATIC RAB Geel): 39.3	/Ft.): 1/8" = 0.00 DN:	006; 3/16" :	SAMPLER (S) SU SAMPLER (S) SU SAMPLE PUMP FLOW RATE (ml	0.0026; SAMPL SNATURES: SNATURES: SAMPL	5/16" = 0.004: ING DATA	3/8" = 0.00E	SAMPLING INITIATED AT: 10 TUBING	110; 5/8 1:22	SAMPLING ENDED AT:	0:26
CUBING INSIDE DI SAMPLED BY (PF PUMP OR TUBINO DEPTH IN WELL (A. CAPACITY (Gal RINT) / AFFILIATIO RAB Geel): 39.3 MINATION: SAMPLE CON	/Ft): 1/8" = 0.00 DN: Y N 2	006; 3/16" :	SAMPLER (S) SU SAMPLER (S) SU SAMPLE PUMP FLOW RATE (ml	0.0026; SAMPL SNATURES: SNATURES: SAMPL	5/16" = 0.004: ING DATA	3/8" = 0.000	3: 1/2" = 0.0 SAMPLING INITIATED AT: 10 TUBING MATERIAL CODE µm	110; 5/8 2:22 5: PI DUPLICATE: NDED	*=0.016 SAMPLING ENDED AT: 1 E Y N N SA	0:26
TUBING INSIDE DI	A. CAPACITY (Gal RINT) / AFFILIATIO RAB Geet): 39.3 MINATION: SAMPLE CON SPECIFICA	/Ft): 1/8" = 0.00 DN: Y N 2	006; 3/16" :	SAMPLER (S) SU SAMPLER (S) SU SAMPLE PUMP FLOW RATE (ml	0.0026; SAMPL RNATURES: Per minute): per minute): y ant Type. SAMPLE PRE	5/16" = 0.004: ING DATA	3/8" = 0.000	3: 1/2" = 0.0 SAMPLING INITIATED AT: 10 TUBING MATERIAL CODE µm INTE ANALYSI	22 22 22 22 22 22 22 22 22 22 22 22 22	*= 0.016 ENDED AT: 1 E Y N R SA	0:26 2
UBING INSIDE DI SAMPLED BY (PF PUMP OR TUBIN DEPTH IN WELL (TIELD DECONTAL	A. CAPACITY (Gal RINT) / AFFILIATIO RAB Geet): 39.3 MINATION: SAMPLE CON SPECIFICA	/FL): 1/8" = 0.00 DN: Y □ N ☑ TAINER TION MATERIAL	1006; 3/16" = TECO	SAMPLER (S) SMPLER (S) SMPLER (S) SMPLE PUMP FLOW RATE (ml FIELD-FILTEREC Filtralion Equipmo	0.0026; SAMPL NATURES: perminute): mt Type. SAMPLE PRI ADDED II	5/16" = 0.004: ING DATA M ING DATA 3 N IN Filt ESERVATION TAL VOL	3/8" = 0,006	3: 1/2" = 0.0 SAMPLING INITIATED AT: 10 TUBING MATERIAL CODE µm INTE ANALYSI ME [*]	110; 5/8 1:22 1:22 DUPLICATE: NDED S AND/OR	* = 0.016 ENDED AT: 1 E Y N R SA E SA	10:26
UBING INSIDE DI SAMPLED BY (PF PUMP OR TUBING SEPTH IN WELL (FIELD DECONTA!	A. CAPACITY (Gal RINT) / AFFILIATIO RAB 3 feet): 39.3 MINATION: 3 SAMPLE CON SPECIFICA # CONTAINERS	/FL: 1/8" = 0.00 DN: Y I N Y TAINER TION MATERIAL CODE	TECO	SAMPLER (S) SM SAMPLER (S) SM FLOW RATE (MI FIELD-FILTEREC Filtration Equipme PRESERVATIVE USED	0.0026; SAMPL RNATURES: Per minute): per minute): SAMPLE PRI TO ADDED II		3/8" = 0.006	3: 1/2" = 0.0 SAMPLING INITIATED AT: 10 TUBING MATERIAL CODE µm INTE ANALYSI ME INOTS	222 DUPLICATE: NDED S AND/OR HOD ganics	* = 0.016	IO:26 MPLING JIPMENT CODE
UBING INSIDE DI SAMPLED BY (PF PUMP OR TUBING SEPTH IN WELL (FIELD DECONTA!	A. CAPACITY (Gal RINT) / AFFILIATIO RAB 3 feet): 39.3 MINATION: 3 SAMPLE CON SPECIFICA # CONTAINERS	/FL: 1/8" = 0.00 DN: Y I N Y TAINER TION MATERIAL CODE	TECO	SAMPLER (S) SM SAMPLER (S) SM FLOW RATE (MI FIELD-FILTEREC Filtration Equipme PRESERVATIVE USED	0.0026; SAMPL NATURES: per minute): on Type. SAMPLE PRI ADDED II	5/16" = 0.004: ING DATA 3 N ☑ FILT ESERVATION TAL VOL N FIELD (ml) (t)	3/8" = 0.006	3: 1/2" = 0.0 SAMPLING INITIATED AT: 10 TUBING MATERIAL CODE µm INTE ANALYSI ME Inorg	10; 5/8 ::22	* = 0.016 SAMPLING ENDED AT: 1 E Y N N SA EQ SA EQ SA	2 MPLING JIPMENT CODE
UBING INSIDE DI SAMPLED BY (PR PUMP OR TUBING SEPTH IN WELL (IELD DECONTAI SAMPLE ID CODE @Ino-500 @Met-250	A. CAPACITY (Gal RINT) / AFFILIATIO RAB Geel): 39.3 MINATION: SAMPLE CON SPECIFICA # CONTAINERS 1 1 2	/FL: 1/8" = 0.00 DN: Y □ N Ø TAINER TION MATERIAL CODE PE PE	VOLUME 500ml	SAMPLER (S) SMPLER (S) SMPLER (S) SMPLER (S) SMPLE PUMP FLOWRATE (ml FIELD-FILTEREE Filtration Equipme PRESERVATIVE USED NONE	0.0026; SAMPL NATURES: per minute): on Type. SAMPLE PRI ADDED II	5/16" = 0.004: ING DATA 3 N ☑ FILT ESERVATION TAL VOL N FIELD (ml) (t) IONE 1ml	3/8" = 0.006	3: 1/2" = 0.0 SAMPLING INITIATED AT: 10 TUBING MATERIAL CODE µm INTE ANALYSI ME Inorg	222 DUPLICATE: NDED S AND/OR THOD ganics etals	* = 0.016 SAMPLING ENDED AT: 1 E Y N N SA EQ SA EQ SA	0:26 DIPUING JIPMENT CODE ESP ESP
CUBING INSIDE DI SAMPLED BY (PF PUMP OR TUBING DEPTH IN WELL (TIELD DECONTAI SAMPLE ID CODE @Ino-500 @Met-250	A. CAPACITY (Gal RINT) / AFFILIATIO RAB Geel): 39.3 MINATION: SAMPLE CON SPECIFICA # CONTAINERS 1 1 2	/FL: 1/8" = 0.00 DN: Y □ N Ø TAINER TION MATERIAL CODE PE PE	VOLUME 500ml	SAMPLER (S) SMPLER (S) SMPLER (S) SMPLER (S) SMPLE PUMP FLOWRATE (ml FIELD-FILTEREE Filtration Equipme PRESERVATIVE USED NONE	0.0026; SAMPL NATURES: per minute): on Type. SAMPLE PRI ADDED II	5/16" = 0.004: ING DATA 3 N ☑ FILT ESERVATION TAL VOL N FIELD (ml) (t) IONE 1ml	3/8" = 0.006	3: 1/2" = 0.0 SAMPLING INITIATED AT: 10 TUBING MATERIAL CODE µm INTE ANALYSI ME Inorg	222 DUPLICATE: NDED S AND/OR THOD ganics etals	* = 0.016 SAMPLING ENDED AT: 1 E Y N N SA EQ SA EQ SA	DIC:26
CUBING INSIDE DI SAMPLED BY (PF PUMP OR TUBING DEPTH IN WELL (FIELD DECONTAI SAMPLE ID CODE @Ino-500 @Met-250	A. CAPACITY (Gal RINT) / AFFILIATIO RAB Geel): 39.3 MINATION: SAMPLE CON SPECIFICA # CONTAINERS 1 1 2	/FL: 1/8" = 0.00 DN: Y □ N Ø TAINER TION MATERIAL CODE PE PE	VOLUME 500ml	SAMPLER (S) SMPLER (S) SMPLER (S) SMPLER (S) SMPLE PUMP FLOWRATE (ml FIELD-FILTEREE Filtration Equipme PRESERVATIVE USED NONE	0.0026; SAMPL NATURES: per minute): on Type. SAMPLE PRI ADDED II	5/16" = 0.004: ING DATA 3 N ☑ FILT ESERVATION TAL VOL N FIELD (ml) (t) IONE 1ml	3/8" = 0.006	3: 1/2" = 0.0 SAMPLING INITIATED AT: 10 TUBING MATERIAL CODE µm INTE ANALYSI ME Inorg	222 DUPLICATE: NDED S AND/OR THOD ganics etals	* = 0.016 SAMPLING ENDED AT: 1 E Y N N SA EQ SA EQ SA	2 MPLING JIPMENT CODE ESP ESP
CUBING INSIDE DI SAMPLED BY (PR PUMP OR TUBING SEPTH IN WELL (IELD DECONTAN SAMPLE ID CODE @Ino-500 @Met-250 @Rad-1L CREARKS:	A. CAPACITY (Gal	/FL): 1/8" = 0.00	VOLUME	AMPLER (S) SMPLER (S) SMPLER (S) SMPLER (S) SMPLE PUMP FLOW RATE (ml FIELD-FILTERED Filtration Equipment PRESERVATIVE USED NONE HNO3 HNO3	0.0026: SAMPL Perminute): SAMPLE PRI SAMPLE PRI ADDED II	5/16" = 0.004: ING DATA 3 N ☑ FILT ESERVATION TAL VOL N FIELD (ml) (t) IONE 1ml	3/8" = 0.006	3: 1/2" = 0.0 SAMPLING INITIATED AT: 10 TUBING MATERIAL CODE µm INTE ANALYSI ME Inorg	222 DUPLICATE: NDED S AND/OR THOD ganics etals	* = 0.016 SAMPLING ENDED AT: 1 E Y N N SA EQ SA EQ SA	DIC:26
CUBING INSIDE DI SAMPLED BY (PR DEPTH IN WELL (TIELD DECONTAN SAMPLE ID CODE @Ino-500 @Met-250 @Rad-1L	A. CAPACITY (Gal RINT) / AFFILIATIO RAB 3 3 3 1 3 3 3 3 3 3 3 3 3 3 3 3 3	/FL): 1/8" = 0.00 DN: TAINER TION MATERIAL CODE PE PE PE PE PE	VOLUME	SAMPLER (S) SMPLER (S) SMPLER (S) SMPLE PUMP FLOW RATE (mil FIELD-FILTERED PRESERVATIVE USED NONE HNO3 HNO3 OT to sample c	0.0026: SAMPL Perminute): SAMPLE PRI SAMPLE PRI TO ADDED II	5/16" = 0.004: ING DATA 3 N ☑ FILT ESERVATION TAL VOL N FIELD (ml) (t) IONE 1ml	3/8" = 0.006	s: 1/2" = 0.0 SAMPLING INITIATED AT: 10 TUBING MATERIAL CODE µm INTE ANALYSI Inorg Inorg Radio	222 DUPLICATE: NDED S AND/OR rHOD panics etals logicals	* = 0.016	DIC:26

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2);

oplionally, ± 0.2 mg/L or ± 10% (whichever is greater) Turbidity: all readings ≤ 20 NTU; optionally ± 5 NTU or 10% (whichever is greater)

SITE NAME:		Big Be	end			SITE LOCATION:		Apono	Beach, FL.		
WELL NO:	BBS	-CCR-BW	1-2		SAMPLE ID:	L1810	055-05 A		DATE:	9/12/18	
						NG DATA					
VELL DIAMETER (inches	5)	TUBING DIAMETER (inc	hes) 1/4	WELL SCREEN IN DEPTH 13.64	feet to	23.34 (feet)	STATIC DEP TO WATER (f	reet); 7.05	PURGE PUMP T OR BAILER:	PP PP	
VELL VOLUME P only fillout if applic	URGE: able)	1 WELL VO	LUME = (TOT/ = (AL WELL DEPTH -	STATIC DEP feet -	TH TO WATER)	feet) x	PACITY	gallons/foc	ot =	gallons
EQUIPMENT VOL only fillout if applic	JME PURGE: able)	1 EQU		. = PUMP VOLUMI 0	E + (TUBING	CAPACITY X 1 0.0026 gall			LL VOLUME et) + 0.06	gallons =	0.12 gallons
NITIAL PUMP OR DEPTH IN WELL (TUBING eet): 18.49		FINAL PUMP		.49	PURGING	9:30	PURGING ENDED AT:	9:43	TOTAL VOLUM	ME ans): 2.0
TIME	VOLUME PURGED (GALLONS)	VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circle mg/) r % saturation)	TURBIDITY (NTUS)	COLOR (describe)	ODOR (describe)
9:39	1.43	1.43	0.16	7.36	6.60	27.44	1958	0.86	5.63	Lt. Yellow	Mild
9:41	0.33	1.76	0.17	7.35	6.60	27.47	1960	0.88	4.04	Lt. Yellow	Mild
9:43	0.32	2.08	0.16	7.35	6.60	27.46	1958	0.83	4.34	Lt. Yellow	Mild
		0.75" = 0.02; /Ft.): 1/8" = 0.00	1" = 0.0 006; 3/16" =	04; 1.25" = 0.0 = 0.0014; 1/4" =		0.16; 3'' = 0. 5/16'' = 0.004;	.37; 4" = 3/8" = 0.006		= 1.02; 6" = 1 010; 5/8	1.47; 12" = " = 0.016	= 5.88
WELL CAPACITY (TUBING INSIDE DI, SAMPLED BY (PR	A. CAPACITY (Gai	./Ft.): 1/8" = 0.00	006; 3/16" :		0.0026: SAMPL		3/8" = 0.006	5: 1/2" = 0.0 SAMPLING INITIATED AT:	010; 5/8	* = 0.016 SAMPLING ENDED AT:	
TUBING INSIDE DI, SAMPLED BY (PR	A, CAPACITY (Gal INT) / AFFILIATIO RAE	./Ft.): 1/8" = 0.00 DN: }		= 0.0014; 1/4" =		5/16" = 0.004; ING DATA	3/8'' = 0.006	5: 1/2" = 0.0 SAMPLING INITIATED AT: 9	:43	* = 0.016 SAMPLING ENDED AT:	= 5.88 D:54
TUBING INSIDE DI SAMPLED BY (PR PUMP OR TUBING DEPTH IN WELL (A, CAPACITY (Gai INT) / AFFILIATIO RAE Geet): 18.5	,/Ft.): 1/8" = 0.00 DN: }	006; 3/16" :	SAMPLER (S) SIC	0.0026: SAMPL SNATURES: per minute):	5/16" = 0.004; ING DATA	3/8'' = 0.006	5: 1/2" = 0.0 SAMPLING INITIATED AT:	:43 E: PE	* = 0.016 SAMPLING ENDED AT:	9:54
TUBING INSIDE DI SAMPLED BY (PR PUMP OR TUBING DEPTH IN WELL (A. CAPACITY (Gai INT) / AFFILIATIO RAE Geet): 18.5 MINATION: SAMPLE CON	./Ft.): 1/8" = 0.00 DN: 3 5 Y □ N ☑ ITAINER	006; 3/16" :	SAMPLER (S) SIC	0.0026: SAMPL SNATURES: per minute):	5/16" = 0.004; ING DATA	3/8" = 0.006	SAMPLING INITIATED AT: 9 TUBING MATERIAL CODE Jum	210; 5/8 243 5: PE DUPLICATE: NDED	** = 0.016 SAMPLING ENDED AT: 5/S Y N E	9:54
TUBING INSIDE DI SAMPLED BY (PR PUMP OR TUBING DEPTH IN WELL (A, CAPACITY (Gai INT) / AFFILIATI(RAE Geet): 18.5 AINATION:	./Ft.): 1/8" = 0.00 DN: 3 5 Y □ N ☑ ITAINER	006; 3/16" :	SAMPLER (S) SIC	0.0026: SAMPL SNATURES: per minute): int Type. SAMPLE PRE TOT	5/16" = 0.004; ING DATA	3/8" = 0.006	SAMPLING INITIATED AT: 9 TUBING MATERIAL CODE µm INTE ANALYSI	:43 :: PE DUPLICATE:	** = 0.016	9:54 2]
TUBING INSIDE DI SAMPLED BY (PF PUMP OR TUBING DEPTH IN WELL (FIELD DECONTA	A, CAPACITY (Gai	(JF1): 1/8" = 0.00 ON: 3 Y □ N ☑ ITAINER TION MATERIAL	006; 3/16" = TECO	SAMPLER (S) SIC	0.0026: SAMPL ENATURES: per minute): nt Type. SAMPLE PRE TOT ADDED IF	5/16" = 0.004; ING DATA N PILT ESERVATION TAL VOL.	3/8" = 0.006	SAMPLING INITIATED AT: 9 TUBING MATERIAL CODE µm INTE ANALYSI ME	:43 :: PE DUPLICATE: NDED S AND/OR	** = 0.016	D:54
TUBING INSIDE DI SAMPLED BY (PF PUMP OR TUBING DEPTH IN WELL (FIELD DECONTA) SAMPLE ID CODE	A, CAPACITY (Gal INT) / AFFILIATIO RAE Geet): 18.5 MINATION: SAMPLE CON SPECIFICA # CONTAINERS	(JFt.): 1/8" = 0.00 ON: 3 Y □ N ☑ ITAINER TION MATERIAL CODE	006; 3/16" : TECO	SAMPLER (S) SIC SAMPLER (S) SIC SAMPLE PUMP FLOW RATE (mL FIELD-FILTERED Filtration Equipme PRESERVATIVE USED	0.0026: SAMPL ENATURES: per minute): nt Type. SAMPLE PRE TOT ADDED IF	5/16" = 0.004; ING DATA M PILT SERVATION FAL VOL. N FIELD (ml) (1)	3/8" = 0.006	SAMPLING INITIATED AT: 9 TUBING MATERIAL CODE µm INTE ANALYSI ME	210; 5/8 243 2: PE DUPLICATE: NDED S AND/OR THOD	** = 0.016	2):54 2 MPLING IPMENT CODE
SAMPLED BY (PF	A, CAPACITY (Gal INT) / AFFILIATIO RAE Geet): 18.5 MINATION: SAMPLE CON SPECIFICA # CONTAINERS	(JFt.): 1/8" = 0.00 ON: 3 Y □ N ☑ ITAINER TION MATERIAL CODE	006; 3/16" : TECO	SAMPLER (S) SIC SAMPLER (S) SIC SAMPLE PUMP FLOW RATE (mL FIELD-FILTERED Filtration Equipme PRESERVATIVE USED	0.0026: SAMPL SNATURES: per minute): nt Type. SAMPLE PRE TOT ADDED IT	5/16" = 0.004; ING DATA M PILT SERVATION FAL VOL. N FIELD (ml) (1)	3/8" = 0.006	s: 1/2" = 0.0 SAMPLING INITIATED AT: 9 TUBING MATERIAL CODE µm INITE ANALYSI ME INORS	210; 5/8 243 2: PE DUPLICATE: NDED S AND/OR THOD	" = 0.016	2:54 MPLING IPMENT CODE
TUBING INSIDE DI SAMPLED BY (PF PUMP OR TUBING DEPTH IN WELL (FIELD DECONTA) SAMPLE ID CODE	A, CAPACITY (Gai	(JFt.): 1/8" = 0.00 ON: Y □ N ☑ ITAINER ITAINER ITAINER MATERIAL CODE PE	006; 3/16" : TECO VOLUME 500ml	SAMPLER (S) SIC	0.0026: SAMPL ENATURES: per minute): ni Type. SAMPLE PRE TOT ADDED II	5/16" = 0.004; ING DATA M FILT ESERVATION FAL VOL. N FIELD (ml) (1) IONE	3/8" = 0.006	s: 1/2" = 0.0 SAMPLING INITIATED AT: 9 TUBING MATERIAL CODE µm INTE ANALYSI ME Inors	310; 5/8 343 E: PE DUPLICATE: INDED S AND/OR THOD ganics	" = 0.016	D:54
SAMPLED BY (PF CUMP OR TUBING DEPTH IN WELL (FIELD DECONTAN SAMPLE ID CODE @Ino-500 @Met-250	A. CAPACITY (Gai INT) / AFFILIATIC RAE Geet): 18.5 MINATION: SAMPLE CON SPECIFICA # CONTAINERS 1 1 2	JFt.): 1/8" = 0.00 ON: 3 S	VOLUME 500ml	SAMPLER (S) SIC SAMPLER (S) SIC SAMPLE PUMP FLOW RATE (mL FIELD-FILTERED Filtration Equipme PRESERVATIVE USED NONE	0.0026: SAMPL ENATURES: per minute): ni Type. SAMPLE PRE TOT ADDED II	5/16" = 0.004; ING DATA	3/8" = 0,006	s: 1/2" = 0.0 SAMPLING INITIATED AT: 9 TUBING MATERIAL CODE µm INTE ANALYSI ME Inors	210; 5/8 243 E: PE DUPLICATE: NDED S AND/OR THOD ganics etals	" = 0.016	D:54
TUBING INSIDE DI SAMPLED BY (PF PUMP OR TUBING DEPTH IN WELL (FIELD DECONTA) SAMPLE ID CODE @Ino-500 @Met-250	A. CAPACITY (Gai INT) / AFFILIATIC RAE Geet): 18.5 MINATION: SAMPLE CON SPECIFICA # CONTAINERS 1 1 2	JFt.): 1/8" = 0.00 ON: 3 S	VOLUME 500ml	SAMPLER (S) SIC SAMPLER (S) SIC SAMPLE PUMP FLOW RATE (mL FIELD-FILTERED Filtration Equipme PRESERVATIVE USED NONE	0.0026: SAMPL ENATURES: per minute): ni Type. SAMPLE PRE TOT ADDED II	5/16" = 0.004; ING DATA	3/8" = 0,006	s: 1/2" = 0.0 SAMPLING INITIATED AT: 9 TUBING MATERIAL CODE µm INTE ANALYSI ME Inors	210; 5/8 243 E: PE DUPLICATE: NDED S AND/OR THOD ganics etals	" = 0.016	D:54
TUBING INSIDE DI SAMPLED BY (PF PUMP OR TUBING DEPTH IN WELL (FIELD DECONTA) SAMPLE ID CODE @Ino-500 @Met-250	A. CAPACITY (Gai INT) / AFFILIATIC RAE Geet): 18.5 MINATION: SAMPLE CON SPECIFICA # CONTAINERS 1 1 2	JFt.): 1/8" = 0.00 ON: 3 S	VOLUME 500ml	SAMPLER (S) SIC SAMPLER (S) SIC SAMPLE PUMP FLOW RATE (mL FIELD-FILTERED Filtration Equipme PRESERVATIVE USED NONE	0.0026: SAMPL ENATURES: per minute): ni Type. SAMPLE PRE TOT ADDED II	5/16" = 0.004; ING DATA	3/8" = 0,006	s: 1/2" = 0.0 SAMPLING INITIATED AT: 9 TUBING MATERIAL CODE µm INTE ANALYSI ME Inors	210; 5/8 243 E: PE DUPLICATE: NDED S AND/OR THOD ganics etals	" = 0.016	D:54
TUBING INSIDE DI SAMPLED BY (PR PUMP OR TUBINO DEPTH IN WELL (FIELD DECONTAN SAMPLE ID CODE @Ino-500 @Met-250 @Rad-1L	A, CAPACITY (Gai INT) / AFFILIATIC RAE Get): 18.5 MINATION: SAMPLE CON SPECIFICA # CONTAINERS 1 2 2	//Ft.): 1/8" = 0.00 DN: 3 Y □ N ☑ ITAINER ITAINER ITAINER ITAINER ITAINER PE PE PE	VOLUME	0.0014; 1/4" = SAMPLER (S) SIG SAMPLE PUMP FLOW RATE (mL FIELD-FILTERED PRESERVATIVE USED NONE HNO3 HNO3	0.0026: SAMPL SNATURES: per minute): Int Type SAMPLE PRE TOT ADDED II	5/16" = 0.004; ING DATA	3/8" = 0,006	s: 1/2" = 0.0 SAMPLING INITIATED AT: 9 TUBING MATERIAL CODE µm INTE ANALYSI ME Inors	210; 5/8 243 E: PE DUPLICATE: NDED S AND/OR THOD ganics etals	" = 0.016	D:54
EVEING INSIDE DI SAMPLED BY (PR PUMP OR TUBINO DEPTH IN WELL (FIELD DECONTAN SAMPLE ID CODE @Ino-500 @Met-250 @Rad-1L	A. CAPACITY (Gai INT) / AFFILIATIO RAE Seet): 18.5 MINATION: SAMPLE CON SPECIFICA # CONTAINERS 1 2 2 2 2	JFt.): 1/8" = 0.00 ON: 3 S	VOLUME	O 0014; 1/4" = SAMPLER (\$) SIC SAMPLE PUMP FLOW RATE (mL FIELO-FILTERED Filtration Equipme PRESERVATIVE USED NONE HNO3 HNO3 HNO3	0.0026: SAMPL SNATURES: per minute): nt Type. SAMPLE PRE TOT ADDED II	5/16" = 0.004; ING DATA	3/8" = 0,006	s: 1/2" = 0.0	210: 5/8 243 2: PE DUPLICATE: NDED S AND/OR THOD Ganics etals logicals	" = 0.016	D:54

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2);

optionally, ± 0.2 mg/L or ± 10% (whichever is greater) Turbidity: all readings ≤ 20 NTU; optionally ± 5 NTU or 10% (whichever is greater)



THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa 6712 Benjamin Road Suite 100 Tampa, FL 33634 Tel: (813)885-7427

TestAmerica Job ID: 660-89608-1 Client Project/Site: L18I055

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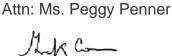
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Authorized for release by: 9/24/2018 11:15:09 AM

Keaton Conner, Project Manager I (813)885-7427 keaton.conner@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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Lab Sample ID	Client Sample ID	Matrix	Collected Received
660-89608-1	L18I055-01	Water	09/12/18 12:30 09/13/18 12:35
660-89608-2	L181055-02	Water	09/12/18 12:00 09/13/18 12:35
660-89608-3	L18I055-03	Water	09/12/18 11:08 09/13/18 12:35
660-89608-4	L18I055-04	Water	09/12/18 10:26 09/13/18 12:35
660-89608-5	L18I055-05	Water	09/12/18 09:54 09/13/18 12:35

4

5

Qualifiers

Metals

Metals		
Qualifier	Qualifier Description	
Ι	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.	
U	Indicates that the compound was analyzed for but not detected.	

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.	
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis	
%R	Percent Recovery	8
CFL	Contains Free Liquid	
CNF	Contains No Free Liquid	9
DER	Duplicate Error Ratio (normalized absolute difference)	
Dil Fac	Dilution Factor	
DL	Detection Limit (DoD/DOE)	
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample	
DLC	Decision Level Concentration (Radiochemistry)	
EDL	Estimated Detection Limit (Dioxin)	
LOD	Limit of Detection (DoD/DOE)	
LOQ	Limit of Quantitation (DoD/DOE)	
MDA	Minimum Detectable Activity (Radiochemistry)	13
MDC	Minimum Detectable Concentration (Radiochemistry)	
MDL	Method Detection Limit	
ML	Minimum Level (Dioxin)	
NC	Not Calculated	
ND	Not Detected at the reporting limit (or MDL or EDL if shown)	
PQL	Practical Quantitation Limit	
QC	Quality Control	
RER	Relative Error Ratio (Radiochemistry)	
RL	Reporting Limit or Requested Limit (Radiochemistry)	
RPD	Relative Percent Difference, a measure of the relative difference between two points	
TEF	Toxicity Equivalent Factor (Dioxin)	

TEQ Toxicity Equivalent Quotient (Dioxin)

Job ID: 660-89608-1

Laboratory: TestAmerica Tampa

Narrative

CASE NARRATIVE Client: Tampa Electric Company Project: L18l055

Report Number: 660-89608-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 9/13/2018 12:35 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.8° C.

TOTAL METALS (ICP)

Samples L18I055-01 (660-89608-1), L18I055-02 (660-89608-2), L18I055-03 (660-89608-3), L18I055-04 (660-89608-4) and L18I055-05 (660-89608-5) were analyzed for total metals (ICP) in accordance with EPA Method 200.7. The samples were prepared on 09/19/2018 and analyzed on 09/21/2018.

The serial dilution performed for the following sample associated with batch 400-412553 was outside control limits: (660-89607-A-1-A SD)

The post digestion spike % recovery associated with batch 400-412553 was outside of control limits.

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

Detection Summary

TestAmerica Job ID: 660-89608-1

Client Sample ID: L18I055-01						Lab S	ample ID: 66	60-89608-1
Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D Method	Prep Type
Lithium	0.016	I	0.050	0.0010	mg/L	1	200.7 Rev 4.4	Total/NA
Client Sample ID: L18I055-02						Lab S	ample ID: 66	60-89608-2
Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D Method	Prep Type
Lithium	0.013	<u> </u>	0.050	0.0010	mg/L	1	200.7 Rev 4.4	Total/NA
Client Sample ID: L18I055-03						Lab S	ample ID: 66	60-89608-3
Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D Method	Prep Type
Lithium	0.011	<u> </u>	0.050	0.0010	mg/L	1	200.7 Rev 4.4	Total/NA
Client Sample ID: L18I055-04						Lab S	ample ID: 66	60-89608-4
Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D Method	Prep Type
Lithium	0.017	I	0.050	0.0010	mg/L	1	200.7 Rev 4.4	Total/NA
Client Sample ID: L18I055-05						Lab S	ample ID: 66	60-89608-5
Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D Method	Prep Type
Lithium	0.0062	I	0.050	0.0010	mg/L	1	200.7 Rev 4.4	Total/NA

TestAmerica Tampa

Client Sample Results

TestAmerica Job ID: 660-89608-1

Client: Tampa Electric Company Project/Site: L18I055

Client Sample ID: L181055-01 Date Collected: 09/12/18 12:30 Date Received: 09/13/18 12:35						L	.ab Sample	e ID: 660-89 Matrix	9608-1 : Water
Method: 200.7 Rev 4.4 - Metals (IC	P)								
Analyte		Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.016	I	0.050	0.0010	mg/L		09/19/18 10:22	09/21/18 21:01	1
Client Sample ID: L181055-02						L	ab Sample	e ID: 660-89	9608-2
Date Collected: 09/12/18 12:00 Date Received: 09/13/18 12:35							_	Matrix	: Water
Method: 200.7 Rev 4.4 - Metals (IC Analyte		Qualifier	PQL	МП	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.013		0.050	0.0010			•	09/21/18 21:04	1
Client Sample ID: L18I055-03						L	ab Sample	e ID: 660-89	9608-3
Date Collected: 09/12/18 11:08 Date Received: 09/13/18 12:35									: Water
Method: 200.7 Rev 4.4 - Metals (IC Analyte		Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.011	I	0.050	0.0010	mg/L		09/19/18 10:22	09/21/18 21:08	1
Client Sample ID: L181055-04						L	ab Sample	e ID: 660-89	9608-4
Date Collected: 09/12/18 10:26 Date Received: 09/13/18 12:35							_	Matrix	: Water
Method: 200.7 Rev 4.4 - Metals (IC Analyte		Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.017		0.050	0.0010			-	09/21/18 21:11	1
Client Sample ID: L181055-05						L	ab Sample	e ID: 660-89	9608-5
Date Collected: 09/12/18 09:54 Date Received: 09/13/18 12:35									: Water
Method: 200.7 Rev 4.4 - Metals (IC Analyte		Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.0062		0.050	0.0010			09/19/18 10:22	•	1

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 400-412 Matrix: Water	2052/1-A							Clie	ent Sam	ple ID: M Prep Typ		
Analysis Batch: 412553										Prep Ba		
Analysis Baten. 412000		МВ МВ								Пер Бе		12002
Analyte	Re	sult Qualifier	P	2L	MDL	Unit		D P	repared	Analyz	ed	Dil Fac
Lithium	0.0	0010 U	0.0	50 0.0	0010	mg/L		09/1	9/18 10:22	09/21/18	20:11	1
Lab Sample ID: LCS 400-41	2052/2-A						Clie	nt Sa	mple ID:	Lab Con	trol S	ample
Matrix: Water										Prep Typ		
Analysis Batch: 412553			Spike	LCS	LCS					Prep Ba %Rec.		
Analyte			Added	Result		ifier	Unit	D	%Rec	Limits		
Lithium			1.00	1.05			mg/L		105	85 - 115		
_ Lab Sample ID: 660-89607-/	A-1-B MS							C	lient Sar	nple ID: I	Matrix	Spike
Matrix: Water										Prep Typ		
Analysis Batch: 412553										Prep Ba		
-	Sample	Sample	Spike	MS	MS					%Rec.		
Analyte	Result	Qualifier	Added	Result	Qual	ifier	Unit	D	%Rec	Limits		
Lithium	0.079		1.00	1.18			mg/L		110	70 - 130		
Lab Sample ID: 660-89607-/	A-1-C MSD)					Client	Samp	le ID: M	atrix Spil	ce Dup	olicate
Matrix: Water										Prep Typ	be: To	tal/NA
Analysis Batch: 412553										Prep Ba	tch: 4	12052
-	Sample	Sample	Spike	MSD	MSD					%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qual	ifier	Unit	D	%Rec	Limits	RPD	Limit
Lithium	0.079		1.00	1.24			mg/L		116	70 - 130	5	20

Metals

Prep Batch: 412052

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
60-89608-1	L18I055-01	Total/NA	Water	200.7	
60-89608-2	L181055-02	Total/NA	Water	200.7	
60-89608-3	L181055-03	Total/NA	Water	200.7	
60-89608-4	L181055-04	Total/NA	Water	200.7	
60-89608-5	L181055-05	Total/NA	Water	200.7	
IB 400-412052/1-A	Method Blank	Total/NA	Water	200.7	
CS 400-412052/2-A	Lab Control Sample	Total/NA	Water	200.7	
60-89607-A-1-B MS	Matrix Spike	Total/NA	Water	200.7	
60-89607-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	
ah Sample ID	Client Sample ID	Pren Tyne	Matrix	Method	Pren Batch
•	Client Sample ID	Prep Type Total/NA	Matrix Water	Method 200.7 Rev 4.4	Prep Batch 412052
60-89608-1	· · · · · · · · · · · · · · · · · · ·	Prep Type Total/NA Total/NA	Matrix Water Water	Method 200.7 Rev 4.4 200.7 Rev 4.4	Prep Batch 412052 412052
60-89608-1 60-89608-2	L18I055-01	Total/NA	Water	200.7 Rev 4.4	412052
60-89608-1 60-89608-2 60-89608-3	L181055-01 L181055-02	Total/NA Total/NA	Water Water	200.7 Rev 4.4 200.7 Rev 4.4	412052 412052
60-89608-1 60-89608-2 60-89608-3 60-89608-4	L181055-01 L181055-02 L181055-03	Total/NA Total/NA Total/NA	Water Water Water	200.7 Rev 4.4 200.7 Rev 4.4 200.7 Rev 4.4	412052 412052 412052
60-89608-1 60-89608-2 60-89608-3 60-89608-4 60-89608-5	L181055-01 L181055-02 L181055-03 L181055-04	Total/NA Total/NA Total/NA Total/NA	Water Water Water Water	200.7 Rev 4.4 200.7 Rev 4.4 200.7 Rev 4.4 200.7 Rev 4.4	412052 412052 412052 412052
60-89608-1 60-89608-2 60-89608-3 60-89608-4 60-89608-5 1B 400-412052/1-A	L181055-01 L181055-02 L181055-03 L181055-04 L181055-05	Total/NA Total/NA Total/NA Total/NA Total/NA	Water Water Water Water Water	200.7 Rev 4.4 200.7 Rev 4.4 200.7 Rev 4.4 200.7 Rev 4.4 200.7 Rev 4.4 200.7 Rev 4.4	412052 412052 412052 412052 412052 412052
Lab Sample ID 560-89608-1 560-89608-2 560-89608-3 560-89608-3 560-89608-5 560-89608-5 560-89608-5 400-412052/1-A 560-89608-5 560-89608-5 560-89608-5 560-89608-5 560-89608-5 560-89608-5 560-89608-5 560-89608-5 560-89608-5 560-89608-5 560-89608-5 560-89608-5 560-89608-5 560-89608-5 560-89608-5 560-89607-A-1-B 560-89607-A-1-2 560-89607-A-1-2<	L18I055-01 L18I055-02 L18I055-03 L18I055-04 L18I055-05 Method Blank	Total/NA Total/NA Total/NA Total/NA Total/NA Total/NA	Water Water Water Water Water Water	200.7 Rev 4.4 200.7 Rev 4.4 200.7 Rev 4.4 200.7 Rev 4.4 200.7 Rev 4.4 200.7 Rev 4.4 200.7 Rev 4.4	412052 412052 412052 412052 412052 412052 412052

Lab Sample ID: 660-89608-3 Matrix: Water

Lab Sample ID: 660-89608-4

Lab Sample ID: 660-89608-5

Matrix: Water

Matrix: Water

er

Client Sam Date Collecte Date Receive	d: 09/12/18 1	2:30					L	ab Sample		-89608-1 trix: Water
Prep Type Total/NA Total/NA	Batch Type Prep Analysis Instrumer	Batch Method 200.7 200.7 Rev 4.4 nt ID: 6500 ICP Duc	Run	Dil Factor 1	Initial Amount 50 mL	Final Amount 50 mL	Batch Number 412052 412553	Prepared or Analyzed 09/19/18 10:22 09/21/18 21:01	Analyst KWN GESP	Lab TAL PEN TAL PEN
Client Sam Date Collecte Date Receive	d: 09/12/18 1	2:00					L	ab Sample		-89608-2 trix: Water
Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA Total/NA	Prep Analysis	200.7 200.7 Rev 4.4		1	50 mL	50 mL	412052 412553	09/19/18 10:22 09/21/18 21:04	KWN GESP	TAL PEN TAL PEN

Client Sample ID: L181055-03 Date Collected: 09/12/18 11:08 Date Received: 09/13/18 12:35

Instrument ID: 6500 ICP Duo

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7			50 mL	50 mL	412052	09/19/18 10:22	KWN	TAL PEN
Total/NA	Analysis	200.7 Rev 4.4		1			412553	09/21/18 21:08	GESP	TAL PEN
	Instrumer	t ID: 6500 ICP Duo								

Client Sample ID: L181055-04 Date Collected: 09/12/18 10:26 Date Received: 09/13/18 12:35

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	200.7			50 mL	50 mL	412052	09/19/18 10:22	KWN	TAL PEN
Total/NA	Analysis Instrumer	200.7 Rev 4.4 nt ID: 6500 ICP Duo		1			412553	09/21/18 21:11	GESP	TAL PEN

Client Sample ID: L181055-05 Date Collected: 09/12/18 09:54 Date Received: 09/13/18 12:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7			50 mL	50 mL	412052	09/19/18 10:22	KWN	TAL PEN
Total/NA	Analysis	200.7 Rev 4.4		1			412553	09/21/18 21:14	GESP	TAL PEN
	Instrumer	nt ID: 6500 ICP Duo								

Laboratory References:

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

TestAmerica Tampa

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Laboratory: TestAmerica Tampa

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Florida	NELAP	4	E84282	06-30-19

Laboratory: TestAmerica Pensacola

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Florida	NELAP	4	E81010	06-30-19

Client: Tampa Electric Company Project/Site: L18I055

Method

200.7

200.7 Rev 4.4

Protocol References:

Laboratory References:

ect/Site: L	18I055			2
nod	Method Description	Protocol	Laboratory	3
7 Rev 4.4	Metals (ICP)	EPA	TAL PEN	
7	Preparation, Total Metals	EPA	TAL PEN	
rotocol Refe	arençes.			5
	Environmental Protection Agency			6
aboratory R	eferences:			
TAL PEN :	= TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001			
				8
				9

TestAmerica Tampa

SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Services

L18I055

SENDING LABORATORY:

Tampa Electric Company, Laboratory Services 5012 Causeway Blvd Tampa, FL 33619 Phone: (813) 630-7490 Fax: (813) 630-7360 Project Manager: Peggy Penner

RECEIVING LABORATORY:

TestAmerica Laboratories, Inc. - Tampa 6712 Benjamin Rd., Suite 100 Tampa, FL 33634 Phone :(813) 885-7427 Fax: -

Due Date: 09/26/18 16:00

Analysis		Expires		Laboratory ID	Comments
Sample ID: L181055-01 Sampled: 09/12/18 12:30	BBS-CCR-1		Water		
Lithium, Total EPA 6010		03/11/19 12:30			
Containers Supplied: Poly HNO3 - 250mL (A)					
Sample ID: L181055-02	BBS-CCR-2		Water		
Sampled: 09/12/18 12:00					
Lithium, Total EPA 6010 Containers Supplied: Poly HNO3 - 250mL (A)		03/11/19 12:00			
Sample ID: L181055-03	BBS-CCR-3		Water		
Sampled: 09/12/18 11:08					
Lithium, Total EPA 6010 Containers Supplied:		03/11/19 11:08			
Poly HNO3 - 250mL (A)					
Sample ID: L181055-04	BBS-CCR-BW1		Water		
Sampled: 09/12/18 10:26					
Lithium, Total EPA 6010 Containers Supplied: Poly HNO3 - 250mL (A)		03/11/19 10:26			
Sample ID: L181055-05	BBS-CCR-BW2		Water	The second of	
Sampled: 09/12/18 09:54					
Lithium, Total EPA 6010 Containers Supplied:		03/11/19 09:54			
Poly HNO3 - 250mL (A)			660-89608 C	hain of Custody	Loc: 660 89608
2			1,0	2.0	

At Cold 9-13-18 C 1235 Received By Date & Time

Released By

Date & Time

Received By

2.8/2.8 CU-09

Page 1 of 1 9/24/2018

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Page 13 of 16

TestAmerica Tampa 6712 Benjamin Road Suite 100

Chain of Custody Record



	Sampler:			Lab F							Ca	arrier Tra	cking No(s):		COC No:	
Client Information (Sub Contract Lab)	Change			Con E-Ma	ner, K	eator	1	_		_	-	ate of Or	inin:			660-107805.1	
ient Contact. hipping/Receiving	Phone:					nner	testar	merica	inc.co	m		lorida	igin.			Page: Page 1 of 1	
ompany: estAmerica Laboratories, Inc.							s Requir Florida;			exas						Job #: 660-89608-1	
ddress:	Due Date Requeste	d:			-	-		-			-				1	Preservation Code	s:
355 McLemore Drive, ,	9/20/2018 TAT Requested (da	ve).			1		TT	-1	Anal	ysis I	Requested					A - HCL	M - Hexane
Pensacola	Int requested (da	13].												11	13	B - NaOH C - Zn Acetate	N - None O - AsNaO2
tate, Zip: L, 32514														11		D - Nitric Acid E - NaHSO4 F - MeOH	P - Na2O4S Q - Na2SO3 R - Na2S2O3
hone: 150-474-1001(Tel) 850-478-2671(Fax)	PO #:															G - Amchlor H - Ascorbic Acid	S - H2SO4 T - TSP Dodecahydra
mail:	WO #:				or No)	6								11		I - Ice J - DI Water	U - Acetone V - MCAA
roject Name:	Project #:				ample (Yes	ium No)			1						ainers	K - EDTA L - EDA	W - pH 4-5 Z - other (specify)
.181055 Bite:	66004821 SSOW#:	-			ple	TOT Lithi							11	11	containe	Other:	
					0	TOT									To		
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (w=water, S=solid, O=westeloil. BT=Tissue, A=A	eld Filte	Perform MS/MSD (Yes o									Total Number	Special In	structions/Note:
	\rightarrow	\times	Preserva	tion Code:	X	X									X		
181055-01 (660-89608-1)	9/12/18	12:30 Eastern	1.1	Water	Π	>	c								1	-	
L181055-02 (660-89608-2)	9/12/18	12:00 Eastern		Water	T)	<								1		
L18I055-03 (660-89608-3)	9/12/18	11:08 Eastern		Water	П)	(1	-	
L181055-04 (660-89608-4)	9/12/18	10:26 Eastern		Water	П)	×								1		
L181055-05 (660-89608-5)	9/12/18	09:54 Eastern		Water	11)	×								1		
				-	11	+	+		-	-		-	+			-	
1					++	+	-	$\left \right $	+	-	$\left \right $	4	++	-	-		
			-		++	+	+	$\left \right $	+	+		+	+		-	-	
		-			11					1							
Note: Since laboratory accreditations are subject to change, TestAmeric currently maintain accreditation in the State of Origin listed above for an Laboratories, Inc. attention immediately. If all requested accreditations a	alysis/tests/matrix being analy	zed, the samp	les must be ship	pped back to	the Test	tAmeric	ca labora	atory or i	other in	struction	ns will b						
Possible Hazard Identification						Sam	ple Dis	posal	(A fe	e may						ned longer than t	
Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify)	Primary Delive	rable Rank	2		-		Return			Requi	_		By Lab	(Arc	chive For	Months
	t titlary belive		-		_		a mau		101.010	. noqui	onici	_			_		
Empty Kit Relinquished by:	In a	Date:		10.00	Tin			_	19		_	Me	thod of S	-	_		P
Relinguishedby	Date/Time:	se 1	700.	Company	AN	1	eperved	nf	2	4	de	A		Pate/Time:		\$ 915	Company
Reinquisited by:	Date/Time:			Company			leceived		-			V		Date Time:			9/14/18 2
Relinguished by:	Date/Time:			Company										Date/Time			Company

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9/24/2018

Client: Tampa Electric Company

Login Number: 89608 List Number: 1 Creator: Redding, Charles S

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.	True	
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	
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?	N/A	
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.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Job Number: 660-89608-1

List Source: TestAmerica Tampa

Client: Tampa Electric Company

Login Number: 89608 List Number: 2 Creator: Johnson, Jeremy N

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	
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Job Number: 660-89608-1

List Source: TestAmerica Pensacola

List Creation: 09/14/18 11:51 AM



FL DOH Certification #E84025

Report Date: September 26, 2018

TECO 5012 Causeway Blvd. Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client Client/Field ID: L18I055-01 BBS-CCR-1 Sample Collection: 09-12-18/1230 Lab ID No: 18.10577 Lab Custody Date: 09-13-18/0929 Sample description: Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Re	sul	ts	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	34.7	±	1.8	Calc	Calc	0.7
Radium-226	pCi/l	33.2	±	1.8	9-24-18/1300	EPA 903.0	0.6
Radium-228	pCi/l	1.5	±	0.5	9-24-18/1124	EPA Ra-05	0.7

Alpha Standard: Th-230

James W. Hayes

James W. Hayes Laboratory Manager

Test results meet all requirements of the NELAC standards. Statement of estimated uncertainty available upon request. Test results refer only to sample(s) listed. Contact person: Jim Hayes (813) 229-2879.

Page 1 of 1

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FL DOH Certification #E84025

Report Date: September 26, 2018

TECO 5012 Causeway Blvd. Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client Client/Field ID: L18I055-02 BBS-CCR-2 Sample Collection: 09-12-18/1200 Lab ID No: 18.10578 Lab Custody Date: 09-13-18/0929 Sample description: Water

CERTIFICATE OF ANALYSIS

Units	Re	sul	ts	Analysis Date	Method	Detection Limit
pCi/l	15.3	±	1.3	Calc	Calc	0.7
pCi/l	15.3	±	1.3	9-24-18/1300	EPA 903.0	0.6
pCi/l	0.0	±	0.4	9-24-18/1124	EPA Ra-05	0.7
	pCi/l pCi/l	pCi/l 15.3 pCi/l 15.3	pCi/l 15.3 ± pCi/l 15.3 ±	pCi/l 15.3 ± 1.3 pCi/l 15.3 ± 1.3	Units Results Date pCi/l 15.3 ± 1.3 Calc pCi/l 15.3 ± 1.3 9-24-18/1300	Units Results Date Method pCi/l 15.3 ± 1.3 Calc Calc pCi/l 15.3 ± 1.3 9-24-18/1300 EPA 903.0

Alpha Standard: Th-230

ames W. Hayes

James W. Hayes Laboratory Manager

Test results meet all requirements of the NELAC standards. Statement of estimated uncertainty available upon request. Test results refer only to sample(s) listed. Contact person: Jim Hayes (813) 229-2879.

Page 1 of 1

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FL DOH Certification #E84025

Report Date: September 26, 2018

TECO 5012 Causeway Blvd. Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client Client/Field ID: L18I055-03 BBS-CCR-3 Sample Collection: 09-12-18/1108 Lab ID No: 18.10579 Lab Custody Date: 09-13-18/0929 Sample description: Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Re	sul		Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	14.8	±	1.3	Calc	Calc	0.7
Radium-226	pCi/l	14.1	±	1.3	9-24-18/1300	EPA 903.0	0.6
Radium-228	pCi/l	0.7	±	0.5	9-24-18/1124	EPA Ra-05	0.7

Alpha Standard: Th-230

ames W. Hayes

James W. Hayes Laboratory Manager

Test results meet all requirements of the NELAC standards. Statement of estimated uncertainty available upon request. Test results refer only to sample(s) listed. Contact person: Jim Hayes (813) 229-2879.

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FL DOH Certification #E84025

Report Date: September 26, 2018

TECO 5012 Causeway Blvd. Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client Client/Field ID: L18I055-04 BBS-CCR-BW1 Sample Collection: 09-12-18/1026 Lab ID No: 18.10580 Lab Custody Date: 09-13-18/0929 Sample description: Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Re	sul		Analysis Date	Method	Detection Limit		
Combined Radium (Radium-226 + Radium 228)	pCi/l	23.6	±	1.3	Calc	Calc	0.7		
Radium-226	pCi/l	20.6	±	1.3	9-24-18/1300	EPA 903.0	0.4		
Radium-228	pCi/l	3.0	±	0.6	9-25-18/0959	EPA Ra-05	0.7		

Alpha Standard: Th-230

James W. Hayes

James W. Hayes Laboratory Manager

Test results meet all requirements of the NELAC standards. Statement of estimated uncertainty available upon request. Test results refer only to sample(s) listed. Contact person: Jim Hayes (813) 229-2879.

Page 1 of 1

KNL ENVIROMENTAL TESTING, INC. | 3202 NORTH FLORIDA AVENUE | TAMPA, FLORIDA 33603 813.229.2879 | KNLENVIRONMENTAL.COM



FL DOH Certification #E84025

Report Date: September 26, 2018

TECO 5012 Causeway Blvd. Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client Client/Field ID: L18I055-05 BBS-CCR-BW2 Sample Collection: 09-12-18/0954 Lab ID No: 18.10581 Lab Custody Date: 09-13-18/0929 Sample description: Water

CERTIFICATE OF ANALYSIS

					Analysis		Detection	
Parameter	Units	Re	esul	ts	Date	Method	Limit	
Combined Radium (Radium-226 + Radium 228)	pCi/l	3.7	±	0.6	Calc	Calc	0.7	
Radium-226	pCi/l	3.5	±	0.6	9-24-18/1300	EPA 903.0	0.4	
Radium-228	pCi/l	0.2	±	0.4	9-25-18/0959	EPA Ra-05	0.7	

Alpha Standard: Th-230

James W. Hayes

James W. Hayes Laboratory Manager

Test results meet all requirements of the NELAC standards. Statement of estimated uncertainty available upon request. Test results refer only to sample(s) listed. Contact person: Jim Hayes (813) 229-2879.

Page 1 of 1

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SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Services

L18I055

SENDING LABORATORY:

Tampa Electric Company, Laboratory Services 5012 Causeway Blvd Tampa, FL 33619 Phone: (813) 630-7490 Fax: (813) 630-7360 Project Manager: Peggy Penner

RECEIVING LABORATORY:

KNL Laboratory Services 3202 N. Florida Ave. Tampa, FL 33603 Phone :(813) 229-2879 Fax: -

Due Date: 09/26/18 16:00

Analysis	Expires		Laboratory ID Comments
Sample ID: L181055-01 BBS-CC Sampled: 09/12/18 12:30	R-1	Water	18.105TT
Radium 226 EPA 903.0	03/11/19 12:30		Level 2 Data requred
Radium 226+228, Total	03/11/19 12:30		Level 2 Data requred
Radium 228 Ra-05	03/11/19 12:30		Level 2 Data requred
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000	mL (D)	
Sample ID: L181055-02 BBS-CC Sampled: 09/12/18 12:00	CR-2	Water	18.1057E
Radium 226 EPA 903.0	03/11/19 12:00		Level 2 Data requied
Radium 226+228, Total	03/11/19 12:00		Level 2 Data requied
Radium 228 Ra-05	03/11/19 12:00		Level 2 Data requred
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000	mL (D)	
Sample ID: L181055-03 BBS-CC Sampled: 09/12/18 11:08	CR-3	Water	18.10579
Radium 226+228, Total	03/11/19 11:08		Level 2 Data requred
Radium 226 EPA 903.0	03/11/19 11:08		Level 2 Data requred
Radium 228 Ra-05	03/11/19 11:08		Level 2 Data requied
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000		
Sample ID: L181055-04 BBS-C0 Sampled: 09/12/18 10:26	CR-BW1	Water	18.10.50
Radium 226+228, Total	03/11/19 10:26		Level 2 Data requred
Radium 226 EPA 903.0	03/11/19 10:26		Level 2 Data requred
Radium 228 Ra-05	03/11/19 10:26		Level 2 Data requred
Containers Supplied: RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000)mL (D)	

9-13-18

FNL_ Received By

413-1E 92 Date & Time

Released By

SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Services

L18I055

Analysis	Expires	Laboratory ID Comments
Sample ID: L181055-05 BBS-CCR Sampled: 09/12/18 09:54	-BW2 Water	18.10581
Radium 228 Ra-05	03/11/19 09:54	Level 2 Data requred
Radium 226 EPA 903.0	03/11/19 09:54	Level 2 Data requred
Radium 226+228, Total	03/11/19 09:54	Level 2 Data requred
Containers Supplied:		
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000mL (D)	

2014 9-13-18 0929 Date & Time Released

Received By

9-13-1& 929 Date & Time

Released By

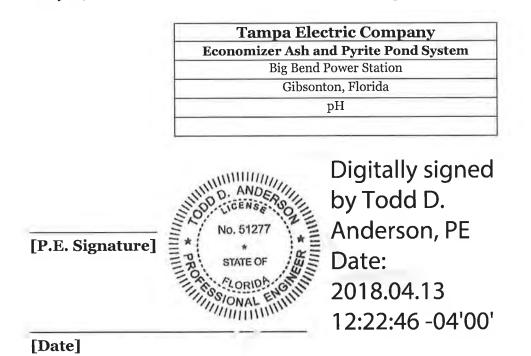
Received By

Date & Time

APPENDIX C Alternate Source Demonstration

Certification of Accuracy of Demonstration – Statistically Significant Increase Over Background Levels Not Caused by CCR Unit

As required by 40 C.F.R. § 257.94(e)(2), the undersigned, being a qualified professional engineer, as that term is defined under 40 C.F.R. § 257.53, hereby certifies the accuracy of the information in the report to demonstrate whether, with respect to the CCR unit and Appendix III constituents listed in the table below, the statistically significant increase over background levels determined pursuant to 40 C.F.R. § 257.93(h) (i) was caused by a source other than the CCR unit, or (ii) resulted from error in sampling analysis, statistical evaluation, or natural variation in groundwater quality.





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ALTERNATE SOURCE DEMONSTRATION – ECONOMIZER ASH AND PYRITE POND SYSTEM

Big Bend Power Station 13031 Wyandotte Road Gibsonton, FL 33572

Prepared for

Tampa Electric Company Tampa, Florida

Prepared by

Geosyntec Consultants, Inc. 12802 Tampa Oaks Boulevard, STE 151 Tampa, FL 33637

Project FR2814.01

13 April 2018

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- Figure 8 Regional Surficial Aquifer Monitoring Well Locations
- Figure 9 Surficial Aquifer Groundwater Potentiometric Surface Map August 2014

LIST OF APPENDICIES

- Appendix A Summary of Statistical Analyses of Baseline Groundwater Samples
- Appendix B EPA 530-R-93-017 Subpart E Section 5.10
- Appendix C Groundwater Sampling and Calibration Forms October 13, 2017

1. PURPOSE OF ALTERNATE SOURCE DEMONSTRATION REPORT

On behalf of the Tampa Electric Company (TEC), Geosyntec Consultants. Inc. (Geosyntec) has prepared this alternate source demonstration (ASD) for the economizer ash and pyrite pond system (EAPPS) at the TEC's Big Bend Power Station (BBS) in Gibsonton, Florida. This ASD has been prepared to meet the requirements of the U. S. Environmental Protection Agency's (USEPA) coal combustion residual (CCR) Rule 40 CFR Part 257.94(e)(2) which states:

The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report.

1.1 Regulatory Background

In June 2016, TEC implemented baseline groundwater sampling as part of closure requirements for the EAPPS. The monitoring well network consists of two background locations (BBS-CCR-BW1 and BBS-CCR-BW2) and three downgradient locations (BBS-CCR-1, BBS-CCR-2, and BBS-CCR-3) installed within the surficial aquifer at the EAPPs (**Figure 1**). Data from the 10 baseline monitoring events and the first detection monitoring events presented in **Table 1**.

In accordance with the provisions established in 40 CFR 257.93, background concentrations were established for each of the constituents listed in 40 CFR 257 Appendix III by analyzing the data from the two background wells present at EAPPS. A 95% upper prediction limit (UPL) was established for each constituent from the results of 10 baseline sampling events occurring between June 2016 and August 2017. For pH a lower prediction limit (LPL) was also determined since acidic water could potentially be an indicator of a release. The first detection monitoring event occurred in October 2017 and resulted in a statistically significant increase (SSI) in pH above the established UPL of 6.70 standard units (SU) in two of the three downgradient monitoring wells, namely 6.83 and 6.87 SU in BBS-CCR-1, and BBS-CCR-2, respectively. The pH SSIs were documented in a summary memorandum entitled "Summary of Statistical Analyses of Baseline Groundwater Samples" dated 15 January 2018 (Appendix A).

1.2 Objective of ASD

The purpose of this ASD is to document that the SSIs for pH are not associated with a release from the EAPPS. Although 40 CFR 257 does not contain requirements for an ASD beyond the requirements in 257.94(e)(2), the EPA document *Solid Waste Disposal Facility Criteria Technical Manual EPA 530-R-93-017*, November 1993, Subpart E provides guidance on what would be included in an ASD for a municipal solid waste landfill. Geosyntec's approach has been modeled after Section 5.10 of Subpart E (excerpt provided in **Appendix B**) and the analytical techniques and methods presented in *Guidelines for Development of Alternative Source Demonstrations at*

Coal Combustion Residual Sites (EPRI, 2017). This ASD is based on the following three lines of evidence:

- There is inherent error present in the equipment used to measure pH in the field;
- There is natural variation within pH ranges from both BBS background wells and regional monitoring wells;
- A change in local groundwater flow direction will result in the influence from higher pH waters within the immediate vicinity of the EAPPS.

The approaches developed to evaluate the evidence is provided in Section 2 of this report. The justification and support for each approach is provided in Section 3 of this report.

2. ALTERNATE SOURCE DEMONSTRATION APPROACH

2.1 Evaluation of Inherent Error

Given that pH is a parameter that is collected in the field during groundwater sampling, a possible source of error exists in both the calibration of the measurement instrument and the inherent error present due to the accuracy limits of the instrument. Due to this possibility, a thorough investigation of the instrument calibration forms and groundwater sampling forms was conducted to verify that calibration and sampling were accomplished in accordance with standard operating procedures established by the Florida Department of Environmental Protection (FDEP) in FS 2200. A review of pertinent field logs was performed to identify if the pH probe used to collect the detection monitoring samples from wells BBS-CCR-1 and BBS-CCR-2 was properly calibrated, if the calibration drifted throughout the course of the sampling event, if an adequate amount of groundwater was withdrawn to obtain a representative sample from each monitoring well, and if pH readings were allowed to stabilize prior to sample collection. Additionally, the accuracy limitations of the instrument used to measure pH was assessed and compared to the baseline UPL to ascertain if the margin of error for the two pH measurements in question is below the UPL.

2.2 Evaluation of Natural Variation

Because no other Appendix III constituent exhibited a SSI in the October 2017 detection monitoring event, pH results in BBS-CCR-1 and BBS-CCR-2 are not believed to be the result of a release from the EAPPS, but are rather indicative of background levels in the surficial aquifer. To evaluate background pH, data collected from the TEC industrial wastewater (IWW) and remedial action plan (RAP) monitoring well network (**Figure 2**) were obtained for the period of August 2008 to November 2017 (**Table 2**). Three RAP wells within approximately 100 feet from the northwest, southwest, and southeast corners of the EAPPS (B-36, B-35, and B-17R, respectively) were selected for evaluation based on their upgradient proximity to the EAPPS (**Figure 3 to Figure 7**).

For comparison, monitoring wells B-4R, B-39, B-40, and B-41 have historically been designated as surficial aquifer background wells by TEC due to their locations upgradient of any TEC development along the perimeter of the property (**Figure 2**). Additionally, four surficial monitoring wells within the Southwest Florida Water Management District (SWFWMD) Regional Observation and Monitoring Program (ROMP) in the Tampa Bay, FL vicinity were identified for a regional background analysis based on available pH data (**Figure 8**). Historical ROMP data obtained by Geosyntec ranged from September 1985 to March 2003.

ProUCL version 5.1 (EPA, 2016) was utilized to generate a 95% upper confidence limit (UCL) of the arithmetic mean for pH values within each individual monitoring well and each dataset in general accordance with guidelines of Chapter 62-780.680 of the Florida Administrative Code (FAC). The most applicable data distribution provided by ProUCL was utilized. The 95% UCLs provide conservative estimates for the true arithmetic mean of each data set. These values were

compared to the October 2017 pH SSIs in BBS-CCR-1 and BBS-CCR-2 to determine if surficial groundwater pH in the vicinity of the EAPPS is exhibiting typical ranges of background variability.

2.3 Evaluation of Groundwater Flow Direction

Should the observed SSIs be the result of influence from background groundwater, a change in the flow direction of groundwater within the EAPPS would likely be observed. Potentiometric surface maps were generated from the baseline and detection monitoring events to compare the observed flow directions and determine if the SSIs could be the result of a change in flow direction.

3. DEMONSTRATION OF OTHER REASONS FOR STATISTICAL INCREASE

This section presents the results of the approaches discussed in Section 2 and provides support that the lines of evidence identified are plausible sources of the pH SSI.

3.1 Findings from Evaluation of Inherent Error

The sampling team used a YSI[®] multimeter for pH data collection (as well as temperature, specific conductivity, and dissolved oxygen) during monitoring well purging and sampling. Field forms from the October 2017 detection monitoring sampling event are provided in **Appendix C**. A review of the instrument calibration log recorded at 7:02 AM on 13 October 2017 reveals that a 3-point calibration for the pH probe was conducted in accordance with FDEP FS2200. Initial calibration verification (ICV) was conducted for a pH 7.0 SU buffer solution resulting in an acceptable reading of 7.03 SU at 7:06 AM. The continued calibration verification (CCV) performed at 2:29 PM upon the completion of the sampling activities resulted in an acceptable reading of 7.11 SU. Groundwater sampling forms documenting field parameter stabilization for BBS-CCR-1 and BBS-CCR-2 indicate that an adequate amount of water was withdrawn from each well prior to sampling to obtain a representative sample. Additionally, three consecutive pH readings were collected within ± 0.2 SU of each other signifying pH stabilization in each well.

A 0.08 SU drift in pH was observed in the post calibration verification but is not enough to explain why the pH concentrations of BBS-CCR-1 and BBS-CCR-2 (6.83 and 6.87 SU respectively) are outside of the background level of 6.70 SU. However, the error inherent to the instrument itself is accurate within \pm 0.2 SU (YSI, 2009). As a result, the October 2017 pH values at BBS-CCR-1 and BBS-CCR-2 are more correctly stated as 6.83 ± 0.2 SU and 6.87 ± 0.2 SU, indicating that the 6.70 SU background level is within the accuracy limits of the instrument.

3.2 Findings from Evaluation of Natural Variation

Statistics for pH data from TEC surficial monitoring wells immediately upgradient of the EAPPS, BBS surficial background monitoring wells, and regional SWFWMD ROMP surficial monitoring wells are included in **Table 2**. Results from 95% UCL calculations are summarized below.

3.2.1 Anthropogenic Background Data – Surficial Aquifer

The pH data from the Economizer Ash and Long-Term Fly Ash Pond monitoring wells (B-17R, B-35, and B-36) indicates the following:

- pH values ranged between 6.60 and 6.96 SU between May 2011 and May 2017;
- 95% UCL values for individual monitoring wells ranged between 6.78 and 6.89 SU and
- The 95% UCL for pH within all three monitoring wells was calculated as 6.82 SU based on 35 total observations.

3.2.2 Natural Background Data – Surficial Aquifer

The pH data from TEC Big Bend IWW/RAP Background Monitoring Wells (B-4R, B-39, B-40, and B-41) indicates the following:

- pH values within the surficial TEC property background wells ranged from 5.81 to 7.31 SU between May 2011 to May 2017;
- 95% UCL values for individual monitoring wells ranged between 6.21 and 7.21 SU; and
- The 95% UCL for pH within all four monitoring wells calculated using 51 total observations is 6.85 SU.

The pH data from the SWFWMD ROMP Monitoring Wells indicates the following:

- pH values ranged between 5.59 and 7.42 SU between September 1985 and March 2003;
- Three of the four monitoring wells had an insufficient number of data points (< 8) to calculate a 95% UCL. Arithmetic mean values are reported for these wells instead. Arithmetic mean and 95% UCL values ranged between 5.77 and 7.25 SU within the individual ROMP wells; and
- The 95% UCL for pH within all four ROMP wells calculated using 34 total observations is 7.13 SU

A 95% UCL of 6.93 SU was also calculated using the combined TEC background and ROMP background well data (85 total observations) over an average range from 5.59 to 7.42 SU.

3.3 Findings from Evaluation of Groundwater Flow Direction

Seasonal variations (e.g., wet and dry seasons) in groundwater flow direction from June 2016 to October 2017 (wet to dry seasons) are presented in **Figure 3** (June 2016), **Figure 4** (August 2015), **Figure 5** (November 2016), **Figure 6** (April 2017), and **Figure 7** (October 2017). Since the installation of the EAPPS monitoring well network in May 2016, little variability in groundwater flow direction was observed during the baseline monitoring events with a predominately north-northeast flow direction observed from background wells BBS-CCR-BW1 and BBS-CCR-BW2 towards the three upgradient monitoring wells located along the northern and eastern borders of the EAPPS. **Figures 3-6** illustrate that surficial groundwater was flowing towards the EAPPS monitoring wells from RAP monitoring well B-35 consistently and that B-36 has been cross to upgradient of BBS-CCR-1 periodically. Similarly, the location of B-17R is typically upgradient of the EAPPS and BBS-CCR-3 based on the northward flow direction observed at BBS-CCR-BW-1 throughout baseline sampling events.

However, noticeable change in groundwater elevations was observed during the October 2017 detection monitoring event, resulting in a more pronounced east-west component across the EAPPS (**Figure 7**). Additionally, a south-southwesterly component appears to be present based on the reversal of gradients observed between monitoring wells BBS-CCR-3 and BBS-CCR-BW-1. These westerly flow components are more aligned with the regional flow across BBS which follows a general east to west flow pattern towards Tampa Bay (**Figure 9**).

4. CONCLUSIONS AND RECOMMENDATIONS

Based on the data review and analysis presented in this ASD, Geosyntec concludes the following regarding the pH SSIs observed in October 2017:

- The margin of error in the pH instrument of ± 0.2 SU means that the background pH level of 6.70 SU is also between 6.50 and 6.90 SU. As a result, the pH values at BBS-CCR-1 and BBS-CCR-2 of 6.83 and 6.87 SU, respectively, are within the margin of error of the instrument and should not be considered SSIs.
- The range of pHs in background adjacent to the EAPPS (6.78 SU to 6.89 SU with a total 95% UCL of 6.82 SU) and BBS to regional background (5.59 to 7.42 SU with a total 95% UCL of 6.93 SU) encompasses the range of pH values (6.30 and 6.70 SU) observed at the EAPPS.
- Subtle changes in groundwater flow direction at the EAPPS (observed in October 2017 during the detection monitoring event) indicates that groundwater originating from the southeast and northwest migrates towards the EAPPS, thus providing for mixing of background groundwater (both anthropogenic and natural) with local groundwater.

This ASD documents that the statistically significant increase in pH at two downgradient monitoring wells is from a source other than the EAPPS. Therefore, the EAPPS will remain in the detection monitoring program.

5. REFERENCES

- Electric Power Research Institute (EPRI). 2017. Guidelines for Development of Alternative Source Demonstrations at Coal Combustion Residual Sites.
- Geosyntec Consultants, Inc. 2018. Technical Memorandum: Summary of Statistical Analyses of Baseline Groundwater Samples Economizer Ash and Pyrite Pond System.
- Southwest Florida Water Management District (SWFWMD). 2018. Water Management Information System: <u>https://www.swfwmd.state.fl.us/data/hydrologic</u>
- United States Environmental Protection Agency (EPA). 2002. 40 CFR Part 257 Criteria for Classification of Solid Waste Disposal Facilities and Practices.
- United States Environmental Protection Agency (EPA). 1993. Solid Waste Disposal Facility Criteria. *Technical Manual 530R-93-017 Subpart E*.
- United States Environmental Protection Agency (EPA). 2016. ProUCL Version 5.1. Statistical Support Software for Site Investigation and Evaluation.

YSI Environmental. 2009. YSI 556 MPS Operations Manual.

TABLES

TECO, Big Bend Facility Apollo Beach, Florida

			Well ID					BBS-CC	R-BW1					
		Sa	ample Date	6/24/2016	7/27/2016	8/26/2016	10/28/2016	11/10/2016	1/26/2017	4/13/2017	6/28/2017	7/20/2017	8/16/2017	10/13/2017
Parameter	Units	MCL	Bkgd*	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
Top of Casing Elevation	ft NAVD 88			30.13	30.13	30.13	30.13	30.13	30.13	30.13	30.13	30.13	30.13	30.13
Depth to Water	ft BTOC			25.37	26.19	25.78	29.42	29.84	30.49	30.71	29.92	28.89	28.74	29.60
Groundwater Elevation	ft NAVD 88			4.76	3.94	4.35	0.71	0.29	-0.36	-0.58	0.21	1.24	1.39	0.53
Temperature	С	NA		27.84	28.25	28.11	27.46	27.50	26.98	27.20	27.72	27.89	28.08	28.16
Specific Conductivity (field)	umhos/cm	NA		5620	5420	5140	4860	5000	4940	1580	5010	4960	5000	4570
pH (field)	SU	6.5 - 8.5		6.51	6.38	6.41	6.50	6.52	6.46	6.49	6.47	6.49	6.52	6.55
Dissolved Oxygen	mg/L	NA		0.180	0.170	0.120	0.130	0.130	0.200	0.140	0.420	0.600	0.450	0.400
Redox Potential	mV	NA		-8.60	-7.30	-22.80	-76.20	-71.1	-20.2	-114.00	-11.4	-23.00	3.60	-18.40
Turbidity (field)	NTU	NA		5.14	7.10	6.47	4.08	1.77	2.04	4.22	0.69	2.38	6.03	2.51
Appendix III Parameters														
Boron	mg/L	1.4**	54.6	59.1	56.9	53.7 V	51.4	49.7	45.9	49.0	51.7	47.00	48.00	44.20
Calcium	mg/L	NA	997.5	781	737	729	675 V	692	728	693	781	744 V	743	691
Chloride	mg/L	250	1088	1140 J-	1120	1030	939 V	993 V	942 V	934	995	915 V	793	809
Fluoride	mg/L	4***	0.664	0.199	0.110	0.180	0.194	0.261	0.315	0.256	0.298	0.255 J	0.0100 U	0.334
Sulfate	mg/L	250	1677	1440 J-	1510	1420	1400	1440	1520	1550	1510	1470	1320	217
Total Dissolved Solids	mg/L	500	5418	5050 J-	4190 (-)	4290	4120 J-	4170 J-	4510 J	4060 J	4430	4160 J	4340	3890
Appendix IV Parameters														
Antimony	ug/L	6	1.47	0.600 U	0.600 U	1.77 I	6.00 U	0.600 U	0.600 U	0.600 U	0.600 U	6.00 U	0.600 U	0.600 U
Arsenic	ug/L	10	8.89	10.2	8.10	8.89	3.20 U	8.49	0.320 U	8.61	7.68	8.48 I	6.60	9.06
Barium	ug/L	2000	106	72.9	68.2	61.4	60.0	61.2	54.6	53.6	55.4	51.7	55.6	55.8
Beryllium	ug/L	4	0.215	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Cadmium	ug/L	5	0.235	0.100 U	0.100 U	0.100 U	1.00 U	0.100 U	0.100 U	0.108 I	0.124 I	1.00 U	0.100 U	0.100 U
Chromium	ug/L	100	2.45	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	3.23 I	2.29 I	2.16 I	2.48 J	1.6 U
Cobalt	ug/L	140**	1.61	1.40 I	1.33 I	1.52 I	0.963 l	1.45 I	1.50 I	2.0 U	1.71 I	1.97 l	1.66 J	1.86 J
Lead	ug/L	15	0.265	0.0800 U	0.200 l	0.111 I	0.800 U	0.102 l	0.113 I	0.129 l	0.0800 U	0.800 U	0.291 J	0.103 J
Lithium	ug/L	140**	19	8.9 I	20 I	7.4 I	11 I	10 I	18 I	39.7	15 U	17 I	0.050 U	17 I,V
Mercury	ug/L	2	0.0500	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Molybdenum	ug/L	35**	12.8	4.46 I	2.88 I	11.1 I	6.00 I	6.58 I	7.16 I	15.6 I	16.3 U	13.6 I	1.43 J	4.27 J
Radium 226/228	pCi/L	1	38.2	38	35	31	32.3	29.9	32.5	39.7	37.8	37.2	30.1	22.1
Selenium	ug/L	50	2.08	2.09	1.92 l	1.73 I	2.00 U	2.51	0.200 U	1.62 I	1.81 I	2.00 U	1.76 J	2.14 J
Thallium	ug/L	2	0.229	0.118 I	0.100 U	0.100 U	1.00 U	0.100 U	0.100 U	0.100 U	0.100 U	1.00 U	0.100 U	0.100 U

TECO, Big Bend Facility Apollo Beach, Florida

			Well ID	BBS-CCR-BW2										
		Sa	ample Date	6/24/2016	7/27/2016	8/26/2016	10/28/2016	11/10/2016	1/26/2017	4/13/2017	6/28/2017	7/20/2017	8/16/2017	10/13/2017
Parameter	Units	MCL	Bkgd*	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Results Q	Results Q	Result Q
Top of Casing Elevation	ft NAVD 88			9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	30.13
Depth to Water	ft BTOC			4.72	5.52	5.22	8.06	8.45	9.13	9.24	8.53	7.45	7.33	7.38
Groundwater Elevation	ft NAVD 88			5.09	4.29	4.59	1.75	1.36	0.68	0.57	1.28	2.36	2.48	22.75
Temperature	С	NA		26.42	27.56	27.74	27.22	27.10	25.25	30.71	26.69	27.20	27.69	27.95
Specific Conductivity (field)	umhos/cm	NA		1640	1500	1380	1340	1400	1460	1480	1538	1540	1580	1700
pH (field)	SU	6.5 - 8.5		6.53	6.48	6.48	6.67	6.68	6.62	6.67	6.64	6.66	6.68	6.70
Dissolved Oxygen	mg/L	NA		0.370	0.150	0.100 U	0.370	0.200	0.300	1.32	0.190	0.330	0.430	0.280
Redox Potential	mV	NA		-59.4	-84.1	-59.5	-91.5	-73.8	-74.1	-42.0	-82.4	-94.0	-53.3	-72.10
Turbidity (field)	NTU	NA		6.70	4.86	1.73	3.99	5.86	16.4	19.0	6.1	5.3	3.66	3.96
Appendix III Parameters														
Boron	mg/L	1.4**	54.6	3.89	4.25	3.70 V	3.90	3.75	3.27	4.08	4.54 J-	4.57	4.39	4.08
Calcium	mg/L	NA	997.5	313	271	237	238 J-,V	243	240	260	290 J-	278	V 287	321
Chloride	mg/L	250	1088	123	116	116	125 V	129 V	145 V	140	135	123	V 117	84.9
Fluoride	mg/L	4***	0.664	0.409	0.432	0.455	0.440	0.464	0.472	0.478	0.559	0.319	J 0.352	0.513
Sulfate	mg/L	250	1677	414	341	276	246	255	255	323	402	41.7	462	632
Total Dissolved Solids	mg/L	500	5418	1230	1060	980	1010	966 J-	1140	1120	1170	1200	1180	J 1330
Appendix IV Parameters														
Antimony	ug/L	6	1.47	0.600 U	0.600 U	0.600 U	0.600 U	0.600 U	0.600 U	0.600 U	0.600 U	6.000	J 0.600 l	J 0.600 U
Arsenic	ug/L	10	8.89	2.65	1.75 I	2.03	1.62 I	2.59	0.709 l	1.45 I	1.68 I	3.20	J 1.80	J 2.01
Barium	ug/L	2000	106	51.3	49.8	43.2	46.3	45.8	38.8	42.7	48.8	47.7	49.9	56.2
Beryllium	ug/L	4	0.215	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.220	J 0.200 l	J 0.254 J
Cadmium	ug/L	5	0.235	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	1.00	J 0.100 l	J 0.100 U
Chromium	ug/L	100	2.45	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	1.68 I	2.26	I 1.60 U	J 1.60 U
Cobalt	ug/L	140**	1.61	1.00 U	0.14 I	0.153 I	0.151 I	0.157 l	0.136 I	2.0 U	0.0959 I	0.400	J 0.110	J 0.129 J
Lead	ug/L	15	0.265	0.0800 U	0.0800 U	0.0800 U	0.0800 U	0.0800 U	0.0800 U	0.0800 U	0.0800 U	0.800	J 0.101	J 0.800 U
Lithium	ug/L	140**	19	3.8 I	9.1 I	2.0 I	3.8 I	1.7 I	5.2 I	3.4	5.2 I	5.9	I 0.050 l	J 8.2 I,V
Mercury	ug/L	2	0.0500	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500	J 0.0500 l	J 0.0500 U
Molybdenum	ug/L	35**	12.8	2.40 I	1.00 U	7.57	1.42 I	1.00 U	2.56 I	9.65 I	10.2 U	8.9	I 4.08	J 2.51 J
Radium 226/228	pCi/L	1	38.2	4.8	5.1 J	4.0	4.8	8.0	4.8 J	4.5	4.8	4.4	4.9	4.9
Selenium	ug/L	50	2.08	0.722 I	0.760 I	0.577 I	0.489 I	0.485 I	0.260 I	0.539 I	0.386 I	2.00	J 0.420	J 0.523 J
Thallium	ug/L	2	0.229	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	1.00	J 0.100 l	J 0.100 U

TECO, Big Bend Facility Apollo Beach, Florida

			Well ID						BBS-CCR-1					
		S	ample Date	6/24/2016	7/27/2016	8/26/2016	10/28/2016	11/10/2016	1/26/2017	4/13/2017	6/28/2017	7/20/2017	8/16/2017	10/13/2017
Parameter	Units	MCL	Bkgd*	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Results Q	Results Q	Result Q
Top of Casing Elevation	ft NAVD 88			7.79	7.79	7.79	7.79	7.79	7.79	7.79	7.79	7.79	7.79	7.79
Depth to Water	ft BTOC			3.51	5.00	5.06	6.78	7.38	7.46	7.64	7.41	5.86	7.03	7.32
Groundwater Elevation	ft NAVD 88			4.28	2.79	2.73	1.01	0.41	0.33	0.15	0.38	1.93	0.76	0.47
Temperature	C	NA		25.48	26.41	27.05	25.78	25.70	24.03	23.70	25.54	25.81	25.80	26.57
Specific Conductivity (field)	umhos/cm	NA		3940	4180	4000	4060	4290	4320	4170	4063	3960	4110	4260
pH (field)	SU	6.5 - 8.5		6.80	6.67	6.71	6.83	6.82	6.79	6.84	6.78	6.81	6.82	6.83
Dissolved Oxygen	mg/L	NA		0.100	0.220	0.140	0.10 U	0.100 U	0.100 U	0.100 U	0.270	0.100	0.280	0.240
Redox Potential	mV	NA		-49.1	-74.1	-34.8	-107.0	-136	-110	-80.40	-80.60	-122.00	-109.00	-83.30
Turbidity (field)	NTU	NA		8.01	3.88	2.08	3.22	0.890	1.99	4.12	3.63	1.58	1.88	0.89
Appendix III Parameters														
Boron	mg/L	1.4**	54.6	14.4	0.306	11.4	15.7	16.2	15.5 J-	16.4	16.5	16	17	19.90
Calcium	mg/L	NA	997.5	541	227	556	556 V	606	579 J-	555	569	576 V	572	596.00
Chloride	mg/L	250	1088	619	742 J-	695	743 J-	817 V	820 V	124	720	694 J-, V	710	716
Fluoride	mg/L	4***	0.664	0.211	0.128	0.454	0.104	0.0871	0.184	0.170	0.208	0.157 J	0.200	0.201
Sulfate	mg/L	250	1677	1240	1320 J-	1240	1230 J-	1290	1350	443	1120	1390	1240	1230
Total Dissolved Solids	mg/L	500	5418	3060 J	3140	2980	3170 J-	3470 J-	3670 J	3110 J	3140	3400 J	2960 J	3470
Appendix IV Parameters														
Antimony	ug/L	6	1.47	0.600 U	1.03 l	0.600 U	0.600 U	0.600 U	0.602 l	0.600 U	0.600 U	3.00 U	0.600 U	0.600 U
Arsenic	ug/L	10	8.89	8.74	7.38	7.94	8.30	8.93	9.04	10.5	9.76	10.3	9.33	9.03
Barium	ug/L	2000	106	122	30.8	115	122	129	115	116 I	113	112	122	129
Beryllium	ug/L	4	0.215	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	2.00 U	0.200 U	0.200 U	0.200 U	0.200 U
Cadmium	ug/L	5	0.235	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.500 U	0.100 U	0.100 U
Chromium	ug/L	100	2.45	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	1.93 I	1.62 I	1.60 U	1.60 U
Cobalt	ug/L	140**	1.61	1.00 U	0.450 l	0.485	0.507 l	0.519 I	0.489 I	<mark>2.0</mark> U	0.484 I	0.495 I	0.473 J	0.453 J
Lead	ug/L	15	0.265	0.0800 U	0.110 I	0.0800 U	0.0800 U	0.0800 U	0.0800 U	0.0979 l	0.0800 U	<mark>0.400</mark> U	0.080 U	0.080 U
Lithium	ug/L	140**	19	8.3 I	15 I	7.4 I	12 I	8.4 I	14 I	10 I	13 I	14 I, J3	0.050 U	15 I,V
Mercury	ug/L	2	0.0500	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Molybdenum	ug/L	35**	12.8	106	105	80.3	95.5	98.4	92.4	124 I	96.5 I	99.6	86.4	82.5
Radium 226/228	pCi/L	1	38.2	<mark>39</mark>	33	15	42.6	37.3	32.5	35.8 I	41.4	34.7	33.4	35.6
Selenium	ug/L	50	2.08	0.696 l	0.960 l	0.385	0.690 l	1.04 I	0.653 I	0.937 l	0.756 l	2.25 I	0.918 J	0.99 J
Thallium	ug/L	2	0.229	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	<mark>0.500</mark> U	0.100 U	0.100 U

TECO, Big Bend Facility Apollo Beach, Florida

			Well ID						BBS-CCR-2					
		S	ample Date	6/24/2016	7/27/2016	8/26/2016	10/28/2016	11/10/2016	1/26/2017	4/13/2017	6/28/2017	7/20/2017	8/16/2017	10/13/2017
Parameter	Units	MCL	Bkgd*	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Results Q	Results Q	Result Q
Top of Casing Elevation	ft NAVD 88			8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14
Depth to Water	ft BTOC			3.45	5.30	5.35	6.78	6.88	6.93	7.15	6.97	5.06	6.53	6.88
Groundwater Elevation	ft NAVD 88			4.69	2.84	2.79	1.36	1.26	1.21	0.99	1.17	3.08	1.61	1.26
Temperature	С	NA		25.62	26.42	27.35	25.64	25.66	24.27	23.95	25.12	25.74	26.43	26.46
Specific Conductivity (field)	umhos/cm	NA		1580	1700	1570	1500	1540	1560	1540	1485	1630	1560	1350
pH (field)	SU	6.5 - 8.5		6.80	6.68	6.74	6.87	6.89	6.89	6.93	6.87	6.97	6.92	6.87
Dissolved Oxygen	mg/L	NA		0.100	0.130	0.100 U	0.100	0.130	0.100 U	0.100 U	0.240	0.100 U	0.250	0.200
Redox Potential	mV	NA		-71.0	-67.4	-27.3	-183	-186	-182	-138	-131	-154.0	-233.0	-188
Turbidity (field)	NTU	NA		4.90	7.16	3.31	3.73	7.10	4.93	3.43	4.71	4.56	3.22	3.03
Appendix III Parameters														
Boron	mg/L	1.4**	54.6	1.55	2.81	2.86	2.08	2.28	3.86	5.01	3.20	4.94	4.32	0.888
Calcium	mg/L	NA	997.5	198	193	192	181 V	181	172	163	173	178 V	/ 171	169
Chloride	mg/L	250	1088	118	140	124	112 V	111 V	115 J+	119	105	114 V	/ 113	70.9
Fluoride	mg/L	4***	0.664	0.148	0.183	0.150	0.171	0.168	0.248 J+	0.237	0.214	0.166	0.155	0.182
Sulfate	mg/L	250	1677	471	542	484	468	468	490 J-	485 J-	415 J-	481	459	432
Total Dissolved Solids	mg/L	500	5418	1170 J-	1170	1120	1130	1110	1140	1150	1080	1140	1080	1030
Appendix IV Parameters														
Antimony	ug/L	6	1.47	0.600 U	0.830	0.600 U	0.600 U	0.600 U	0.600 U	0.600 U	0.600 U	0.600 L	1.20 U	0.600 U
Arsenic	ug/L	10	8.89	1.83 I	0.990 l	1.25	1.16 I	1.37 I	1.09 l	2.64	1.01 I	0.974	l 1.02 J	1.14
Barium	ug/L	2000	106	65.0	64.8	61.4	60.6	62.4	54.6	55.8	54.6	54.6	56.8	53.3
Beryllium	ug/L	4	0.215	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.423 U	0.200 U	0.200 U
Cadmium	ug/L	5	0.235	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 L	0.200 U	0.200 U
Chromium	ug/L	100	2.45	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	2.29 I	1.96 I	3.11	l 1.60 U	1.60 U
Cobalt	ug/L	140**	1.61	1.00 U	0.0900 I	0.0776	0.107 I	0.105 I	0.0902 I	<mark>2.0</mark> U	0.0875 I	0.0857	0.150 J	0.115 J
Lead	ug/L	15	0.265	0.0800 U	0.110 I	0.0800 U	0.129 l	0.0955 I	0.0800 U	0.176 I	0.144 I	0.127	0.244 J	0.15 J
Lithium	ug/L	140**	19	10 I	17 I	11 I	14 I	11 I	13 I	13 I	14 I	16	I 0.050 U	16 I,V
Mercury	ug/L	2	0.0500	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Molybdenum	ug/L	35**	12.8	1.73 I	1.00 U	7.78	1.00 U	1.43 I	2.52 I	9.82 I	9.59 U	9.88	3.02 J	1.99 J
Radium 226/228	pCi/L	1	38.2	15.0	13.2	32	14.9	14.8	13.9	14.2	14.7	14.4	12.1	13.5
Selenium	ug/L	50	2.08	0.376 I	0.280 l	0.200 U	0.333 I	0.259 l	0.200 U	0.200 U	0.200 U	0.474	0.662 J	0.474 J
Thallium	ug/L	2	0.229	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.200 U

TECO, Big Bend Facility Apollo Beach, Florida

			Well ID						BBS-CCR-	3				
		Sa	ample Date	6/24/2016	7/27/2016	8/26/2016	10/28/2016	11/10/2016	1/26/2017	4/13/2017	6/28/2017	7/20/2017	8/16/2017	10/13/2017
Parameter	Units	MCL	Bkgd*	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
Top of Casing Elevation	ft NAVD 88			6.78	6.78	6.78	6.78	6.78	6.78	6.78	6.78	6.78	6.78	6.78
Depth to Water	ft BTOC			1.51	3.60	3.48	6.54	6.77	6.81	7.13	6.64	4.77	6.04	6.52
Groundwater Elevation	ft NAVD 88			5.27	3.18	3.30	0.24	0.01	-0.03	-0.35	0.14	2.01	0.74	0.26
Temperature	С	NA		26.62	27.28	27.07	26.20	26.10	24.25	24.27	26.15	26.73	26.86	27.18
Specific Conductivity (field)	umhos/cm	NA		1580	1740	1690	1640	1650	1510	1580	1755	1750	1790	1750
pH (field)	SU	6.5 - 8.5		6.42	6.19	6.29	6.42	6.46	6.42	6.49	6.38	6.36	6.42	6.44
Dissolved Oxygen	mg/L	NA		0.540	0.100 U	0.150	0.100 U	0.100 U	0.110	0.140	0.280	0.170	0.290	0.370
Redox Potential	mV	NA		-145	-74.4	-155.0	-266	-239	-168	-114	-125	-122	-206	-249
Turbidity (field)	NTU	NA		11.5	8.04	6.35	3.26	1.18	1.79	4.22	0.94	0.51	0.47	2.39
Appendix III Parameters														
Boron	mg/L	1.4**	54.6	0.662	13.2	0.540 ∨	0.532	0.502	0.381	0.385	0.184	0.211	0.266	0.373
Calcium	mg/L	NA	997.5	187	196	200	201 V	200	176	176	192	205 J-, V	187	190
Chloride	mg/L	250	1088	88.9	140	136	140 V	129 V	129 V	124	168	158 V	156	153
Fluoride	mg/L	4***	0.664	0.313	0.262	0.286	0.299	0.331	0.391	0.415	0.338	0.230 J	0.338	0.333
Sulfate	mg/L	250	1677	474	516	517	541	492	454	443	493	506	484	503
Total Dissolved Solids	mg/L	500	5418	1200	1220	1210	1220	1220	1200	1120	1280	1310	1290	1310
Appendix IV Parameters														
Antimony	ug/L	6	1.47	0.600 U	0.770 l	0.600 U	0.600 U	0.600 U	0.600 U	0.600 U	0.600 U	<mark>3.00</mark> U	0.600 U	0.600 U
Arsenic	ug/L	10	8.89	1.23 I	0.540 l	0.603 I	0.623 I	0.765 I	0.320 U	0.320 U	0.525 I	1.60 U	0.536 J	0.665 J
Barium	ug/L	2000	106	65.3	67.6	63.6	66.3	63.0	56.2	58.6	61.8	63.4	59.8	59.3
Beryllium	ug/L	4	0.215	0.200 U	0.200 U	0.272	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	<mark>0.356</mark> U	0.200 U	0.200 U
Cadmium	ug/L	5	0.235	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	<mark>0.500</mark> U	0.100 U	0.100 U
Chromium	ug/L	100	2.45	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	1.60 U	3.12 I	3.43 I	2.02 J	1.60 U
Cobalt	ug/L	140**	1.61	1.00 U	0.0900 I	0.125 I	0.124 I	0.117 I	0.0989	<mark>2.0</mark> U	0.119 I	0.200 U	0.123 J	0.115 J
Lead	ug/L	15	0.265	0.125 I	0.0800 I	0.0800 U	0.107 I	0.0800 U	0.0800 U	0.0800 U	0.0800 U	<mark>0.400</mark> U	0.0800 U	0.0800 U
Lithium	ug/L	140**	19	3.7 I	11 I	6.1 I	8.2 I	6.1 I	7.7	6.3 I	5.2 I	10 I	0.050 U	11 I,V
Mercury	ug/L	2	0.0500	0.0580	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Molybdenum	ug/L	35**	12.8	4.09 I	2.23 I	8.10	3.63 I	3.90 I	5.42 I	11.7 I	11.9 U	10.6 I	3.14 J	3.82 J
Radium 226/228	pCi/L	1	38.2	10.3	12.3	15	18.1	17.5	15	14.4	17.7	20.3	19.6	20.0
Selenium	ug/L	50	2.08	0.262 l	0.270 l	0.200 U	0.200 U	0.253	0.200 U	0.200 U	0.200 U	1.00 U	0.200 U	0.285 J
Thallium	ug/L	2	0.229	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	<mark>0.500</mark> U	0.100 U	0.100 U

Table 1: TECO Big Bend EAPPS Analytical Groundwater Results TECO, Big Bend Facility Apollo Beach, Florida

Notes:

1. U: Laboratory gualifer - Indicates that the compound was not detected above the reporting limit.

2. I: Laboratory qualifier - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit; estimated value

3. J(-): Laboratory qualifier - The reported value is an estimated value.

4. J: Data validation qualifer - The analyte was postively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

5. UJ: Data validation qualifer - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

6. J-: Data validation gualifer - The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

7. V: Analyte detected in the method blank.

8. Q: Laboratory qualifer- Re-analysis of sample beyond the accepted holding time.

9. J3: Laboratory qualifer - Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.

9. MCLs - EPA Maximum Contaminant Levels; primary enforceable standards shown unless otherwise noted. Secondary (non-enforceable) standards shown in italics.

10. Detections shown in bold text and higlighted yellow when above background levels or enforceable federal MCLs or Florida Groundwater Cleanup Target Levels (GCTL) if background is less.

11. * Background concentration determined as two times the mean from BBS-CCR-BW1 and BBS-CCR-BW2 in accordance with FDEP Guidance Document "Guidance for Comparing Background and Site Chemical Concentrations in Groundwater" (July 2013). Non -

detects taken as 1/2 the reporting limit. Yellow shading indicates above background.

12. ** Florida GCTLs per FDEP Chapter 62-777 of the Florida Administrative Code. 13. *** Secondary MCL for fluoride is 2 mg/L but not enforceable.

14. Background / Upgradient Well shaded green.

15. Concentrations in red considered anomalous (July 2016).

Abbreviations:

Q - Data qualifier C - Celsius ft BTOC - feet below top of well casing mg/L - milligrams per liter SU - Standard units ft NAVD 88 - feet elevation in North American Vertical Datum 1988 ug/L - micrograms per liter umhos/cm - micromohs per centimeter

Table 2: Statistical Comparison of Background Groundwater pH in the Surficial Aquifer TECO Big Bend Station 13031 Wyandotte Road, Gibsonton, FL 33572

Monitoring Well Units Adjacent to EAPPS

TECO Big Bend Unit Name	Monitoring Wells	Period of Record	Number of Observations	pH ¹ Minimum	pH ¹ Maximum	95% UCL ²	Statistic ³
	B-17R	5/11 - 11/13	11	6.70	6.89	6.89	95% Student's-t UCL
Unit 20 (Economizer and Long Term Fly	B-35	5/11 - 5/17	12	6.60	6.92	6.78	95% Student's-t UCL
Ash Pond)	B-36	5/11 - 5/17	12	6.70	6.96	6.85	95% Student's-t UCL
	TOTAL	5/11 - 5/17	35	6.60	6.96	6.82	95% Adjusted Gamma UCL

TECO Big Bend and Regional Surficial Aquifer Background Monitoring Wells

Background Source	Monitoring Wells	Period of Record	Number of Observations	pH ¹ Minimum	pH ¹ Maximum	95% UCL ²	Statistic ³
TECO Big Bend IWW/RAP ⁴ Background Wells	B-4R	5/11- 5/17	15	5.81	6.5	6.21	95% Student's-t UCL
	B-39	5/11 - 5/17	12	6.87	7.31	7.21	95% Student's-t UCL
	B-40	5/11 - 5/17	12	6.70	7.10	7.00	95% Student's-t UCL
	B-41	5/11 - 5/17	12	6.60	7.10	6.97	95% Student's-t UCL
	TOTAL	5/11 - 5/17	51	5.81	7.31	6.85	95% Student's-t UCL

SWFWMD ⁵ Regional Observation and Monitoring Program	TR 9-2	9/93 - 3/03	4	5.59	5.96	5.77*	Arithmetic Mean
	TR 9-3	9/85 - 3/03	19	6.75	7.42	7.25	95% Student's-t UCL
	TR 10-2	9/85 - 3/03	7	6.71	7.16	7.00*	Arithmetic Mean
	TR12-1	8/93 - 3/03	4	7.15	7.33	7.24*	Arithmetic Mean
	TOTAL	9/85 - 3/03	34	5.59	7.42	7.13	95% Student's-t UCL
	COMBINED ⁶	9/85 - 5/17	85	5.59	7.42	6.93	95% Student's-t UCL

Notes:

1. All results are reported for pH in standard units (SU).

2. 95% UCL = 95% of the Upper Confidence Limit of the arithmetic mean of the data set.

3. Statistics reported are the most appropriate based on the underlying distribution of each data set.

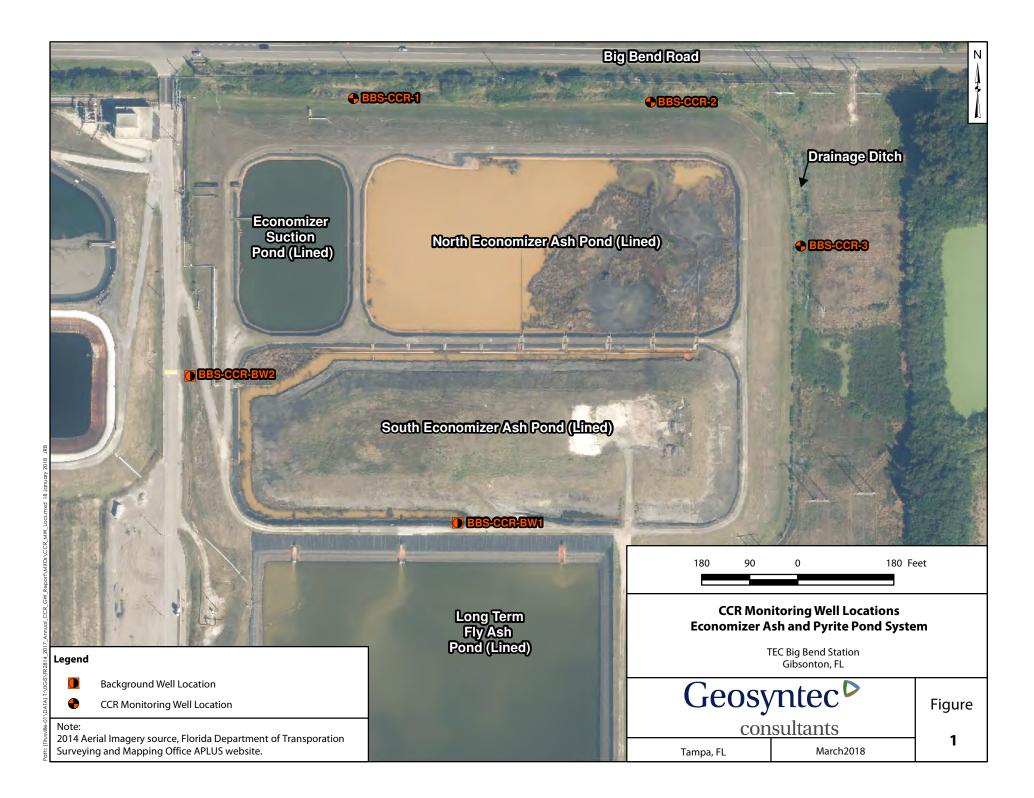
4. IWW and RAP refer to TECO's Industrial Wastewater and Remedial Action Plan monitoring well networks respectively.

5. SWFWMD = Southwest Florida Water Management District

6. Combined statistic represents the combination of both SWFWMD Regional Observation and Monitoring (ROMP) monitoring wells and TECO Big Bend background monitoring wells.

* Insufficient number of observations to calculate a 95% UCL; arithmetic mean reported instead.

FIGURES



Legend

- Industrial Wastewater Well Location
- \bigcirc Remedial Action Plan Well Location
- Ð Upper Floridan Industrial Wastewater Well Location
- \bullet Upper Floridan Remedial Action Plan Well Location
- \bullet Well Location Abandoned in 2015

Approximate Site Boundary

- Long Term Fly Ash Pond/Reclaimed Water Pond (lined) (#22) South Economizer Ash Pond (lined) (#20) 1.
- 2.
- North Economizer Ash Pond (lined) (#20) Economizer Ash Suction Pond (lined) (#20) 3.
- 4. 5. South Bottom Ash Pond (lined) (#19)
- 6.
- South Bottom Ash Pond (lined) (#19) North Bottom Ash Pond (lined) (#19) Bottom Ash Suction Pond (lined) (#19) Settling Basins (concrete) (#17/18) Settling Pond (lined) (#17/18) South Recycle Pond (lined) (#17/18) North Recycle Pond (lined) (#17/18) 7.
- 8.
- 9.
- 10.
- 11.
- 12. Storm Water Pond
- 13. Coal Field
- 14. BB Aero Unit CT4

- BB Aero Unit CT4
 Rail Car Unloading
 Gypsum Storage Area (#21)
 Slag Dewatering Bins
 Long Term Bottom Ash Area (#23)
 Dredge Disposal Area DA-2 (#1/2)
 Former Spray Field (#16)
 Limestone and FGD Area (#13/14)

Notes:

- 1. Site boundary as provided by Tampa Electric Company.

- * indicates background monitoring well.
 R indicates replacement monitoring well.
 UF indicates monitoring well screen interval located in Upper Floridian Aquifer system.
- Prior to abandonment, MWC-19 was converted to an intermediate well and the designation changed to MWI-19.
- 6. Source of 2011 Aerials: Florida Department of Transportation, Surveying
- and Mapping Office.



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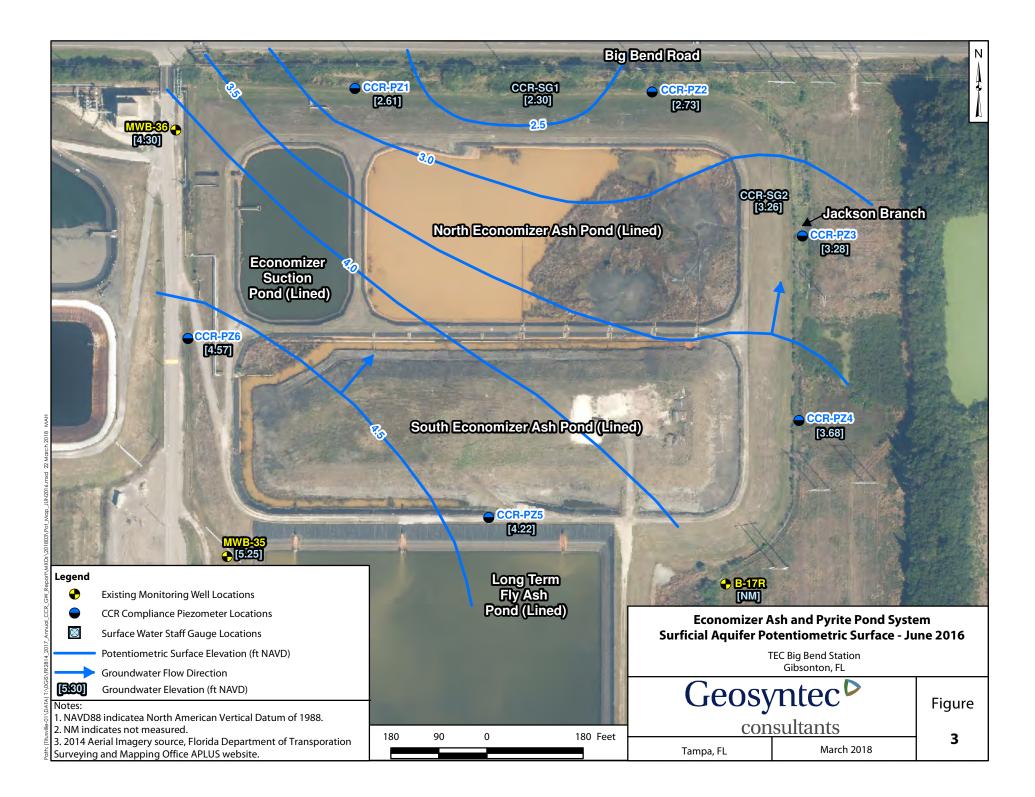
B-6UF

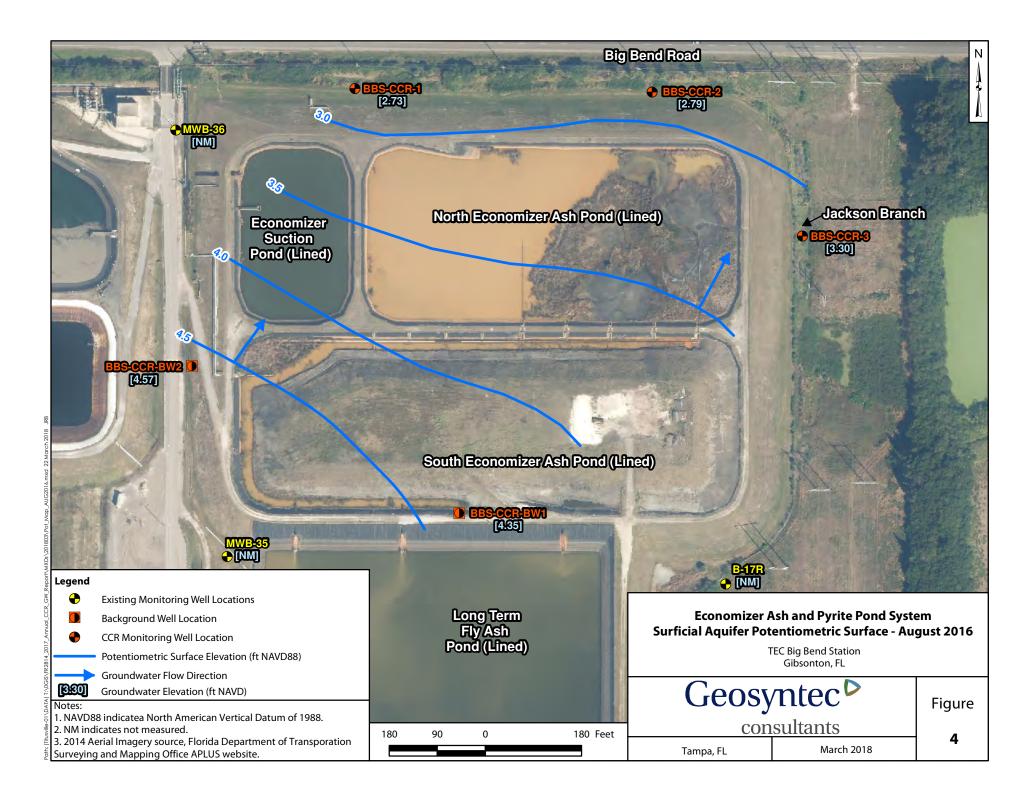
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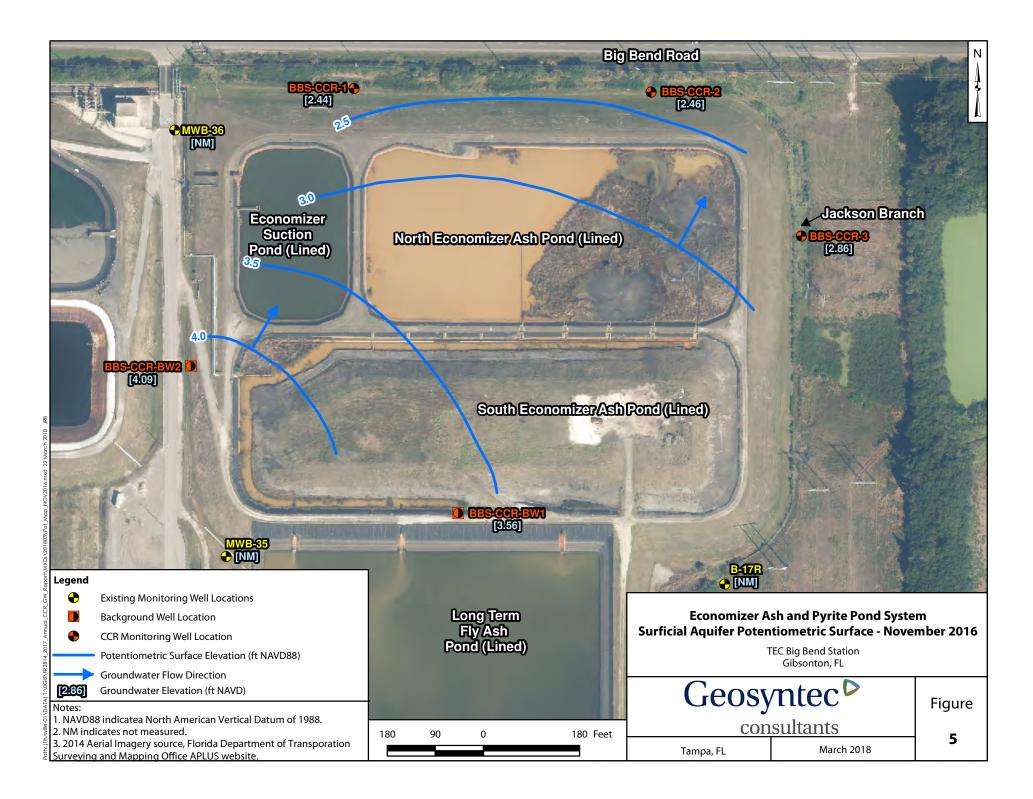
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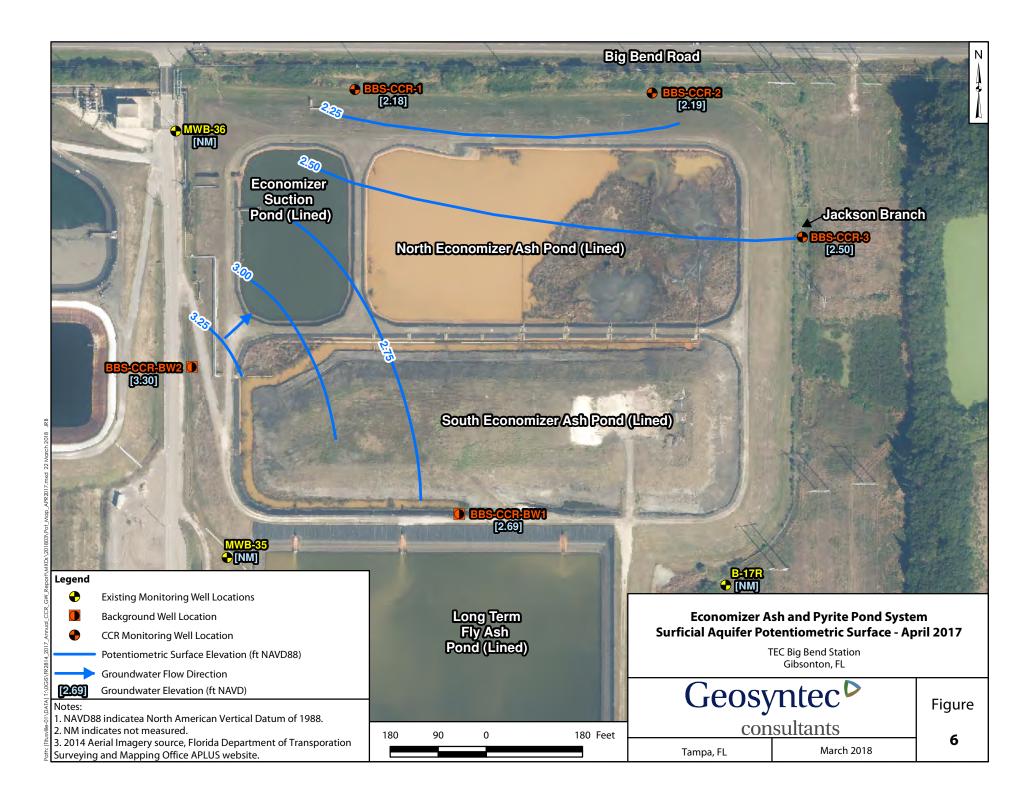
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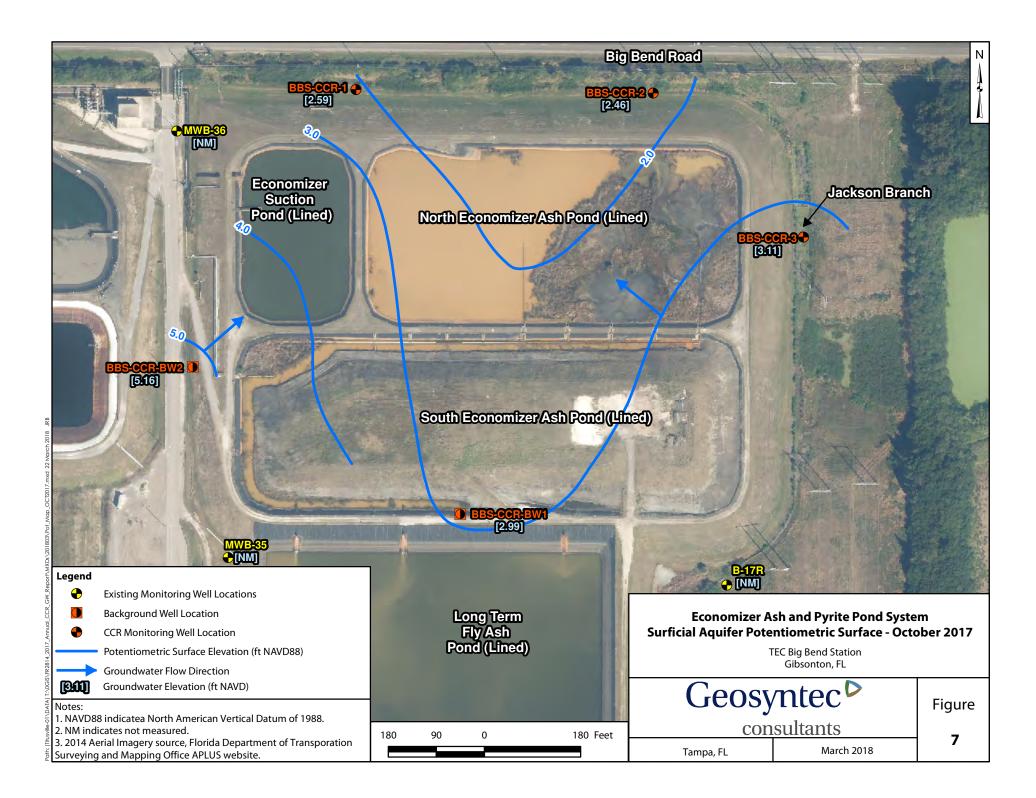
MWC-1

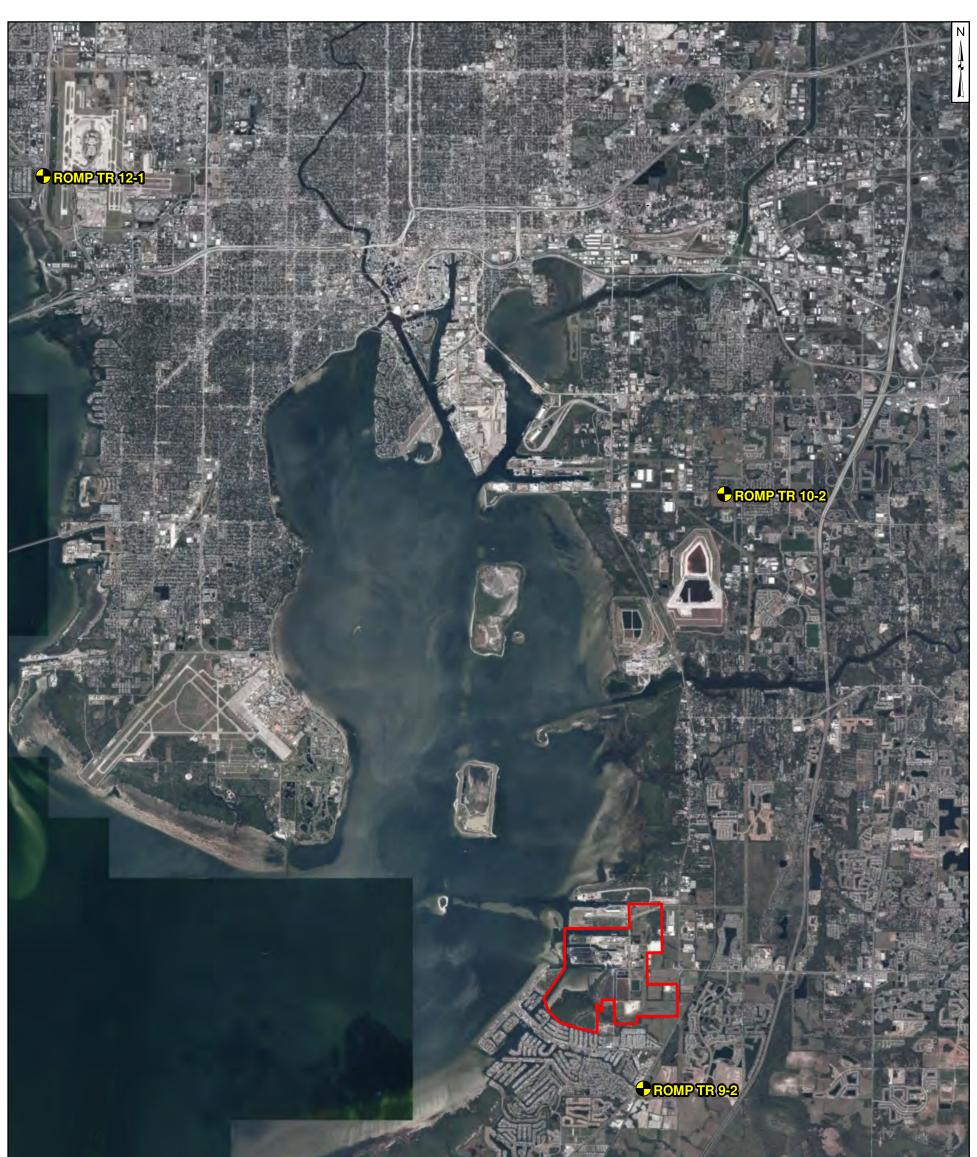












	1.5 0.75	0 1.5	Miles II Locations
Legend ROMP Well Location	Т	FEC Big Bend Station Gibsonton, FL	
Approximate Site Boundary Notes:	Geosyntec [▶] _F		
1. ROMP locations were obtained from the Southwest Florida Water Management District (SWFWMD) Regional Observation and Monitoring Program (ROMP): https://www.swfwmd.state.fl.us/data/hydrologic/.	cons	Figure	
2. 2017 World Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.	Tampa, FL	March 2018	8

Legend

Industrial Wastewater Well Location

- Remedial Action Plan Well Location
- Upper Floridan Industrial Wastewater Well Location
- \bullet Upper Floridan Remedial Action Plan Well Location
- [3.93] Groundwater Elevation (ft NGVD29)
- Inferred Groundwater Contour -

Groundwater Contour

Groundwater Flow Direction

Approximate Site Boundary

Long Term Fly Ash Pond/Reclaimed Water Pond (lined) (#22) 1. South Economizer Ash Pond (lined) (#20) 2. 3. North Economizer Ash Pond (lined) (#20) 4. Economizer Ash Suction Pond (lined) (#20)

- South Bottom Ash Pond (lined) (#19) 5. North Bottom Ash Pond (lined) (#19) Bottom Ash Suction Pond (lined) (#19) 6. 7. Settling Basins (concrete) (#17/18) 8. Settling Pond (lined) (#17/18) South Recycle Pond (lined) (#17/18) 9. 10. North Recycle Pond (lined) (#17/18) 11. Storm Water Pond 12.
- 13. Coal Field BB Aero Unit CT4 14. 15. Rail Car Unloading Gypsum Storage Area (#21) Slag Dewatering Bins 16.
- 17.
- 18.
- Long Term Bottom Ash Area (#23) Dredge Disposal Area DA-2 (#1/2) 19.
- 20. Former Spray Field (#16)
- 21. Limestone and FGD Area (#13/14)

Notes:

- 1. ft NGVD29 indicates feet National Geodetic Vertical Datum of 1929.
- 2. Site boundary as provided by Tampa Electric Company.
- 3. * indicates background monitoring well.
- 4. R indicates replacement monitoring well.
- 5. UF indicates monitoring well screen interval located in Upper Floridian Aquifer system.
- 6. The following monitoring wells were abandoned in 2015: B-5, B-10, B-11, B-13R, B-14R, B-17R, B-51, and B-60.
- 7. Prior to abandonment, MWC-19 was converted to an intermediate well and the designation changed to MWI-19.
- Source of 2011 Aerials: Florida Department of Transportation, Surveying
- and Mapping Office.



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MWC-5 [1.03]

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APPENDIX A

SUMMARY OF STATISTICAL ANALYSES OF BASELINE GROUNDWATER SAMPLES



13101 Telecom Drive, Suite 120 Temple Terrace, Florida 33637 PH 813.558.0990 FAX 813.558.9726 www.geosyntec.com

Memorandum

Date:	15 January 2018
To:	Randy Melton
Copies to:	Terry Eastley Zel Jones
From:	Cathy Crea, M.Sc. Todd Kafka, PG
Subject:	Summary of Statistical Analyses of Baseline Groundwater Samples Economizer Ash and Pyrite Pond System Tampa Electric Company - Big Bend Station 13031 Wyandotte Road Gibsonton, FL 33572

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published 40 Code of Federal Regulations (CFR) Parts 257 and 261: Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule (USEPA, 2015). This regulation addresses the safe disposal of coal combustion residuals (CCR) as solid waste under Subtitle D of the Resource Conservation and Recovery Act (RCRA) and is referred to herein as the CCR Rule. The CCR Rule became effective on October 14, 2015. The rule provides national minimum criteria for "the safe disposal of CCR in new and existing CCR landfills, surface impoundments, and lateral expansions, design and operating criteria, groundwater monitoring and corrective action, closure requirements and post closure care, and recordkeeping, notification, and internet posting requirements." The groundwater monitoring requirements of the CCR Rule apply to the economizer ash and pyrite pond system (EAPPS) at Tampa Electric Company's (TEC) Big Bend Power Station (BBS) in southeast Hillsborough County in Gibsonton, Florida.

Geosyntec Consultants (Geosyntec) has prepared this technical memorandum to summarize the statistical analyses performed on the baseline groundwater samples collected from the groundwater monitoring system (GMS) established at the EAPPS. These activities have been undertaken by TEC to comply with the requirements set forth in 40 CFR 257.50 "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments" pertaining to the EAPPS. TEC installed

TEC EAPP_baseline stats memo_15JAN18

CCR Groundwater Statistical Analysis 15 January 2018 Page 2

a groundwater monitoring system at the EAPPs that complies with 40 CFR 257.91 and performed baseline groundwater sampling events in accordance with 40 CFR 257.93. Geosyntec's statistical analyses were performed in accordance with the *Statistical Analysis Plan* dated 15 October 2017.

BACKGROUND

The groundwater monitoring system (GMS) was installed at the EAPPs in May 2016 and consists to two background monitoring wells, BBS-CCR-BW1 and BBS-CCR-BW2, and three downgradient monitoring wells, BBS-CCR-1, BBS-CCR-2, and BBS-CCR-3. TEC conducted eleven baseline groundwater sampling events from the GMS between June 2016 and October 2017 and analyzed the samples for Appendix III and Appendix IV constituents as required in 40 CFR 257.93. The inorganic data were reviewed based on the following: *CCR Groundwater Monitoring Program Plan*, Big Bend Power Station, Apollo Beach, Florida, September 2016, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, August 2014 (OSWER 9355.0-131, EPA 540-R-013-001), as well as by the pertinent methods referenced by the data package and professional and technical judgment.

Geosyntec prepared a *Statistical Analysis Plan* to provide details on the selection of statistical methods in accordance with the provisions set forth in 40 CFR 257.93 "Groundwater sampling and analysis requirements." These statistical methods were used to establish background conditions and to evaluate groundwater monitoring data collected during detection monitoring (40 CFR 257.94) to evaluate if the CCR units at the BBS are adversely impacting groundwater quality.

METHODOLOGY AND APPROACH

The statistical approach used to evaluate groundwater monitoring data was selected from a suite of methods provided in 40 CFR 257.93(f) (1 through 5) and performed in accordance with a set of performance standards provided in 40 CFR 257.93(g), when applicable.

The approach included the following steps for each Appendix III constituent:

- 1. Graphical display of data and assessment of equal variance;
- 2. Evaluate trends and seasonality in the background dataset for each constituent.
- 3. Identify potential outliers;
- 4. Evaluate the population distribution of the background dataset for each constituent;
- 5. Calculate the frequency of non-detects (NDs), and summary statistics (e.g., minimum, maximum, and mean) of the background dataset for each constituent;

CCR Groundwater Statistical Analysis 15 January 2018 Page 3

- 6. Calculate appropriate upper limits (95%-95% upper tolerance limit [UTL] and a 95% upper prediction limit [UPL]); and
- 7. Compare upper limits to the most recent concentrations in the compliance (or downgradient) wells to determine if a statistically significant increase (SSI) above background has occurred.

Assumptions:

- The laboratory reporting limit was substituted for non-detects in all datasets.
- The laboratory reported value for estimated (J-flagged) concentrations were retained in all datasets.
- When a duplicate sample was collected at a background monitoring well, only the higher of the primary and duplicate sample concentrations were included in the aggregated dataset.

BACKGROUND GROUNDWATER QUALITY STATISTICS

The results of the Appendix III constituents (e.g., boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids) detected in groundwater samples from the two background monitoring wells were used to establish background concentrations for these constituents (**Table 1**). Based on professional judgment, the sulfate concentration of 41.7 milligrams per liter (mg/L) detected in BBS-CCR-BW2 on 7/20/17 was deemed an analytical error and was removed from the dataset.

Potential outliers:

- A sulfate concentration of 217 mg/L at BBS-CCR-BW1 was identified as a potential low concentration outlier but was retained in the dataset.
- The TDS concentration of 5,050 mg/L at BBS-CCR-BW1 was identified as a potential high concentration outlier but was retained in the dataset.

Increasing trends:

• An increasing pH trend is statistically present at BBS-CCR-BW2 based on the non-parametric Mann Kendall analysis.

Each of the Appendix III constituents exhibited a non-parametric distribution among the two background wells. The two background wells did show spatial variability for all the Appendix III constituents. An intra-well comparison is often used in these circumstances; however, this approach is not appropriate for the EAPPS since there is no groundwater data representative of pre-operational conditions (e.g., prior to

CCR Groundwater Statistical Analysis 15 January 2018 Page 4

EAPPS) and therefore no information if the background wells may have already been impacted prior to their construction. Consequently, the data from the two background monitoring wells were aggregated for each constituent to create a single pooled background dataset, consisting of 22 observations (11 events x 2 monitoring wells). Two non-parametric upper limits were calculated for each constituent: a 95%-95% upper tolerance limit (UTL) and a 95% upper prediction limit (UPL), both of which result in the maximum detected concentration among both background wells. However, the 95%-95% UTL could not achieve a confidence level above 67%, but the UPL did achieve 95% confidence. As such, the 95% UPL was used to evaluate SSI for each constituent.

DETECTION MONITORING

Groundwater samples were collected from the GMS in October 2017 to serve as the first detection monitoring event. The comparison of the detection monitoring results to the background values for the Appendix III constituents is shown in **Table 2**. A statistically significant increase (SSI) over background was observed for pH in two compliance monitoring wells (BBS-CCR-1 and BBS-CCR-2).

CONCLUSIONS

As specified in 40 CFR 257.94(3) (e), TEC will either provide (i) a demonstration that the SSI is due to sampling or analysis error, another source, or natural variability or (ii) commence with assessment monitoring within 90 days of this SSI (e.g., by 15 April 2018). The pH values of 6.83 and 6.87 identified as SSIs are within the natural range of groundwater at BBS based on historical values which have been measured across BBS. In the absence of SSIs for other Appendix III constituents, the SSIs for pH do not appear to be attributable to a release from the EAPPS, but are instead attributable to natural variability. Therefore, TEC will continue with detection monitoring as applicable for the EAPPS.

* * * * *

											Background C	oncentration
Parameter	Units	Number of Samples	Number of NDs	Percent NDs	Minimum Result	Average Result	Maximum Result	Potential Outlier?	Trend?	Distribution	95% UPL ²	Comment
Boron	mg/L	22	0	0	3.27	27.32	59.1	None	No	NP	59.1	Confidence for UTL = 67.6%
Calcium	mg/L	22	0	0	237	499	781	None	No	NP	781	Confidence for $UTL = 67.6\%$
Chloride	mg/L	22	0	0	84.9	543.8	1140	None	No	NP	1140	Confidence for UTL = 67.6%
Fluoride	mg/L	22	1	5	<0.01	0.332	0.559	None	No	NP	0.559	Confidence for $UTL = 67.6\%$
pH (field)	STD	22	0	0	6.38	6.55	6.70	None	Yes (BBS-CCR-BW2)	NP	(6.38, 6.70)	Confidence for UTL = 30.18%
Sulfate	mg/L	21 ¹	0	0	217	876	1550	217 (BBS-CCR-BW1)	No	NP	1547	Confidence for UTL = 65.9%
Total Dissolved Solids	mg/L	22	0	0	966	2709	5050	5050 (BBS-CCR-BW1)	No	NP	5050	Confidence for UTL = 67.6%

TABLE 1 - BACKGROUND STATISTICS, TEC BIG BEND STATION ECONOMIZER ASH AND PYRITE POND SYSTEM, APOLLO BEACH, FL

Notes:

< - concentration not detected at or above the adjusted reporting limit

mg/L - milligrams per litre

ND - non-detect

NP - non-parametric

STD - standard units

UTL - upper tolerance limit

UPL - upper prediction limit

1 - A concentration of 41.7 mg/L detected at BBS-CCR-BW2 on 7/20/17 was removed from the data set as a laboratory error based on professional judgment.

2 - The 95% UPL was calculated based on either a normal, lognormal, or Gamma distribution. If data did not follow a discernible distribution, then a non-parametric 95% UPL was calculated. A two-sided prediction interval was calculated for pH.

	Analytical Parameter	Boron, total	Calcium, total	Chloride, total	Fluoride, total	pH (field)	Sulfate, total	Total Dissolved Solids
	Units	mg/L	mg/L	mg/L	mg/L	STD	mg/L	mg/L
Backgrour	nd Concentration Value	59.1	781	1140	0.559	(6.38, 6.70)	1550	5050
Well I D	Sample Collection Date			October 2017	Detection Monitor	ing Results		
BBS-CCR-1	10/13/2017	19.9	596	716	0.201	6.83	1230	3470
BBS-CCR-2	10/13/2017	0.888	169	70.9	0.182	6.87	432	1030
BBS-CCR-3	10/13/2017	0.373	190	153	0.333	6.44	503	1310

TABLE 2 - DETECTION MONITORING RESULTS, TEC BIG BEND STATION ECONOMIZER ASH AND PYRITE POND SYSTEM, APOLLO BEACH, FL

Notes:

- Bold, highlighted text indicates statistically significant increase above background concentration values.

< - concentration not detected at or above the adjusted reporting limit.

mg/L - milligrams per liter

#

STD - standard units

APPENDIX B

EPA530-R-93-017 SUBPART E SECTION 5.10

Individual Well Comparisons

When only two wells (e.g., a single background and a single compliance point well) are being compared, owners or operators should not perform the parametric or nonparametric ANOVA. Instead. a parametric t-test, such as Cochran's Approximation to the Behrens-Fisher Students' t-test, or a nonparametric test should be performed. When a single compliance well group is being compared to background data and a nonparametric test is needed, the Wilcoxin Rank-Sum test should be performed. These tests are discussed in more detail in standard statistical references and in USEPA (1992b).

Intra-Well Comparisons

Intra-well comparisons, where data of one well are evaluated over time, are useful in evaluating trends in individual wells and for identifying seasonal effects in the data. The intra-well comparison methods do not compare background data to compliance data. Where some existing facilities may not have valid background data, however, intra-well comparisons may represent the only valid comparison available. In the absence of a true background well, several monitoring events may be required to determine trends and seasonal fluctuations in ground-water quality.

Control charts may be used for intra-well comparisons but are only appropriate for uncontaminated wells. If a well is intercepting a release, then it is already in an "out-of-control" state, which violates the principal assumption underlying control chart procedures. Time series analysis (i.e., plotting concentrations over time) is extremely useful for identifying trends in monitoring data. Such data may be adjusted for seasonal effects to aid in assessing the degree of change over time. Guidance for and limitations of intra-well comparison techniques are provided in USEPA (1989) and USEPA (1992b).

Treatment of Non-Detects

The treatment of data below the detection limit of the analytical method (non-detects) used depends on the number or percentage of non-detects and the statistical method employed. Guidance on how to treat nondetects is provided in USEPA (1992b).

5.10 DETECTION MONITORING PROGRAM 40 CFR §258.54

5.10.1 Statement of Regulation

(a) Detection monitoring is required at MSWLF units at all ground-water monitoring wells defined under §§258.51(a)(1) and (a)(2) of this part. At a minimum, a detection monitoring program must include the monitoring for the constituents listed in Appendix I of this part.

- 1) The Director of an approved State may delete any of the Appendix I monitoring parameters for a MSWLF unit if it can be shown that the removed constituents are not reasonably expected to be in or derived from the waste contained in the unit.
- 2) The Director of an approved State may establish an alternative list of inorganic indicator parameters for a MSWLF unit, in lieu of some or all of

the heavy metals (constituents 1-15 in Appendix I), if the alternative parameters provide a reliable indication of inorganic releases from the MSWLF unit to the ground water. determining alternative In the parameters. Director shall consider the following factors:

- (i) The types, quantities, and concentrations of constituents in wastes managed at the MSWLF unit;
- (ii) The mobility, stability, and persistence of waste constituents or their reaction products in the unsaturated zone beneath the MSWLF unit;
- (iii) The detectability of indicator parameters, waste constituents, and reaction products in the ground water; and
- (iv) The concentration or values and coefficients of variation of monitoring parameters or constituents in the background ground-water.

(b) The monitoring frequency for all constituents listed in Appendix I, or the alternative list approved in accordance with paragraph (a)(2), shall be at least semiannual during the active life of the facility (including closure) and the postclosure period. A minimum of four independent samples from each well (background and downgradient) must be collected and analyzed for the Appendix I constituents, or the alternative list approved in accordance with paragraph (a)(2), during the first semiannual sampling event. At least one sample from each well(background and downgradient)

must be collected and analyzed during subsequent semiannual sampling events. The Director of an approved State may specify an appropriate alternative frequency for repeated sampling and analysis for Appendix I constituents, or the alternative list approved in accordance with paragraph (a)(2), during the active life (including closure) and the post-closure care period. The alternative during frequency the active life (including closure) shall be no less than annual. The alternative frequency shall be based on consideration of the following factors:

- 1) Lithology of the aquifer and unsaturated zone;
- 2) Hydraulic conductivity of the aquifer and unsaturated zone;
- 3) Ground-water flow rates;
- 4) Minimum distance between upgradient edge of the MSWLF unit and downgradient monitoring well screen (minimum distance of travel); and
- 5) Resource value of the aquifer.

(c) If the owner or operator determines, pursuant to \$258.53(g) of this part, that there is a statistically significant increase over background for one or more of the constituents listed in Appendix I or the alternative list approved in accordance with paragraph (a)(2), at any monitoring well at the boundary specified under \$258.51(a)(2), the owner or operator:

(1) Must, within 14 days of this finding, place a notice in the operating record indicating which constituents have shown statistically significant changes from background levels, and notify the State Director that this notice was placed in the operating record; and

(2) Must establish an assessment monitoring program meeting the requirements of §258.55 of this part within 90 days, except as provided for in paragraph (3) below.

(3) The owner/operator may demonstrate that a source other than a MSWLF unit caused the contamination or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in ground-water quality. A report documenting this demonstration must be certified by a qualified groundwater scientist or approved by the Director of an approved State and be placed in the operating record. If a successful demonstration is made and documented, the owner or operator may detection monitoring continue as specified in this section. If after 90 days, a successful demonstration is not made, the owner or operator must initiate an assessment monitoring program as required in §258.55.

5.10.2 Applicability

Except for the small landfill exemption and the no migration demonstration, detection monitoring is required at existing MSWLF units, lateral expansions of units, and new MSWLF units. Monitoring must occur at least semiannually at both background wells and downgradient well locations. The Director of an approved State may specify sampling alternative frequency. an Monitoring parameters must include all Appendix Ι constituents unless an alternative

list has been established by the Director of an approved State.

During the first semiannual monitoring event, the owner or operator must collect at least four independent ground-water samples from each well and analyze the samples for all constituents in the Appendix I or alternative list. Each subsequent semiannual event must include, at a minimum, the collection and analysis of one sample from all wells. The monitoring requirement continues throughout the active life of the landfill and the post-closure care period.

If an owner or operator determines that a statistically significant increase over background has occurred for one or more Appendix I constituents (or constituents on an alternative list), a notice must be placed in the facility operating record (see Table 5-2). The owner or operator must notify the State Director within 14 days of the finding. Within 90 days, the owner or operator must establish an assessment monitoring program conforming to the requirements of §258.55.

If evidence exists that a statistically significant increase is due to factors unrelated to the unit, the owner or operator may make a demonstration to this effect to the Director of an approved State or place a certified demonstration in the operating record. The potential reasons for an apparent statistical increase may include:

- A contaminant source other than the landfill unit
- A natural variation in ground-water quality
- An analytical error

- A statistical error
- A sampling error.

The demonstration that one of these reasons is responsible for the statistically significant increase over background must be certified by a qualified ground-water scientist or approved by the Director of an approved State. If a successful demonstration is made and documented, the owner or operator may continue detection monitoring.

If a successful demonstration is not made within 90 days, the owner or operator must initiate an assessment monitoring program. A flow chart for a detection monitoring program in a State whose program has not been approved by EPA is provided in Figure 5-5.

5.10.3 Technical Considerations

If there is a statistically significant increase background over during detection monitoring for one or more constituents listed in Appendix I of Part 258 (or an alternative list of parameters in an approved State), the owner or operator is required to begin assessment monitoring. The requirement to conduct assessment monitoring will not change, even if the Director of an approved State allows the monitoring of geochemical parameters in lieu of some or all of the metals listed in Appendix I. If an owner or operator suspects that a statistically significant increase in a geochemical parameter is caused by natural variation in ground-water quality or a source other than a MSWLF unit. a demonstration to this effect must be documented in a report to avoid proceeding to assessment monitoring.

Independent Sampling for Background

The ground-water monitoring requirements specify that four independent samples be collected from each well to establish background during the first semiannual monitoring event. This is because almost all statistical procedures are based on the assumption that samples are independent of each other. In other words, independent samples more accurately reflect the true range of natural variability in the ground water, and statistical analyses based on independent samples are more accurate. Replicate samples, whether field replicates or lab splits, are not statistically independent measurements.

It may be necessary to gather the independent samples over a range of time sufficient to account for seasonal differences. If seasonal differences are not taken into account, the chance for false positives increases (monitoring results indicate a release, when a release has not occurred). The sampling interval chosen must ensure that sampling is being done on different volumes of ground water. To determine the appropriate interval between sample collection events that will ensure independence, the owner or operator can determine the site's effective porosity, hydraulic conductivity, and hydraulic gradient and use this information to calculate ground-water velocity (USEPA, 1989). Knowing the velocity of the ground water should enable an owner/operator to establish an interval that ensures the four samples are being collected from four different volumes of water. For additional information on establishing sampling interval, see Statistical Analysis of Groundwater Monitoring Data at RCRA

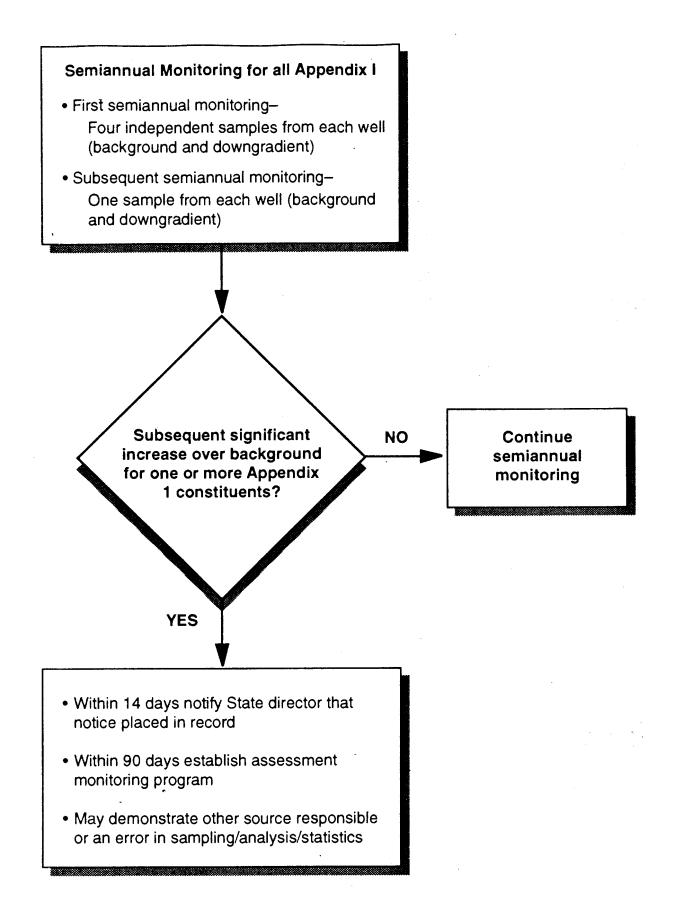


Figure 5-5. Detection Monitoring Program

Facilities - Interim Final Guidance, (USEPA, 1989).

Alternative List/Removal of Parameters

An alternative list of Appendix I constituents may be allowed by the Director of an approved State. The alternative list may use geochemical parameters, such as pH and specific conductance, in place of some or all of the metals (Parameters 1 through 15) in Appendix I. These alternative parameters must provide a reliable indication of inorganic releases from the MSWLF unit to ground water. The option of establishing an alternative list applies only to Parameters 1 through 15 of Appendix I. The list of ground-water monitoring parameters must include all of the volatile organic compounds (Appendix I, Parameters 16 through 62).

А potential problem in substituting geochemical parameters for metals on the alternative list is that many of the geochemical parameters are naturally occurring. However, these parameters have been used to indicate releases from MSWLF units. Using alternative geochemical parameters is reasonable in cases where natural background levels are not high enough to mask the detection of a release from a MSWLF unit. The decision to use alternative parameters also should consider natural spatial and temporal variability in the geochemical parameters.

The types, quantities, and concentrations of wastes managed at the MSWLF unit play an important role in determining whether removal of parameters from Appendix I is appropriate. If an owner or operator has definite knowledge of the nature of wastes accepted at the facility, then removal of constituents from Appendix I may be acceptable. Usually, a waste would have to be homogeneous to allow for this kind of determination. The owner or operator may submit a demonstration that documents the presence or absence of certain constituents in the waste. The owner or operator also would have to demonstrate that constituents proposed for deletion from Appendix I are not degradation or reaction products of constituents potentially present in the waste.

Alternative Frequency

In approved States, 40 CFR §258.54(b) allows the Director to specify an alternative frequency for ground-water monitoring. The alternative frequency is applicable during the active life, including the closure and the post-closure periods. The alternative frequency can be no less than annual.

The need to vary monitoring frequency must be evaluated on a site-specific basis. For example, for MSWLF units located in areas with low ground-water flow rates, it may be acceptable to monitor ground water less frequently. The sampling frequency chosen must be sufficient to protect human health and the environment. Depending on the ground-water flow rate and the resource value of the aquifer, less frequent monitoring may be allowable or more frequent monitoring may be necessary. An approved State may specify an alternative frequency for repeated sampling and analysis of Appendix I constituents based on the following factors:

1) Lithology of the aquifer and the unsaturated zone

- 2) Hydraulic conductivity of the aquifer and the unsaturated zone
- 3) Ground-water flow rates
- 4) Minimum distance between the upgradient edge of the MSWLF unit and the downgradient well screen
- 5) The resource value of the aquifer.

Approved States also can set alternative frequencies for monitoring during the postclosure care period based on the same factors.

Notification

The notification requirement under 40 CFR §258.54(c) requires an owner or operator to 1) place a notice in the operating record that indicates which constituents have shown statistically significant increases and 2) notify the State Director that the notice was placed in the operating record. The constituents can be from either Appendix I or from an alternative list.

Demonstrations of Other Reasons For Statistical Increase

An owner or operator is allowed 90 days to demonstrate that the statistically significant increase of a contaminant/constituent was caused by statistical, sampling, or analytical errors or by a source other than the landfill unit. The demonstration allowed in \$258.54(c)(3) may include:

1) A demonstration that the increase resulted from another contaminant source

- 2) A comprehensive audit of sampling, laboratory, and data evaluation procedures
- 3) Resampling and analysis to verify the presence and concentration of the constituents for which the increase was reported.

A demonstration that the increase in constituent concentration is the result of a source other than the MSWLF unit should document that:

- An alternative source exists.
- Hydraulic connection exists between the alternative source and the well with the significant increase.
- Constituent(s) (or precursor constituents) are present at the alternative source or along the flow path from the alternative source prior to possible release from the MSWLF unit.
- The relative concentration and distribution of constituents in the zone of contamination are more strongly linked to the alternative source than to the MSWLF unit when the fate and transport characteristics of the constituents are considered.
- The concentration observed in ground water could not have resulted from the MSWLF unit given the waste constituents and concentrations in the MSWLF unit leachate and wastes, and site hydrogeologic conditions.
- The data supporting conclusions regarding the alternative source are historically consistent with hydrogeologic

conditions and findings of the monitoring program.

The demonstration must be documented, certified by a qualified ground-water scientist, and placed in the operating record of the facility.

Demonstrations of Other Sources of Error

A successful demonstration that the statistically significant change is the result of an error in sampling, analysis, or data evaluation may include the following:

- Clear indication of a transcription or calculation error
- Clear indication of a systematic error in analysis or data reduction
- Resampling, analysis, and evaluation of results
- Corrective measures to prevent the recurrence of the error and incorporation of these measures into the ground-water monitoring program.

If resampling is necessary, the sample(s) taken must be independent of the previous sample. More than one sample may be required to substantiate the contention that the original sample was not representative of the ground-water quality in the affected well(s).

5.11 ASSESSMENT MONITORING PROGRAM 40 CFR §258.55(a)-(f)

5.11.1 Statement of Regulation

(a) Assessment monitoring is required whenever a statistically significant increase over background has been detected for one or more of the constituents listed in Appendix I or in the alternate list approved in accordance with § 258.54(a)(2).

(b) Within 90 days of triggering an assessment monitoring program, and annually thereafter, the owner or operator must sample and analyze the ground water for all constituents identified in Appendix II of this part. A minimum of one sample from each downgradient well must be collected and analyzed during each sampling event. For any new constituent detected in the downgradient wells as a result of the complete Appendix II analysis, a minimum of four independent samples from each well (background and downgradient) must be collected and analyzed to establish background for the new constituents. The Director of an approved State may specify an appropriate subset of wells to be sampled and analyzed for Appendix Π constituents during assessment monitoring. The Director of an approved State may delete any of the Appendix II monitoring parameters for a MSWLF unit if it can be shown that the removed constituents are not reasonably expected to be contained in or derived from the waste contained in the unit.

APPENDIX C

GROUNDWATER SAMPLING AND CALIBRATION FORMS - OCTOBER 13, 2017

FACILITY NAME:		Big Be	end			SITE LOCATION:		Apollo E	Beach, FL.		
WELL NO:	BI	BS-CCR-1			SAMPLE ID:	L17.J1	15-01 A	-	DATE:	10/13/17	
					PURGI						
WELL DIAMETER (inches		TUBING DIAMETER (inc	hes) 1/4	WELL SCRI DEPTH 12.32	EEN INTERV. feet to		STATIC DEP TO WATER (TH feet): 7.32	PURGE PUMP T' OR BAILER:	^{YPE} PP	
WELL VOLUME PURGE (only fillout if applicable)		1 WELL VOLU		LL DEPTH - STATIC DE		R) X WELL CAPACI			•		
		1 501			feet -		feet) x	TH) + FLOW CEL	gallons/foot	=	gallons
(only fillout if applica		TEQU			,			,			
	TUDINO		=(0	gallons + (0.0026 gallo	ns/foot X	23.3 feet) +	0.06	gallons =	0.12 gallons
INITIAL PUMP OR DEPTH IN WELL (f		CUMUL.	FINAL PUMP DEPTH IN WI		32	PURGING INITIATED AT:	1	PURGING ENDED AT: DISSOLVED	11:32	TOTAL VOLUN PURGED (gallo	//⊑ ^{ons):} 1.5′
TIME	VOLUME PURGED (GALLONS)	VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	OXYGEN (circle mg/lor % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
11:28	1.10	1.10	0.10	7.41	6.83	26.47	4268	0.20	1.86	Clear	None
11:30	0.21	1.31	0.11	7.40	6.83	26.53	4261	0.24	0.97	Clear	None
11:32	0.20	1.51	0.10	7.41	6.83	26.57	4258	0.24	0.89	Clear	None
WELL CAPACITY (Ga TUBING INSIDE DIA.	,		1" = 0.04; 1 3/16" = 0.0014;	.25" = 0.06; 2" = 1/4" = 0.0026;	0.16; 3" = 5/16" = 0.004;	0.37; 4 " = 0.6 3/8 " = 0.006;	5; 5" = 1 1/2" = 0.0		12" = 5.88		
	CALINE (Gal./FL		3/10 - 0.0014;	1/ ₩ = 0.0020,			1/2 - 0.0	io, 3/0 = 0	.010		
SAMPLED BY (PR	INT) / AFFILIATIO		TECO	SAMPLER (S) SIG	SNATURES:			SAMPLING INITIATED AT:	11:32	SAMPLING ENDED AT: 1	1:50
PUMP OR TUBING DEPTH IN WELL (f	i		00	SAMPLE PUMP FLOW RATE (mL	per minute):	2	383	TUBING MATERIAL CODE:		•	
FIELD DECONTAN	,	N 7		FIELD-FILTERED Filtration Equipme			R SIZE:	1	DUPLICATE:	Y 🔲 N 🔽	1
	SAMPLE CON	TAINER		r intauon Equipme	SAMPLE PRE			INTEN	l		MPLING
	SPECIFICA #	TION MATERIAL		PRESERVATIVE		AL VOL.	FINAL	ANALYSIS	S AND/OR	EQU	JIPMENT
SAMPLE ID CODE	CONTAINERS	CODE	VOLUME	USED		FIELD (ml) (1)	pН	MET	нор		CODE
@Ino-500	1	PE	500ml	NONE	N	ONE	N/A	Inorg	anics		PP
@Met-250	2	PE	250ml	HNO3		1ml	<2	Me	tals		PP
@Rad-1L	2	PE	230m 1L	HNO3		5ml	<2	Radiol			PP
@r.du-IL			í L				~2	Rauloi			<u> </u>
REMARKS: (1) Sample bot	ttles nre-proc	erved at lab	oratory prio	r to sample co	llection						
MATERIAL CODES:	·			PE = Polyethylene;		propylene; S =	Silicone; T	= Teflon; 0 = Oth	er (Specify)		
SAMPLING/PURGIN	IG A	APP = After Perist	altic Pump; B	= Bailer; BP = Blad	der Pump; ES	P = Electric Subm	irsable Pump;	PP = Peristaltic Pum	p		
EQUIPMENT CODE				• •	, ,			rap; 0 = Other (Spe	cify)		
NOTES:				nformation requie							

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212. SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or 10% (whichever is greater)

SITE NAME:		Big Be	end			SITE LOCATION:		Apollo	Beach, FL.		
WELL NO:	В	BS-CCR-2			SAMPLE ID:	L17J1	15-02 A		DATE:	10/13/17	
						NG DATA					
WELL DIAMETER (inches		TUBING DIAMETER (inc	ches) 1/4	WELL SCREEN IN DEPTH 11.84	ITERVAL feet to	21.84 (feet)	STATIC DEPTH TO WATER (feel	^{t):} 6.88	PURGE PUMP T OR BAILER:	PP PP	
WELL VOLUME PU (only fillout if application)		1 WELL VO	LUME = (TOT) = (AL WELL DEPTH -	STATIC DEP feet -	TH TO WATER)	X WELL CA	PACITY	gallons/fool	=	gallons
EQUIPMENT VOLU (only fillout if application)	UME PURGE: able)	1 EQU		. = PUMP VOLUM			UBING LENG				
INITIAL PUMP OR DEPTH IN WELL (f			=(FINAL PUMP DEPTH IN W		gallons + (0.0026 gallo PURGING INITIATED AT:	ons/foot X	22.84 feet PURGING ENDED AT:	,	gallons = TOTAL VOLUM PURGED (gallo	0.12 gallons IE ons): 1.20
TIME	VOLUME PURGED (GALLONS)	CUMUL. VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circle(ng/l))r % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
10:56	0.80	0.80	0.10	6.94	6.87	26.44	1348	0.19	3.18	Lt. Yellow	None
10:58	0.20	1.00	0.10	6.94	6.86	26.45	1350	0.16	2.80	Lt. Yellow	None
11:00	0.20	1.20	0.10	6.95	6.87	26.46	1350	0.20	3.03	Lt. Yellow	None
WELL CAPACITY (Ga	allons Per Foot): 0	.75" = 0.02;	1" = 0.04; 1	1.25" = 0.06; 2" =	0.16; 3" =	0.37; 4" = 0.6	65; 5" = 1	.02; 6" = 1.47;	12" = 5.88		
TUBING INSIDE DIA.	CAPACITY (Gal./Ft.): 1/8 " = 0.00006;	3/16" = 0.0014;	1/4" = 0.0026;	5/16" = 0.004;	3/8" = 0.006; ING DATA	1/2" = 0.01	10; 5/8 " = (0.016		
SAMPLED BY (PR	INT) / AFFILIATIO	ON:		SAMPLER (S) SIG				SAMPLING INITIATED AT:		SAMPLING ENDED AT:	
	RAB		TECO						11:00		11:10
PUMP OR TUBING DEPTH IN WELL (f	eet): 16.8			SAMPLE PUMP FLOW RATE (mL			380	TUBING MATERIAL CODE	E PE	/S	
FIELD DECONTAN		″ 🔲 N 🔽		FIELD-FILTERED Filtration Equipme	nt Type	N 🗹 FILTE	ER SIZE:	μm	DUPLICATE:	Y 🔲 N 🗹	•
	SAMPLE CON SPECIFICA	TION			SAMPLE PRE				NDED S AND/OR		MPLING IIPMENT
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	-	AL VOL. I FIELD (ml) ₍₁₎	FINAL pH		HOD		CODE
@Ino-500	1	PE	500ml	NONE	N	ONE	N/A	Inorg	janics		PP
@Met-250	2	PE	250ml	HNO3		1ml	<2	Me	tals		PP
@Rad-1L	2	PE	1L	HNO3	:	5ml	<2	Radio	ogicals		PP
			<u> </u>	1							
REMARKS:		arvad at lab	oratory prio	or to sample co	llection.						
(1) Sample bot						Data i		···· · · · ·	a and <i>i</i> a		
	S: AG = Ambe	r Glass; CG	i = Clear Glass	; PE = Polyeth = Bailer; BP = Blad Pump; SM = Straw	der Pump; ES	= Polypropylene P = Electric Submit Gravity Drain);	irsable Pump;	PP = Peristaltic Pun	ייי. וף	cify)	

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2);

SITE NAME:		Big Be	end			SITE LOCATION:		Apollo I	Beach, FL.		
WELL NO:	В	BS-CCR-3			SAMPLE ID:	L17J1	15-03 A	-	DATE:	10/13/17	
					PURGI	NG DATA			1		
WELL DIAMETER (inches	5)	TUBING DIAMETER (inc		WELL SCREEN IN DEPTH 13.23	ITERVAL feet to	23.23 (feet)	STATIC DEP TO WATER (2TH (feet): 6.52	PURGE PUMP TY OR BAILER:	^{(PE} PP	
WELL VOLUME PU (only fillout if applic	URGE: able)	1 WELL VO	LUME = (TOT/ = (AL WELL DEPTH -	STATIC DEP feet -	TH TO WATER)	X WELL CA		gallons/foo	t =	gallons
EQUIPMENT VOLU		1 EQL		. = PUMP VOLUM		CAPACITY X T		TH) + FLOW CEL			guiono
(only fillout if applic	able)		=(0	gallons + (0.0026 gallo	ons/foot X	24.23 fee	et)+ 0.06	gallons =	0.12 gallons
INITIAL PUMP OR DEPTH IN WELL (f	TUBING ^{(eet):} 18.23		FINAL PUMP DEPTH IN WI	OR TUBING ELL (feet): 18	.23	PURGING INITIATED AT:		PURGING ENDED AT:	,	TOTAL VOLUN PURGED (gallo	/F
TIME	VOLUME PURGED (GALLONS)	CUMUL. VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circlemg/lor % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
10:22	0.43	0.43	0.05	6.72	6.47	27.31	1785	0.36	1.59	Yellow	Mild
10:24	0.10	0.53	0.05	6.72	6.45	27.20	1763	0.50	1.13	Yellow	Mild
10:24	0.10	0.63	0.05	6.71	6.44	27.18	1747	0.37	2.39	Yellow	Mild
WELL CAPACITY (Ga	allons Per Foot):	0.75" = 0.02;	1 " = 0.04; 1	.25 " = 0.06; 2 " =	0.16; 3" =	0.37: 4" = 0.6	65; 5" = 1	1.02; 6" = 1.47;	12" = 5.88		
TUBING INSIDE DIA.	,		3/16" = 0.0014;		5/16" = 0.004;	3/8" = 0.006;	1/2" = 0.0				
SAMPLED BY (PR	INT) / AFFILIATI	ON:		SAMPLER (S) SIG	-	NG DATA		SAMPLING		SAMPLING ENDED AT:	
,	RAE	3	TECO					INITIATED AT: 10	:26		0:42
PUMP OR TUBING DEPTH IN WELL (f	; eet): 18.2)		SAMPLE PUMP FLOW RATE (mL	per minute):		187	TUBING MATERIAL CODE	: PE	/S	
FIELD DECONTAN	, -	Y 🔲 N 🗹		FIELD-FILTERED Filtration Equipme			ER SIZE:	μm	DUPLICATE:	Y 🔲 N 🕨	2
	SAMPLE CON			r in a doir E daibine	SAMPLE PRE	SERVATION		INTE	NDED	SAI	MPLING
	SPECIFICA #	MATERIAL	VOLUME	PRESERVATIVE		AL VOL.	FINAL	ANALYSIS MET	S AND/OR HOD		IIPMENT CODE
SAMPLE ID CODE	CONTAINERS	CODE	, or other	USED	ADDED IN	FIELD (ml) ₍₁₎	рН		-		
@Ino-500	1	PE	500ml	NONE	N	ONE	N/A	Inorg	anics		PP
@Met-250	2	PE	250ml	HNO3		1ml	<2	Me	tals		PP
@Rad-1L	2	PE	1L	HNO3		5ml	<2	Radiol	ogicals		PP
REMARKS:	1	1	1	I	I		1	1		1	
(1) Sample bo	ttles pre-pres	erved at lab	oratory prio	r to sample co	llection.						
MATERIAL CODES	S: AG = Ambe	er Glass; CG	= Clear Glass;	PE = Polyeth	ylene; PP	= Polypropylene	; S = Silico	one; T = Teflon;	O= Other (Spe	cify)	
SAMPLING/PURGIN	IG / S: I	APP = After Perist RFPP = Reverse F	altic Pump; B	= Bailer; BP = Blad Pump; SM = Straw	der Pump; ES Method (tubing	P = Electric Subm Gravity Drain);	irsable Pump; /T = Vacuum T	PP = Peristaltic Pum rap; O = Other (Spe	ip ecify)		
NOTES:	1 The shows of	lo not constitu	to all of the in	nformation requi	ord by Chan	or 62 160 E A	<u> </u>				

NOTES: 1. The above do not constitute all of the information requierd by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212. SECTION 3)

 $\textbf{pH:} \pm 0.2 \text{ units } \textbf{Temperature:} \pm 0.2 \text{ °C } \textbf{Specific Conductance:} \pm 5\% \textbf{ Dissolved Oxygen:} all readings \leq 20\% \text{ saturation (see Table FS 2200-2);} \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation} (see Table FS 2200-2); \textbf{readings} = 20\% \text{ saturation}$

SITE NAME:		Big Be	end			SITE LOCATION:		Apollo	Beach, FL.		
WELL NO:	BBS	-CCR-BW	/-1		SAMPLE ID:	L17J1	15-04 A		DATE:	10/13/17	
						NG DATA					
WELL DIAMETER (inches	5)	TUBING DIAMETER (inc	, ., .	WELL SCREEN IN DEPTH 34.30	feet to			TH feet): 29.60	PURGE PUMP T' OR BAILER:	ESP	
(only fillout if applic		1 WELL VO	LUME = (TOT) = (AL WELL DEPTH -	STATIC DEP feet -	TH TO WATER)	X WELL CA	PACITY	gallons/foo	vt =	gallons
EQUIPMENT VOLI (only fillout if applic	UME PURGE: able)	1 EQU	JIPMENT VOL	. = PUMP VOLUMI 0	E + (TUBING gallons + (CAPACITY X T 0.0026 gallo		TH)+ FLOW CEI 100 fee	LL VOLUME et) + 0.06	gallons =	0.32 gallons
INITIAL PUMP OR DEPTH IN WELL (1			FINAL PUMP DEPTH IN W	OR TUBING ELL (feet): 39	.30	PURGING INITIATED AT:		PURGING ENDED AT:	10:01	TOTAL VOLUN	ЛЕ
TIME	VOLUME PURGED (GALLONS)	VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	DEPTH TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	DISSOLVED OXYGEN (circlemg/lor % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
9:57	5.49	5.49	0.69	30.43	6.55	27.81	4384	0.87	7.30	Clear	None
9:59	1.37	6.86	0.69	30.42	6.55	27.81	4499	0.57	4.40	Clear	None
10:01	1.37	8.23	0.69	30.41	6.55	27.86	4570	0.40	2.51	Clear	None
WELL CAPACITY (TUBING INSIDE DIA	,	0.75" = 0.02; /Ft.): 1/8" = 0.00	1 " = 0.0 006; 3/16 " =	1.25" = 0.0 = 0.0014; 1/4" =	0.0026;	0.16; 3" = 0.3 5/16" = 0.004; NG DATA	3/8 " = 0.006	6; 1/2" = 0.0	1.02; 6" = 1 10; 5/8	" = 0.016	= 5.88
SAMPLED BY (PR	,			SAMPLER (S) SIG	SNATURES:			SAMPLING INITIATED AT:		SAMPLING ENDED AT:	
PUMP OR TUBING DEPTH IN WELL (1	RAB		TECO	SAMPLE PUMP FLOW RATE (mL				1U TUBING MATERIAL CODE	:01		0:04
DEPTH IN WELL (1				FLOW RATE (mL FIELD-FILTERED Filtration Equipme			R SIZE:	MATERIAL CODE	DUPLICATE:	= Y 🗖 N 🖥	7
	SAMPLE CON	TAINER		Filtration Equipme	nt Type. SAMPLE PRE			INTE	NDED		
SAMPLE ID CODE	SPECIFICA # CONTAINERS	TION MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOT	AL VOL. FIELD (ml) (1)	FINAL pH	ANALYSI	S AND/OR HOD	EQU	JIPMENT CODE
@Ino-500	1	PE	500ml	NONE	N	ONE	N/A	Inorg	anics	I	ESP
@Met-250	2	PE	250ml	HNO3		1ml	<2	Ma	tals		ESP
@Rad-1L	2	PE	1L	HNO3		5ml	<2		ogicals		ESP
REMARKS: (1) Sample bo	ttles pre-pres	erved at lab		r to sample co			<u> </u>	<u> </u>		<u> </u>	
MATERIAL CODE			= Clear Glass	•		= Polypropylene	; S = Silico	one; T = Teflon;	O= Other (Spe	cify)	
								PP = Peristaltic Pur			
SAMPLING/PURGIN EQUIPMENT CODE	IG A S: R	FPP = After Perist FPP = Reverse F	low Peristaltic	= Baller; BP = Blad Pump; SM = Straw	Method (tubing	Gravity Drain); N	/T = Vacuum T	rap; 0 = Other (Spe	ecify)		

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2);

SITE NAME:		Big Be	end			SITE LOCATION:		Apollo I	Beach, FL.		
WELL NO:	BBS	S-CCR-BW	-2		SAMPLE ID:	L17J1	15-05 A		DATE:	10/13/17	
					PURGI	NG DATA					
WELL DIAMETER (inches		TUBING DIAMETER (inc	hes) 1/4	WELL SCREEN IN DEPTH 13.64	ITERVAL feet to	23.34 (feet)	STATIC DEP TO WATER (TH feet): 7.38	PURGE PUMP T OR BAILER:	^{YPE} PP	
WELL VOLUME P (only fillout if applic		1 WELL VO	L UME = (TOTA = (AL WELL DEPTH -	STATIC DEP feet -	TH TO WATER)	X WELL CA	PACITY	gallons/foo	st =	gallons
EQUIPMENT VOL (only fillout if applic	UME PURGE: able)	1 EQU			E + (TUBING		UBING LENG	TH)+ FLOW CEI	LL VOLUME		
INITIAL PUMP OR	TUBING		=(FINAL PUMP	0 OR TUBING		0.0026 gallo PURGING		24.64 fee PURGING			0.12 gallons /E
DEPTH IN WELL (1		COMOL.	DEPTH IN WI	ELL (feet): 18. DEPTH	49	INITIATED AT:	9:15	ENDED AT: DISSOLVED	9:32	PURGED (gallo	ons): 2.27
TIME	VOLUME PURGED (GALLONS)	VOLUME PURGED (GALLONS)	PURGE RATE (GPM)	TO WATER (FEET)	pH (standard units)	TEMP. (°C)	COND. (µmhos/cm OR µS/cm)	OXYGEN (circle mg/l)r % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
9:28	1.75	1.75	0.13	7.61	6.68	27.92	1706	0.39	4.98	Lt. Yellow	None
9:30	0.26	2.01	0.13	7.62	6.69	27.95	1702	0.31	6.12	Lt. Yellow	None
9:32	0.26	2.27	0.13	7.62	6.70	27.98	1699	0.28	3.96	Lt. Yellow	None
WELL CAPACITY (Collops Por Foot):	0.75" = 0.02:	1" = 0.0	4; 1.25" = 0.0	06: 2 " = 0	.16: 3" = 0.3	27. 4"	= 0.65: 5 " =	: 1.02; 6" = 1	47· 1 2" -	- 5.88
TUBING INSIDE DIA	,			= 0.0014; 1/4 " = 0	0.0026;	5/16" = 0.004;	3/8 " = 0.006	,		" = 0.016	- 5.66
SAMPLED BY (PR	INT) / AFFILIATIO	ON:		SAMPLER (S) SIG	-			SAMPLING INITIATED AT:		SAMPLING ENDED AT:	
	RAB	6	TECO					9:	32		9:40
PUMP OR TUBING DEPTH IN WELL (1	ieet): 18.5			SAMPLE PUMP FLOW RATE (mL		CU T	03 R SIZE:	TUBING MATERIAL CODE	E PE	/S	
FIELD DECONTAN	INATION:			FIELD-FILTERED Filtration Equipme	nt Type		R SIZE.	μm	DUPLICATE:	Y 🗖 N 🖸	2
	SAMPLE CON SPECIFICA	TION	1		SAMPLE PRE		FILM		NDED S AND/OR		MPLING IIPMENT
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	-	AL VOL. FIELD (ml) ₍₁₎	FINAL pH		HOD		CODE
@lpa 500	1	PE	500ml	NONE	N	ONE	N/A	Inora	Inning		PP
@Ino-500	1	PE	500mi	NONE	IN	ONE	N/A	morg	anics		FF
@Met-250	2	PE	250ml	HNO3		1ml	<2	Me	tals		PP
@Rad-1L	2	PE	1L	HNO3		5ml	<2		ogicals		PP
						-			5		
REMARKS: (1) Sample bo	ttles pre-pres	erved at lab	natory prio	r to sample co	llection		1	<u> </u>		1	
MATERIAL CODE			= Clear Glass;			= Polypropylene	; S = Silico	one; T = Teflon;	O= Other (Spe	cify)	
SAMPLING/PURGIN EQUIPMENT CODE	IG A S: F	APP = After Perist	altic Pump; B	= Bailer; BP = Blad Pump: SM = Straw	der Pump; ES Method (tubing	P = Electric Submi Gravity Drain): V	rsable Pump; /T = Vacuum T	PP = Peristaltic Purr rap; 0 = Other (Spe	np ecify)		
NOTES:				nformation requie					,,		
				RIATION OF LAST							

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2);

Site:	Big Be	nd	Date:	10/13/17	File Name:	101317_	Wells_RAB	Weather:	Partly Clou	ıdy & Warm	Sampler(s) / Initials	RAB /TEC	O Initials (RB
LIMS #	Loction Code	Time	FE ²	pH (SU)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor	1	IGVD
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	\$COLOR-W	\$ODOR-W	Time	LEVEL
L17J115-01 A	BBS-CCR-1	11:50		6.83	26.57	4258	0.24	0.89	-83.3		Clear	None		
L17J115-02 A	BBS-CCR-2	11:10		6.87	26.46	1350	0.20	3.03	-188.5		Lt. Yellow	None		
LIMS #	250ml Cyan (3)	1L Inorg (1)	500ml Inorg (2)	250ml Inorg (3)	1L Mtls (1)	250ml Mtls (3)	1L Rads (1)	500ml Sulfide (2)	500ml Mtls (2)	250ml Nuts (3)	40ml Vial (6)	500 ml Nuts (2)	1L Rads Diss. (1)	Total Containers
L17J115-01 A			1			✓ 2	✓ 2		a	a				10
L17J115-02 A			1			2	₽ 2							10
(1) 1L plastic (PP)		(2) 500ml plastic	c (PP)	(3) 250ml plastic	(PP)	(4) 100ml coliform be	ottle	(5) 1L amber glass (AG)	(6) 40ml VOA vial ((CG)		Samples On Ice	Sample Reciept
ESS	0107301Y	ESS	0218201Y	ESS	0307301Y	ESS		ESS		ESS			Yes 🗌 No	Time 14:18
F	Preservation			Pres ID		Preservation			Pres ID		Preservation		Pres ID	Temp 1.4 C
1L bottles (rads): 5 ml Hl	NO3 to pH <2			<u>L</u> 012558	250ml bottles (nut	s): 1 ml H2SO4 to pH	1 <2			500 ml bottles(Sulfi	de) 2ml NAOH/Zinc	Acet. to pH >12		
500 ml bottles (metals): 2	2 ml HNO3 to pH <2			L	40 ml Vial (TOC):	0.5 ml H2SO4 to pH	<2		L 🗆	250 ml bottles (Cya	n) 1g NAOH to pH >	12		
250 ml bottles (metal): 1	ml HNO3 to pH <2			L 012558	1L bottles (diss. ra	ads): filtered with 0.45	5um, 5 ml HNO3 to pH <2		L	A checked box ind	licates that the sam	ple was verified to	a pH of <2	
pH Meter Calibration		Buffer ID	Buffer Value	Cal	Time	ICV	Time	CCV	Time	Redox Cal	Time	Temp °C	Reading mv	Theo Value mv
Meter ID:	MPM08	L 019949D	7	7.01	7:02	7.03	7:06	7.11	14:29	Meter ID:	7:10	21.5	236.0	236.2
FDEP FT 1100		L 019074C	10	10.05	7:02					MPM08	14:33	21.1	233.5	236.2
Units: SU		L 019303D	4	4.00	7:02				·	Zobell Sol ID:				
Conductivity Meter Cal		Standard ID	Std Value	Cal	Time	ICV	Time	CCV	Time	L 019150B				
Meter ID:	MPM08	L 018805E	1000	1000	7:14					DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg/l
FDEP FT 1200, Units: uN	MHOS	L 019100B	10000			9830	7:18	9791	14:01	Meter ID:	6:54	21.4	8.90	8.863
Turbidity Meter Calibra	tion	Standard ID	Std Value	Acceptabi	lity Range	ICV	Time	CCV	Time	MPM08	14:42	20.8	8.97	8.950
Meter ID:	TM07	L 019883	5.56	5.00	6.12	5.60	6:43	5.61	13:59	Barom. Pres				
FDEP FT 1600, Units: N	TU	L 0								760				
Sulfite Info (QC Check)	(EPA 377.1)		QC Result mg/l	Time	Titrator ID	Na Thio ID	DO 3 Pillow ID	Starch Ind. ID	lodate/lodide ID	Therm ID	рН	Conduct.(%)	DO (mg/l)	Redox (mv)
QC Std: 5ml (NaThio)/50						L	L	L	L	MPM08	0.2	5	0.3	10
Purging Information		Well Capacities	s (gallons/ ft): 2"	" = 0.16 4" =0.65		Tubing Inside Diam	. Capacities Gallons/ft)	: 1/4" =0.0026, 3/8" =	0.006		-			
Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Well Depth (ft)	Depth to Water (ft)	= Water Column (ft)	Well Capacity (gal) =	1 Well Volume (gal)	Capacity X (gal/ft.)	Tubing Length (ft)	+ Volume (gal) +	Cell Volume (gal)	1 Eqpt. Volume (gal)	
BBS-CCR-1	2	10	17.32	22.32	7.32	15.00	0.16	2.40	0.0026	23.3	0	0.06	0.12	
Purge Meth:	Time	Rate (ml/min)	Volume (gal)	Total Vol. (gal)	Water Depth (ft)	pH (SU)	Temp ^o C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Eqpt. Table
1A	11:28	380	1.10	1.10	7.41	6.83	26.47	4268	0.20	1.86	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	11:30	390	0.21	1.31	7.40	6.83	26.53	4261	0.24	0.97	TempºC+/- 0.2	STABLE	Pump:	PP
11:17	11:32	380	0.20	1.51	7.41	6.83	26.57	4258	0.24	0.89	Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:											DO % Sat.< 20	STABLE	Dedicated	✓ Yes
11:32											Turb. NTU < 20	STABLE	Tubing?	□ No
Purge Complete A	11:18	Gallons to P	urge 0.12	Stablility	Values =	6.83	26.57	4258	0.24	0.89		•		
Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Well Depth (ft)	Depth to Water (ft)	Water Column x (ft)	Well Capacity (gal) =	1 Well Volume (gal)	Capacity X	Tubing Length) H	Pump Volume + (gal)	Cell Volume (gal) =	1 Eqpt. Volume (gal)	
BBS-CCR-2	2	10	16.84	21.84	6.88	14.96	0.16	2.39	0.0026	22.84	0	0.06	0.12	
Purge Meth:	Time	Rate (ml/min)	Volume (gal)	Total Vol. (gal)	Water Depth (ft)	pH (SU)	Temp °C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Egpt. Table
1A	10:56	380	0.80	0.80	6.94	6.87	26.44	1348	0.19	3.18	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	10:58	380	0.00	1.00	6.94	6.86	26.45	1350	0.19	2.80	0.2	STABLE	Pump:	PP
10:48	11:00	380	0.20	1.20	6.95	6.87	26.46	1350	0.10	3.03	Temp ^o C+/- 0.2 Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:	11.00	550	0.20	1.20	0.90	0.07	20.40	1300	0.20	0.00	DO % Sat.< 20	STABLE	Dedicated	✓ Yes
11:00											Turb. NTU < 20	STABLE	Tubing?	
Purge Complete At	10-40	Gallons to P	Purge 012	Stablijit.	Values =	6.87	26.46	1350	0.20	3.03		STABLE	rubing :	
Comments:	10.49		urge 0.12	Stability		0.07	20.40	1330	0.20	3.03				

	Big Be		Date: FE ²	10/13/17			Wells_RAB	Weather:		udy & Warm	Initials	RAB /TEC		
LIMS #	Loction Code	Time	-	pH (SU)	Temp °C TEMP-C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv) REDOX	Sulfite (mg/L)	Color	Odor	1	IGVD LEVEL
		40.40	mg/l	PH		COND-F	DO	TURB-N-F		SO3-TR	\$COLOR-W	\$ODOR-W	Time	LEVEL
L17J115-03 A	BBS-CCR-3 CCR-PZ-4	10:42		6.44	27.18	1747	0.37	2.39	-249.3		Yellow	Mild		
LIMS #		11 Inorg (1)	E00ml Inerg (2)	250ml Inerg (2)	11 Mile (1)	250ml Mtla (2)	11 Dada (1)	500ml Sulfide (2)	E00ml Mtla (2)	250ml Nute (2)	40ml \/ial (6)	500 ml Nute (2)	11 Dada Diaa (1)	Total Containers
-	250ml Cyan (3)	1L Inorg (1)	500ml Inorg (2)	250ml Inorg (3)	1L Mtls (1)	250ml Mtls (3)	1L Rads (1) 2	500ml Sulfide (2)	500ml Mtls (2)	250ml Nuts (3)	40ml Vial (6)	500 ml Nuts (2)	1L Rads Diss. (1)	
					<u> </u>					n				- 5
1) 1L plastic (PP)		(2) 500ml plas	tic (PP)	(3) 250ml plastic		(4) 100ml coliform b		(5) 1L amber glass (A	AG)	(6) 40ml VOA vial			Samples On Ice	Sample Reciept
ss	0107301Y	ESS	0218201Y	ESS	0307301Y	ESS		ESS	,	ESS	()		Yes No	Time 14:18
	Preservation	<u>.</u>		Pres ID		Preservation		<u>4</u>	Pres ID		Preservation		Pres ID	Temp 1.4
bottles (rads): 5 ml H				L 012558	250ml bottles (nu	ts): 1 ml H2SO4 to pH	H <2			500 ml bottles(Sulfi	ide) 2ml NAOH/Zinc	Acet. to pH >12		<u> </u>
00 ml bottles (metals):	•					: 0.5 ml H2SO4 to pH				,	an) 1g NAOH to pH >	•		
50 ml bottles (metal):	1 ml HNO3 to pH <2			L 012558	1L bottles (diss. r	ads): filtered with 0.45	5um, 5 ml HNO3 to pH <2			A checked box inc	dicates that the sam	ple was verified to	a pH of <2	
H Meter Calibration	·	Buffer ID	Buffer Value	Cal	Time	ICV	Time	CCV	Time	Redox Cal	Time	Temp ^o C	Reading mv	Theo Value mv
leter ID:	MPM08	L 019949		7	7:02	7.03	7:06	7.11	14:29	Meter ID:	7:10	21.5	236.0	236.2
DEP FT 1100		L 019074	c 10	10	7:02	QC: (pH +/- 0.2) (Co	ond +/- 5%) (DO +/- 0.3m			MPM08	14:33	21.1	233.5	236.2
Inits: SU		L 019303	D 4	4	7:02	A checked box indi	icates ICV / CCV passed		•	Zobell Sol ID:				
Conductivity Meter Ca	alib.	Standard ID	Std Value	Cal	Time	ICV	Time	CCV	Time	L 50B				
leter ID:	MPM08	L 018805	E 1000	1000	7:14					DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg/
DEP FT 1200, Units: u	IMHOS	L 019100	в 10000			9830	7:18	9791	14:01	Meter ID:	6:54	21.4	8.90	8.863
urbidity Meter Calibra	ation	Standard ID	Std Value	Acceptab	ility Range	ICV	Time	CCV	Time	MPM08	14:42	20.8	8.97	8.950
leter ID:	TM07	L 01988	³ 5.56	5.00	6.12	5.60	6:43	5.61	13:59	Barom. Pres				
DEP FT 1600, Units: N	UTU	L	0							760				
Sulfite Info (QC Check	(EPA 377.1)		QC Result mg/	I Time	Titrator ID	Na Thio ID	DO 3 Pillow ID	Starch Ind. ID	lodate/lodide ID	Therm ID	рН	Conduct.(%)	DO (mg/l)	Redox (mv)
QC Std: 5ml (NaThio)/5	00ml DI=10mg/L					L	L	L	L	MPM08	0.2	5	0.3	10
urging Information	1	Well Capaciti	es (gallons/ ft): 2	" = 0.16 4" =0.65		-	n. Capacities Gallons/ft)		0.006					T
				Well	Depth to	 Water 	Well	1 Well	T 111	Tubing	Dumm	Cell		
		Screen	Intake	Depth	Water	= Vvater Column	Capacity (gal) =		Capacity X	Tubing Length) -	Pump + Volume +	Volume	1 Eqpt. Volume	
Well #	Diam/ Comp	Interval (ft)	Depth (ft)	Depth (ft)	(ft)	Column >	T ·	Volume (gal)	(gal/ft.)	(ft) (ft)	+ Volume + (gal)	Volume (gal) =	= Volume (gal)	
BBS-CCR-3	Diam/ Comp 2			Depth (ft) 23.23	6.52	= Valer Column (ft) 16.71	0.16		(^{Tubing} Capacity (gal/ft.) X 0.0026	(ft)) -	+ Volume +	Volume	Volume	
BBS-CCR-3 Purge Meth:	2 Time	Interval (ft) 10 Rate (ml/min	Depth (ft) 18.23) Volume (gal)	Depth (ft) 23.23 Total Vol. (gal)	6.52 Water Depth (ft)	= <u>Column</u> (ft) 16.71 pH (SU)	0.16 Temp °C	Volume (gal) 2.67 Cond (uMHOS)	(gal/ft.) 0.0026 DO (mg/L)	(ft) (ft)	+ Volume (gal) + 0 Purge Criteria	Volume (gal) = 0.06 Status	= Volume (gal) 0.12 Equipment ID	Eqpt. Table
BBS-CCR-3	2 Time 10:22	Interval (ft) 10 Rate (ml/min 180	Depth (ft) 18.23) Volume (gal) 0.43	Depth (ft) 23.23 Total Vol. (gal) 0.43	6.52 Water Depth (ft) 6.72	- Column (ft) 16.71 pH (SU) 6.47	0.16 Temp °C 27.31	Volume (gal) 2.67 Cond (uMHOS) 1785	(gal/ft.) 0.0026 DO (mg/L) 0.36	Length (ft)) 24.23 Turbidity (NTU) 1.59	+ Volume (gal) + 0 Purge Criteria ph:+/- 0.2	Volume (gal) = 0.06 Status STABLE	0.12 Equipment ID Level Meter:	WLM08
BBS-CCR-3 Purge Meth: 1A Purge Start:	2 Time 10:22 10:24	Interval (ft) 10 Rate (ml/min 180 190	Depth (ft) 18.23 Volume (gal) 0.43 0.10	Depth (ft) 23.23 Total Vol. (gal) 0.43 0.53	6.52 Water Depth (ft) 6.72 6.72	- Column (ft) 16.71 pH (SU) 6.47 6.45	0.16 Temp °C 27.31 27.20	Volume (gal) 2.67 Cond (uMHOS) 1785 1763	(gal/ft.) 0.0026 DO (mg/L) 0.36 0.50	Length (ft) 24.23 Turbidity (NTU) 1.59 1.13	+ Volume + (gal) + 0 Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2	Volume (gal) = 0.06 Status STABLE STABLE	Colume (gal) 0.12 Equipment ID Level Meter: Pump:	WLM08 PP
BBS-CCR-3 Purge Meth: 1A urge Start: 10:13	2 Time 10:22	Interval (ft) 10 Rate (ml/min 180	Depth (ft) 18.23) Volume (gal) 0.43	Depth (ft) 23.23 Total Vol. (gal) 0.43	6.52 Water Depth (ft) 6.72	- Column (ft) 16.71 pH (SU) 6.47	0.16 Temp °C 27.31	Volume (gal) 2.67 Cond (uMHOS) 1785	(gal/ft.) 0.0026 DO (mg/L) 0.36	Length (ft)) 24.23 Turbidity (NTU) 1.59	+ Volume + (gal) + Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5	Volume (gal) = 0.06 Status STABLE STABLE STABLE	O.12 O.12 Equipment ID Level Meter: Pump: Tubing:	WLM08 PP PE/S
BBS-CCR-3 Purge Meth: 1A Purge Start: 10:13 Purge End:	2 Time 10:22 10:24	Interval (ft) 10 Rate (ml/min 180 190	Depth (ft) 18.23 Volume (gal) 0.43 0.10	Depth (ft) 23.23 Total Vol. (gal) 0.43 0.53	6.52 Water Depth (ft) 6.72 6.72	- Column (ft) 16.71 pH (SU) 6.47 6.45	0.16 Temp °C 27.31 27.20	Volume (gal) 2.67 Cond (uMHOS) 1785 1763	(gal/ft.) 0.0026 DO (mg/L) 0.36 0.50	Length (ft) 24.23 Turbidity (NTU) 1.59 1.13	Volume (gal) + 0 Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 DO % Sat. 20	Volume (gal) = 0.06 Status STABLE STABLE STABLE STABLE STABLE STABLE	Colume (gal) 0.12 Equipment ID Level Meter: Pump: Tubing: Dedicated	WLM08 PP PE/S Yes
BBS-CCR-3 Purge Meth: 1A ?urge Start: 10:13 ?urge End: 10:26	2 Time 10:22 10:24 10:26	Interval (ft) 10 Rate (ml/min 180 190 190	Depth (ft) 18.23 Volume (gal) 0.43 0.10 0.10	Depth (ft) 23.23 Total Vol. (gal) 0.43 0.53 0.63	6.52 Water Depth (ft) 6.72 6.72 6.71	- Column (ft) 16.71 pH (SU) 6.47 6.45 6.44	0.16 Temp °C 27.31 27.20 27.18	Volume (gal) 2.67 Cond (uMHOS) 1785 1763 1747	(gal/ft.) 0.0026 DO (mg/L) 0.36 0.50 0.37	Length) - 24.23 Turbidity (NTU) 1.59 1.13 2.39	+ Volume + (gal) + Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5	Volume (gal) = 0.06 Status STABLE STABLE STABLE	O.12 O.12 Equipment ID Level Meter: Pump: Tubing:	WLM08 PP PE/S
BBS-CCR-3 Purge Meth: 1A ?urge Start: 10:13 ?urge End: 10:26	2 Time 10:22 10:24 10:26	Interval (ft) 10 Rate (ml/min 180 190 190	Depth (ft) 18.23 Volume (gal) 0.43 0.10	Depth (ft) 23.23 Total Vol. (gal) 0.43 0.53 0.63 Stability	6.52 Water Depth (ft) 6.72 6.72 6.71 Values =	- Column (ft) 16.71 pH (SU) 6.47 6.45 6.44 	0.16 Temp °C 27.31 27.20 27.18 27.18	Volume (gal) 2.67 Cond (uMHOS) 1785 1763 1747 1747	(gal/ft.) 0.0026 DO (mg/L) 0.36 0.50 0.37 0.37	Length (ff)	Volume (gal) + 0 Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 DO % Sat. 20 Turb. NTU <	Volume (gal) = 0.06 Status STABLE STABLE STABLE STABLE STABLE STABLE STABLE STABLE	Volume (gal) 0.12 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing?	WLM08 PP PE/S Yes
BBS-CCR-3 Purge Meth: 1A ?urge Start: 10:13 ?urge End: 10:26	2 Time 10:22 10:24 10:26	Interval (ft) 10 Rate (ml/min 180 190 190	Depth (ft) 18.23 Volume (gal) 0.43 0.10 0.10	Depth (ft) 23.23 Total Vol. (gal) 0.43 0.53 0.63	6.52 Water Depth (ft) 6.72 6.72 6.71 Values =	- Column (ff) 16.71 pH (SU) 6.47 6.45 6.44 	0.16 Temp °C 27.31 27.20 27.18 27.18 27.18 Capacity (gal) =	Volume (gal) 2.67 Cond (uMHOS) 1785 1763 1747	(gal/ft.) 0.0026 DO (mg/L) 0.36 0.50 0.37	Length) - 24.23 Turbidity (NTU) 1.59 1.13 2.39 - 2.39 Tubing - Tubing Length (ft)) -	Volume (gal) + 0 Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 0.2 Cond % +/- 5 00 % Sat. 20 Turb. NTU <	Volume (gal) = 0.06 Status STABLE STABLE STABLE STABLE STABLE STABLE	Volume (gal) 0.12 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? 1 Eqpt. Volume (gal)	WLM08 PP PE/S Yes
BBS-CCR-3 Purge Meth: 1A urge Start: 10:13 urge End: 10:26 urge Complete A	2 Time 10:22 10:24 10:26 xt 10:16	Interval (ft) 10 Rate (ml/min 180 190 190 Gallons to Screen	Depth (ft) 18.23 Volume (gal) 0.43 0.10 0.10 Purge 0.12 Intake	Depth (ft) 23.23 Total Vol. (gal) 0.43 0.53 0.63 Stability Well	6.52 Water Depth (ft) 6.72 6.72 6.71 Values =	- Column (ft) 16.71 pH (SU) 6.47 6.45 6.44 	0.16 Temp °C 27.31 27.20 27.18 27.18 Capacity (gal) =	Volume (gal) 2.67 Cond (uMHOS) 1785 1763 1763 1747 1747 1747	(gal/ft.) 0.0026 D0 (mg/L) 0.36 0.50 0.37 0.37 (Tubing Capacity x	Length) - (ft) - 24.23 Turbidity (NTU) - 1.59 1.13 2.39 	Volume (gal) + 0 - Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 DO % Sat. 20 Turb. NTU <	Volume (gal) = 0.06 Status STABLE STABLE STABLE STABLE STABLE STABLE	Volume (gal) 0.12 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? 1 Eqpt. Volume	WLM08 PP PE/S Yes
BBS-CCR-3 Purge Meth: 1A urge Start: 10:13 urge End: 10:26 urge Complete A Well #	2 Time 10:22 10:24 10:26 Xt 10:16 Diam/ Comp	Interval (ft) 10 Rate (ml/min 180 190 190 Galions to Screen Interval (ft)	Depth (ft) 18.23 Volume (gal) 0.43 0.10 0.10 Purge 0.12 Intake Depth (ft) 14	Depth (ft) 23.23 Total Vol. (gal) 0.43 0.53 0.63 Stablility Well Depth (ft)	6.52 Water Depth (ft) 6.72 6.72 6.71 Values =	- Column (ff) 16.71 pH (SU) 6.47 6.45 6.44 	0.16 Temp °C 27.31 27.20 27.18 27.18 27.18 Capacity (gal) =	Volume (gal) 2.67 Cond (uMHOS) 1785 1763 1763 1747 1747 1747	(gal/ft.) 0.0026 D0 (mg/L) 0.36 0.50 0.37 0.37 (Tubing Capacity (gal/ft.) X	Length) - 24.23 Turbidity (NTU) 1.59 1.13 2.39 - 2.39 Tubing - Tubing Length (ft)) -	Volume (gal) + 0 - Purge Criteria - ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 DO % Sat. 20 Turb. NTU <	Volume (gal) = 0.06 Status STABLE STABLE STABLE STABLE STABLE Cell Volume (gal =	Volume (gal) 0.12 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? 1 Eqpt. Volume (gal)	WLM08 PP PE/S ✓ Yes No
BBS-CCR-3 Purge Meth: 1A urge Start: 10:13 urge End: 10:26 urge Complete A Well #	2 Time 10:22 10:24 10:26 tt 10:16 Diam/ Comp 2	Interval (ft) 10 Rate (ml/min 180 190 190 Gallons to Screen Interval (ft) 10	Depth (ft) 18.23 Volume (gal) 0.43 0.10 0.10 Purge 0.12 Intake Depth (ft) 14	Depth (ft) 23.23 Total Vol. (gal) 0.43 0.53 0.63 Stability Well Depth (ft) 18	6.52 Water Depth (ft) 6.72 6.72 6.71 Values = Depth to Water (ft)	- Column (ft) 16.71 pH (SU) 6.47 6.45 6.44 	0.16 Temp °C 27.31 27.20 27.18 27.18 Capacity (gal) =	Volume (gal) 2.67 Cond (uMHOS) 1785 1763 1763 1747 1747 1747 1747 2.88	(gal/ft.) 0.0026 DO (mg/L) 0.36 0.50 0.37 0.37 (Tubing Capacity (gal/ft.) 0.0026	Length) 24.23 Turbidity (NTU) 1.59 1.13 2.39 Tubing Length 100	Volume (gal) + 0 - Purge Criteria - ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 DO % Sat. 20 Turb. NTU <	Volume (gal) 0.06 Status STABLE STABLE STABLE STABLE STABLE STABLE STABLE Olume (gal) = 0.06	Volume (gal) Cont2 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? Contained Tubing? Dedicated Tubing? 0.12 Equipment ID Level Meter:	WLM08 PP PE/S Ves No Eqpt. Table WLM08
BBS-CCR-3 Purge Meth: 1A hurge Start: 10:13 hurge End: 10:26 hurge Complete A Well #	2 Time 10:22 10:24 10:26 tt 10:16 Diam/ Comp 2	Interval (ft) 10 Rate (ml/min 180 190 190 Gallons to Screen Interval (ft) 10	Depth (ft) 18.23 Volume (gal) 0.43 0.10 0.10 Purge 0.12 Intake Depth (ft) 14	Depth (ft) 23.23 Total Vol. (gal) 0.43 0.53 0.63 Stability Well Depth (ft) 18	6.52 Water Depth (ft) 6.72 6.72 6.71 Values = Depth to Water (ft)	- Column (ft) 16.71 pH (SU) 6.47 6.45 6.44 	0.16 Temp °C 27.31 27.20 27.18 27.18 Capacity (gal) =	Volume (gal) 2.67 Cond (uMHOS) 1785 1763 1763 1747 1747 1747 1747 2.88	(gal/ft.) 0.0026 DO (mg/L) 0.36 0.50 0.37 0.37 (Tubing Capacity (gal/ft.) 0.0026	Length) 24.23 Turbidity (NTU) 1.59 1.13 2.39 Tubing Length 100	Volume (gal) + 0 - Purge Criteria - ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 DO % Sat. 20 Turb. NTU <	Volume (gal) 0.06 Status STABLE STABLE STABLE STABLE STABLE STABLE STABLE Olume (gal) = 0.06	Volume (gal) Content D Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? Volume (gal) 0.32 Equipment ID	WLM08 PP PE/S Yes No Eqpt. Table WLM08 PP
BBS-CCR-3 Purge Meth: 1A Purge Start: 10:13 Purge End: 10:26 Purge Complete A Well #	2 Time 10:22 10:24 10:26 tt 10:16 Diam/ Comp 2	Interval (ft) 10 Rate (ml/min 180 190 190 Gallons to Screen Interval (ft) 10	Depth (ft) 18.23 Volume (gal) 0.43 0.10 0.10 Purge 0.12 Intake Depth (ft) 14	Depth (ft) 23.23 Total Vol. (gal) 0.43 0.53 0.63 Stability Well Depth (ft) 18	6.52 Water Depth (ft) 6.72 6.72 6.71 Values = Depth to Water (ft)	- Column (ft) 16.71 pH (SU) 6.47 6.45 6.44 	0.16 Temp °C 27.31 27.20 27.18 27.18 Capacity (gal) =	Volume (gal) 2.67 Cond (uMHOS) 1785 1763 1763 1747 1747 1747 1747 2.88	(gal/ft.) 0.0026 DO (mg/L) 0.36 0.50 0.37 0.37 (Tubing Capacity (gal/ft.) 0.0026	Length) 24.23 Turbidity (NTU) 1.59 1.13 2.39 Tubing Length 100	Yolume (gal) + 0 Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 0 Cond % +/- 5 0 DO % Sat. 20 1 Turb. NTU <	Volume (gal) 0.06 Status STABLE STABLE STABLE STABLE STABLE STABLE STABLE Olume (gal) = 0.06	Volume (gal) Cont2 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? Contained Tubing? Dedicated Tubing? 0.12 Equipment ID Level Meter:	WLM08 PP PE/S ☑ Yes ☑ No Eqpt. Table WLM08 PP PE/S
BBS-CCR-3 Purge Meth: 1A Purge Start: 10:13 Purge End: 10:26 Purge Complete A	2 Time 10:22 10:24 10:26 tt 10:16 Diam/ Comp 2	Interval (ft) 10 Rate (ml/min 180 190 190 Gallons to Screen Interval (ft) 10	Depth (ft) 18.23 Volume (gal) 0.43 0.10 0.10 Purge 0.12 Intake Depth (ft) 14	Depth (ft) 23.23 Total Vol. (gal) 0.43 0.53 0.63 Stability Well Depth (ft) 18	6.52 Water Depth (ft) 6.72 6.72 6.71 Values = Depth to Water (ft)	- Column (ft) 16.71 pH (SU) 6.47 6.45 6.44 	0.16 Temp °C 27.31 27.20 27.18 27.18 Capacity (gal) =	Volume (gal) 2.67 Cond (uMHOS) 1785 1763 1763 1747 1747 1747 1747 2.88	(gal/ft.) 0.0026 DO (mg/L) 0.36 0.50 0.37 0.37 (Tubing Capacity (gal/ft.) 0.0026	Length) 24.23 Turbidity (NTU) 1.59 1.13 2.39 Tubing Length 100	Yolume (gal) + 0 Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 0 Cond % +/- 5 0 DO % Sat. 20 1 Turb. NTU <	Volume (gal) 0.06 Status STABLE STABLE STABLE STABLE STABLE STABLE STABLE Olume (gal) = 0.06	Volume (gal) Contention Cont	WLM08 PP PE/S Yes No Eqpt. Table WLM08 PP PE/S Yes Yes
BBS-CCR-3 Purge Meth: 1A Turge Start: 10:13 Turge End: 10:26 Turge Complete # Well # Purge Meth: Turge Start:	2 Time 10:22 10:24 10:26 10:16 Diam/ Comp 2 Time	Interval (ft) 10 Rate (ml/min 180 190 190 Gallons to Screen Interval (ft) 10 Rate (ml/min	Depth (ft) 18.23 Volume (gal) 0.43 0.10 0.10 Purge 0.12 Intake Depth (ft) 14	Depth (ft) 23.23 Total Vol. (gal) 0.43 0.53 0.63 Stablility Well Depth (ft) 18 Total Vol. (gal)	6.52 Water Depth (ft) 6.72 6.72 6.71 Values = Depth to Water (ft)	- Column (ft) 16.71 pH (SU) 6.47 6.45 6.44 	0.16 Temp °C 27.31 27.20 27.18 27.18 Capacity (gal) = 0.16	Volume (gal) 2.67 Cond (uMHOS) 1785 1763 1763 1747 1747 1747 1747 2.88	(gal/ft.) 0.0026 DO (mg/L) 0.36 0.50 0.37 0.37 (Tubing Capacity (gal/ft.) 0.0026	Length) 24.23 Turbidity (NTU) 1.59 1.13 2.39 Tubing Length 100	Yolume (gal) + 0 Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 0 Cond % +/- 5 0 DO % Sat. 20 1 Turb. NTU <	Volume (gal) 0.06 Status STABLE STABLE STABLE STABLE STABLE STABLE STABLE Olume (gal) = 0.06	Volume (gal) Cont2 Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? Contained (gal) Contained Contained Tubing? Contained	WLM08 PP PE/S Yes No Eqpt. Table WLM08 PP PE/S

Site:	Big Be	nd	Date:	10/13/17	File Name:	101317	Wells RAB	Weather:	Partly Clou	dy & Warm	Sampler(s) / Initials	RAB /TEC	O Initials	
LIMS #	Loction Code	Time	FE ²	pH (SU)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor	1	IGVD
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	\$COLOR-W	\$ODOR-W	Time	LEVEL
L17J115-04 A	BBS-CCR-BW-1	10:04	Ĭ	6.6	27.9	4570	0.4	2.5	-18.4		Clear	None		
L17J115-05 A	BBS-CCR-BW-2	9:40		6.7	28.0	1699	0.3	4.0	-72.1		Lt. Yellow	None		
LIMS #	250ml Cyan (3)	1L Inorg (1)	500ml Inorg (2) 250ml Inorg (3)	1L Mtls (1)	250ml Mtls (3)	1L Rads (1)	500ml Sulfide (2)	500ml Mtls (2)	250ml Nuts (3)	40ml Vial (6)	500 ml Nuts (2)	1L Rads Diss. (1)	Total Containers
L17J115-04 A			1			⊻ 2	⊻ 2				0			40
L17J115-05 A			1			✓ 2	✓ 2							10
(1) 1L plastic (PP)	•	(2) 500ml plas	stic (PP)	(3) 250ml plastic	(PP)	(4) 100ml coliform be	ottle	(5) 1L amber glass (AG)	(6) 40ml VOA vial	(CG)		Samples On Ice	Sample Reciept
ESS	0107301Y	ESS	0218201Y	ESS	0307301Y	ESS		ESS		ESS		•	Yes 🗖 No	Time 14:18
	Preservation			Pres ID		Preservation		•	Pres ID		Preservation		Pres ID	Temp 1.4
1L bottles (rads): 5 ml I	HNO3 to pH <2			L 012558 🗹	250ml bottles (nu	ts): 1 ml H2SO4 to pH	1<2		L 🗆	500 ml bottles(Sulfi	de) 2ml NAOH/Zinc	Acet. to pH >12	L 🗆	
500 ml bottles (metals)): 2 ml HNO3 to pH <2				40 ml Vial (TOC)	0.5 ml H2SO4 to pH	<2				n) 1g NAOH to pH >	-	L	
250 ml bottles (metal):	-			L 012558 🗹			ium, 5 ml HNO3 to pH <2	2	L		licates that the sam		apH of <2	
pH Meter Calibration		Buffer ID	Buffer Value	Cal	Time	ICV	Time	CCV	Time	Redox Cal	Time	Temp °C	Reading mv	Theo Value mv
Meter ID:	MPM08	L 019949		7	7:02	7.03	7:06	7.11	14:29	Meter ID:	7:10	21.5	236.0	236.2
FDEP FT 1100	1000	L 019074		10	7:02		nd +/- 5%) (DO +/- 0.3m			MPM08	14:33	21.3	233.5	236.2
Units: SU		L 019303	10	4	7:02		cates ICV / CCV passed		,	Zobell Sol ID:				200.2
Conductivity Meter Ca	alib.	Standard ID		Cal	Time	ICV	Time	ccv	Time	L 019150B		1		1
Meter ID:	MPM08	L 018805		1000	7:14					DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg/l
FDEP FT 1200, Units:		L 019100		1000		9830	7:18	9791	14:01	Meter ID:	6:54	21.4	8.90	8.863
Turbidity Meter Calib		Standard ID		Accentab	ility Range	ICV	Time	CCV	Time	MPM08	14:42	20.8	8.97	8.950
Meter ID:	TM07	L 0198		5.00	6.12	5.60	6:43	5.61	13:59	Barom, Pres	17.72	20.0	0.07	0.000
FDEP FT 1600, Units:	-	L	0	0.00	0.12	0.00	0.40	0.01	10.00	760				
Sulfite Info (QC Chec			QC Result ma/	I Time	Titrator ID	Na Thio ID	DO 3 Pillow ID	Starch Ind. ID	lodate/lodide ID	Therm ID	рН	Conduct.(%)	DO (mg/l)	Redox (mv)
QC Std: 5ml (NaThio)/	• • • •		QC Result mg/	I IIIIe	The alor TD	L	L	L	L	MPM08	0.2	5	0.3	10
Purging Information	g-=	Well Capacit	ies (gallons/ ft): 2	" = 0.16 4" =0.65		Tubing Inside Diam	. Capacities Gallons/ft)	: 1/4" =0.0026 3/8" =0	.006		•			
				Well	Depth to	14/ - 4	Well	1 Well	Tubing	Tubing	Pump	Cell	1 Eqpt.	
Well #	Diam/ Comp	Screen	Intake Depth (ft)	Depth (ft)	Depth to Water (ft)	Column x	Capacity (gal) 😑	Volume (gal)	Capacity X (gal/ft.)	Length) H	+ Volume + (gal)	Volume (gal) =	Volume (gal)	
BBS-CCR-BW-1	1		Deput (it)		r	. ,			(0)					
	2	Interval (ft)	39.3	44.3	29.60	14 70	0.16	2 35	0.0026	100	0	0.06	0.32	
Purge Meth:	2 Time	10	39.3	44.3	29.60	14.70	0.16	2.35	0.0026	100	0 Burgo Critoria	0.06	0.32	East Table
Purge Meth:	Time	10 Rate (ml/mir	i) Volume (gal)	Total Vol. (gal)	Water Depth (ft)	pH (SU)	Temp ^o C	Cond (uMHOS)	DO (mg/L)	Turbidity (NTU)	Purge Criteria	Status	Equipment ID	Eqpt. Table
1A	Time 9:57	10 Rate (ml/mir 2600	Volume (gal) 5.49	Total Vol. (gal) 5.49	Water Depth (ft) 30.43	pH (SU) 6.55	Temp °C 27.81	Cond (uMHOS) 4384	DO (mg/L) 0.87	Turbidity (NTU) 7.30	Purge Criteria ph:+/- 0.2	Status STABLE	Equipment ID Level Meter:	WLM08
1A Purge Start:	Time 9:57 9:59	10 Rate (ml/mir 2600 2600	Volume (gal) 5.49 1.37	Total Vol. (gal) 5.49 6.86	Water Depth (ft) 30.43 30.42	pH (SU) 6.55 6.55	Temp °C 27.81 27.81	Cond (uMHOS) 4384 4499	DO (mg/L) 0.87 0.57	Turbidity (NTU) 7.30 4.40	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2	Status STABLE STABLE	Equipment ID Level Meter: Pump:	WLM08 ESP
1A Purge Start: 9:49	Time 9:57	10 Rate (ml/mir 2600	Volume (gal) 5.49	Total Vol. (gal) 5.49	Water Depth (ft) 30.43	pH (SU) 6.55	Temp °C 27.81	Cond (uMHOS) 4384	DO (mg/L) 0.87	Turbidity (NTU) 7.30	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5	Status STABLE STABLE STABLE	Equipment ID Level Meter: Pump: Tubing:	WLM08 ESP PE
1A Purge Start: 9:49 Purge End:	Time 9:57 9:59	10 Rate (ml/mir 2600 2600	Volume (gal) 5.49 1.37	Total Vol. (gal) 5.49 6.86	Water Depth (ft) 30.43 30.42	pH (SU) 6.55 6.55	Temp °C 27.81 27.81	Cond (uMHOS) 4384 4499	DO (mg/L) 0.87 0.57	Turbidity (NTU) 7.30 4.40	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 DO % Sat. 20	Status STABLE STABLE STABLE STABLE	Equipment ID Level Meter: Pump: Tubing: Dedicated	WLM08 ESP PE Yes
1A Purge Start: 9:49 Purge End: 10:01	Time 9:57 9:59 10:01	10 Rate (ml/mir 2600 2600 2600) Volume (gal) 5.49 1.37 1.37	Total Vol. (gal) 5.49 6.86 8.23	Water Depth (ft) 30.43 30.42 30.41	pH (SU) 6.55 6.55 6.55	Temp ℃ 27.81 27.81 27.86	Cond (uMHOS) 4384 4499 4570	DO (mg/L) 0.87 0.57 0.40	Turbidity (NTU) 7.30 4.40 2.51	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5	Status STABLE STABLE STABLE	Equipment ID Level Meter: Pump: Tubing:	WLM08 ESP PE
1A Purge Start: 9:49 Purge End:	Time 9:57 9:59 10:01	10 Rate (ml/mir 2600 2600 2600	Volume (gal) 5.49 1.37	Total Vol. (gal) 5.49 6.86 8.23	Water Depth (ft) 30.43 30.42 30.41 Values =	pH (SU) 6.55 6.55 6.55 6.55	Temp °C 27.81 27.81 27.86 27.86	Cond (uMHOS) 4384 4499 4570 	DO (mg/L) 0.87 0.57 0.40	Turbidity (NTU) 7.30 4.40 2.51 2.51	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 DO % Sat. 20 Turb. NTU <	Status STABLE STABLE STABLE STABLE STABLE	Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing?	WLM08 ESP PE Yes
1A Purge Start: 9:49 Purge End: 10:01 Purge Complete	Time 9:57 9:59 10:01 At 9:49	10 Rate (ml/mir 2600 2600 2600 Gallons to Screen) Volume (gal) 5.49 1.37 1.37 Purge 0.32	Total Vol. (gal) 5.49 6.86 8.23 Stability Well	Water Depth (ft) 30.43 30.42 30.41 Values =	pH (SU) 6.55 6.55 6.55 6.55 6.55 6.55 6.55	Temp ℃ 27.81 27.81 27.86	Cond (uMHOS) 4384 4499 4570 4570 1 Well Volume	DO (mg/L) 0.87 0.57 0.40 0.40	Turbidity (NTU) 7.30 4.40 2.51 2.51	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 DO % Sat. 20 Turb. NTU <	Status STABLE STABLE STABLE STABLE STABLE Cell Volume	Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing?	WLM08 ESP PE Yes
1A Purge Start: 9:49 Purge End: 10:01 Purge Complete / Well #	Time 9:57 9:59 10:01 At 9:49 Diam/ Comp	10 Rate (ml/mir 2600 2600 2600 Gallons to Screen Interval (ft)) Volume (gal) 5.49 1.37 1.37 Purge 0.32 Intake Depth (ft)	Total Vol. (gal) 5.49 6.86 8.23	Water Depth (ft) 30.43 30.42 30.41 Values = Depth to Water (ft)	pH (SU) 6.55 6.55 6.55 6.55 6.55 6.55 6.55 6.55	Temp °C 27.81 27.81 27.86 27.86 27.86 27.86	Cond (uMHOS) 4384 4499 4570 4570 4570 Volume (gai)	DO (mg/L) 0.87 0.57 0.40 0.40 (Tubing Capacity X	Turbidity (NTU) 7.30 4.40 2.51 2.51 Tubing Length (ft)	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 D0 % Sat. 20 Turb. NTU <	Status STABLE STABLE STABLE STABLE STABLE Cell Volume (gal) =	Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? 1 Eqpt. Volume (gal)	WLM08 ESP PE Yes
1A Purge Start: 9:49 Purge End: 10:01 Purge Complete / Well # BBS-CCR-BW-2	Time 9:57 9:59 10:01 At 9:49 Diam/ Comp 2	10 Rate (ml/mir 2600 2600 2600 Gallons to Screen Interval (ft) 10) Volume (gal) 5.49 1.37 1.37 Purge 0.32 intake Depth (ft) 18.49	Total Vol. (gal) 5.49 6.86 8.23 Stability Well Depth (ft) 23.84	Water Depth (ft) 30.43 30.42 30.41 Values = Values = Depth to Water (ft) 7.38	pH (SU) 6.55 6.55 6.55 6.55 6.55 6.55 6.55 16.46	Temp °C 27.81 27.81 27.86 27.86 27.86 Capacity (gal) = 0.16	Cond (uMHOS) 4384 4499 4570 4570 1 Well Volume (gal) 2.63	DO (mg/L) 0.87 0.57 0.40 0.40 (Tubing Capacity (gal/ft.) X	Turbidity (NTU) 7.30 4.40 2.51 2.51 Tubing Length (ft) 24.64	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 D0 % Sat. 20 Turb. NTU <	Status STABLE STABLE STABLE STABLE STABLE Cell Volume (gal) = 0.06	Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? 1 Eqpt. Volume (gal) 0.12	WLM08 ESP PE Yes No
1A Purge Start: 9:49 Purge End: 10:01 Purge Complete / Well # BBS-CCR-BW-2 Purge Meth:	Time 9:57 9:59 10:01 At 9:49 Diam/ Comp 2 Time	10 Rate (ml/mir 2600 2600 2600 Gallons to Screen Interval (ft) 10 Rate (ml/mir) Volume (gal) 5.49 1.37 1.37 Purge 0.32 intake Depth (ft) 18.49) Volume (gal)	Total Vol. (gal) 5.49 6.86 8.23 Stability Well Depth (ft) 23.84 Total Vol. (gal)	Water Depth (ft) 30.43 30.42 30.41 Values = Depth to Water (ft) 7.38 Water Depth (ft)	pH (SU) 6.55 6.5	Temp °C 27.81 27.81 27.86 27.86 27.86 Capacity (gal) = 0.16 Temp °C	Cond (uMHOS) 4384 4499 4570 4570 1 Well Volume (gal) 2.63 Cond (uMHOS)	DO (mg/L) 0.87 0.57 0.40 (Tubing Capacity (gal/ft.) X 0.0026 DO (mg/L)	Turbidity (NTU) 7.30 4.40 2.51 2.51 Tubing Length (ft) 24.64 Turbidity (NTU)	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 D0 % Sat. 20 Turb. NTU <	Status STABLE STABLE STABLE STABLE STABLE Cell Volume (gal) 0.06 Status	Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? 1 Eqpt. (gal) 0.12 Equipment ID	WLM08 ESP PE Yes No Eqpt. Table
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1A Purge Start: 9:49 Purge End: 10:01 Purge Complete / Well # BBS-CCR-BW-2 Purge Meth: 1A	Time 9:57 9:59 10:01 At 9:49 Diam/ Comp 2 Time 9:28	10 Rate (ml/mir 2600 2600 2600 Gallons to Screen Interval (ft) 10 Rate (ml/mir 510) Volume (gal) 5.49 1.37 1.37 Purge 0.32 intake Depth (ft) 18.49) Volume (gal) 1.75	Total Vol. (gal) 5.49 6.86 8.23 Stability Well Depth (ft) 23.84 Total Vol. (gal) 1.75	Water Depth (ft) 30.43 30.42 30.41 Values = Depth to Water (ft) 7.38 Water Depth (ft) 7.61	pH (SU) 6.55 6.5	Temp °C 27.81 27.81 27.86 27.86 27.86 Capacity (gal) = 0.16 Temp °C 27.92	Cond (uMHOS) 4384 4499 4570 4570 1 Well Volume (gal) 2.63 Cond (uMHOS) 1706	DO (mg/L) 0.87 0.57 0.40 (Tubing Capacity (gal/ft.) X 0.0026 DO (mg/L) 0.39	Turbidity (NTU) 7.30 4.40 2.51 2.51 Tubing Length (ft) 24.64 Turbidity (NTU) 4.98	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 D0 % Sat. 20 Turb. NTU <	Status STABLE STABLE STABLE STABLE STABLE Cell Volume (gal) = 0.06 Status STABLE STABLE STABLE STABLE	Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? Uedicated Tubing? 0.12 Equipment ID Level Meter: Pump: Tubing:	WLM08 ESP PE Yes ✓ No Eapt. Table WLM08 PP PE/S
1A Purge Start: 9:49 Purge End: 10:01 Purge Complete / Well # BBS-CCR-BW-2 Purge Meth: 1A Purge Start: 9:15 Purge End:	Time 9:57 9:59 10:01 At 9:49 Diam/ Comp 2 Time 9:28 9:30	10 Rate (ml/mir 2600 2600 2600 Gallons to Screen Interval (ft) 10 Rate (ml/mir 510 500) Volume (gal) 5.49 1.37 1.37 Purge 0.32 intake Depth (ft) 18.49) Volume (gal) 1.75 0.26	Vol. (gal) 5.49 6.86 8.23 Stability Well Depth (ft) 23.84 Total Vol. (gal) 1.75 2.01	Water Depth (ft) 30.43 30.42 30.41 Values = Depth to Water (ft) 7.38 Water Depth (ft) 7.61 7.62	pH (SU) 6.55 6.56 6.68 6.69	Temp °C 27.81 27.81 27.86 27.86 27.86 Capacity (gal) = 0.16 Temp °C 27.92 27.95	Cond (uMHOS) 4384 4499 4570 4570 1 Well Volume (gal) 2.63 Cond (uMHOS) 1706 1702	DO (mg/L) 0.87 0.57 0.40 (Tubing Capacity (gal/ft.) X 0.0026 DO (mg/L) 0.39 0.31	Turbidity (NTU) 7.30 4.40 2.51 2.51 Tubing Length) - (t) - 24.64 Turbidity (NTU) 4.98 6.12	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 D0 % Sat. 20 Turb. NTU <	Status STABLE STABLE STABLE STABLE Cell Colore (gal) 0.06 Status STABLE STABLE STABLE STABLE STABLE	Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing?	WLM08 ESP PE Yes No Eapt. Table WLM08 PP PE/S Yes
1A Purge Start: 9:49 Purge End: 10:01 Purge Complete / Well # BBS-CCR-BW-2 Purge Meth: 1A Purge Start: 9:15 Purge End: 9:32	Time 9:57 9:59 10:01 At 9:49 Diam/ Comp 2 Time 9:28 9:30 9:32	10 Rate (ml/mir 2600 2600 2600 Gallons to Screen Interval (ft) 10 Rate (ml/mir 510 500 500) Volume (gal) 5.49 1.37 1.37 Purge 0.32 Intake Depth (ft) 18.49 Volume (gal) 1.75 0.26 0.26	Total Vol. (gal) 5.49 6.86 8.23 Stability Well Depth (ft) 23.84 Total Vol. (gal) 1.75 2.01 2.27	Water Depth (tt) 30.43 30.42 30.41 Values = Depth to Water (tt) 7.38 Water Depth (tt) 7.61 7.62 7.62	pH (SU) 6.55 6.57 6.5	Temp °C 27.81 27.81 27.86 27.86 27.86 Capacity (gal) = 0.16 Temp °C 27.92 27.95 27.98	Cond (uMHOS) 4384 4499 4570 4570 1 Well Volume (gal) 2.63 Cond (uMHOS) 1706 1702 1699	DO (mg/L) 0.87 0.57 0.40 (Tubing (gal7L) X 0.0026 DO (mg/L) 0.39 0.31 0.28	Turbidity (NTU) 7.30 4.40 2.51 2.51 2.51 2.51 24.64 Turbidity (NTU) 4.98 6.12 3.96	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 D0 % Sat. 20 Turb. NTU <	Status STABLE STABLE STABLE STABLE STABLE Cell Volume (gal) = 0.06 Status STABLE STABLE STABLE STABLE	Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing? Uedicated Tubing? 0.12 Equipment ID Level Meter: Pump: Tubing:	WLM08 ESP PE Yes ✓ No Eqpt. Table WLM08 PP PE/S
1A Purge Start: 9:49 Purge End: 10:01 Purge Complete / Well # BBS-CCR-BW-2 Purge Meth: 1A Purge Start: 9:15 Purge End:	Time 9:57 9:59 10:01 At 9:49 Diam/ Comp 2 Time 9:28 9:30 9:32	10 Rate (ml/mir 2600 2600 2600 Gallons to Screen Interval (ft) 10 Rate (ml/mir 510 500 500) Volume (gal) 5.49 1.37 1.37 Purge 0.32 intake Depth (ft) 18.49) Volume (gal) 1.75 0.26	Total Vol. (gal) 5.49 6.86 8.23 Stability Well Depth (ft) 23.84 Total Vol. (gal) 1.75 2.01 2.27	Water Depth (ft) 30.43 30.42 30.41 Values = Depth to Water (ft) 7.38 Water Depth (ft) 7.61 7.62	pH (SU) 6.55 6.56 6.68 6.69	Temp °C 27.81 27.81 27.86 27.86 27.86 Capacity (gal) = 0.16 Temp °C 27.92 27.95	Cond (uMHOS) 4384 4499 4570 4570 1 Well Volume (gal) 2.63 Cond (uMHOS) 1706 1702	DO (mg/L) 0.87 0.57 0.40 (Tubing Capacity (gal/ft.) X 0.0026 DO (mg/L) 0.39 0.31	Turbidity (NTU) 7.30 4.40 2.51 2.51 Tubing Length) - (t) - 24.64 Turbidity (NTU) 4.98 6.12	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 D0 % Sat. 20 Turb. NTU <	Status STABLE STABLE STABLE STABLE Cell Colore (gal) 0.06 Status STABLE STABLE STABLE STABLE STABLE	Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing?	WLM08 ESP PE Yes Woo Eqpt. Table WLM08 PP PE/S Yes
1A Purge Start: 9:49 Purge End: 10:01 Purge Complete / Well # BBS-CCR-BW-2 Purge Meth: 1A Purge Start: 9:15 Purge End: 9:32	Time 9:57 9:59 10:01 At 9:49 Diam/ Comp 2 Time 9:28 9:30 9:32	10 Rate (ml/mir 2600 2600 2600 Gallons to Screen Interval (ft) 10 Rate (ml/mir 510 500 500) Volume (gal) 5.49 1.37 1.37 Purge 0.32 Intake Depth (ft) 18.49 Volume (gal) 1.75 0.26 0.26	Total Vol. (gal) 5.49 6.86 8.23 Stability Well Depth (ft) 23.84 Total Vol. (gal) 1.75 2.01 2.27	Water Depth (tt) 30.43 30.42 30.41 Values = Depth to Water (tt) 7.38 Water Depth (tt) 7.61 7.62 7.62	pH (SU) 6.55 6.57 6.5	Temp °C 27.81 27.81 27.86 27.86 27.86 Capacity (gal) = 0.16 Temp °C 27.92 27.95 27.98	Cond (uMHOS) 4384 4499 4570 4570 1 Well Volume (gal) 2.63 Cond (uMHOS) 1706 1702 1699	DO (mg/L) 0.87 0.57 0.40 (Tubing (gal7L) X 0.0026 DO (mg/L) 0.39 0.31 0.28	Turbidity (NTU) 7.30 4.40 2.51 2.51 2.51 2.51 24.64 Turbidity (NTU) 4.98 6.12 3.96	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 D0 % Sat. 20 Turb. NTU <	Status STABLE STABLE STABLE STABLE Cell Colore (gal) 0.06 Status STABLE STABLE STABLE STABLE STABLE	Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing?	WLM08 ESP PE Yes No Eapt. Table WLM08 PP PE/S Yes
1A Purge Start: 9:49 Purge End: 10:01 Purge Complete Well # BBS-CCR-BW-2 Purge Meth: 1A Purge Start: 9:15 Purge End: 9:32 Purge Complete /	Time 9:57 9:59 10:01 At 9:49 Diam/ Comp 2 Time 9:28 9:30 9:32	10 Rate (ml/mir 2600 2600 2600 Gallons to Screen Interval (ft) 10 Rate (ml/mir 510 500 500) Volume (gal) 5.49 1.37 1.37 Purge 0.32 Intake Depth (ft) 18.49 Volume (gal) 1.75 0.26 0.26	Total Vol. (gal) 5.49 6.86 8.23 Stability Well Depth (ft) 23.84 Total Vol. (gal) 1.75 2.01 2.27	Water Depth (tt) 30.43 30.42 30.41 Values = Depth to Water (tt) 7.38 Water Depth (tt) 7.61 7.62 7.62	pH (SU) 6.55 6.57 6.5	Temp °C 27.81 27.81 27.86 27.86 27.86 Capacity (gal) = 0.16 Temp °C 27.92 27.95 27.98	Cond (uMHOS) 4384 4499 4570 4570 1 Well Volume (gal) 2.63 Cond (uMHOS) 1706 1702 1699	DO (mg/L) 0.87 0.57 0.40 (Tubing (gal7L) X 0.0026 DO (mg/L) 0.39 0.31 0.28	Turbidity (NTU) 7.30 4.40 2.51 2.51 2.51 2.51 24.64 Turbidity (NTU) 4.98 6.12 3.96	Purge Criteria ph:+/- 0.2 Temp°C+/- 0.2 Cond % +/- 5 D0 % Sat. 20 Turb. NTU <	Status STABLE STABLE STABLE STABLE Cell Colore (gal) 0.06 Status STABLE STABLE STABLE STABLE STABLE	Equipment ID Level Meter: Pump: Tubing: Dedicated Tubing?	WLM08 ESP PE Yes No Eqpt. Table WLM08 PP PE/S Yes No

APPENDIX D

Geosyntec Data Validation Reports – Second and Third Detection Monitoring Events



Memorandum

Date: 25 May 2018

To: Todd Kafka

From: Chris Pracheil

CC: J. Caprio

Subject: Stage 2A Data Validation – Level II Data Deliverable – Tampa Electric Laboratory Services #L18D079 and L18D116, TestAmerica #660-86743-1 and KNL Environmental Testing # L18D079 and L18D116

SITE: Big Bend Power Station, Apollo Beach, Florida

INTRODUCTION

This report summarizes the findings of the Stage 2A data validation of five water samples, collected on April 13, 2018 and one water sample, collected on April 25, 2018 as part of the Big Bend Power Station coal combustion residuals (CCR) groundwater monitoring program plan. The lithium analyses were performed by TestAmerica Laboratories, Inc., Tampa, Florida (TA). The radium analyses were performed by KNL Environmental Testing, Tampa, Florida (KNL). The rest of the analyses were performed by Tampa Electric Laboratory Services, Tampa, Florida (TELS). The samples were analyzed for the following:

- Metals by EPA Methods 200.8 and 6010B
- Mercury by EPA Method 7470A
- Radium-226 by EPA Method 903.0
- Radium-228 by EPA Method Ra-05
- Chloride, Fluoride and Sulfate by EPA Method 300.0
- Total Dissolved Solids by Standard Method 2540C

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives. The qualified data should be used within the limitations of the qualifications.

The inorganic data were reviewed based on the following: CCR Groundwater Monitoring Program Plan, Big Bend Power Station, Apollo Beach, Florida, September 2016 (GWMP), USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, January 2017 (OLEM 9355.0-135, EPA 540-R-2017-001), as well as by the pertinent methods referenced by the data package and professional and technical judgment.

The following samples were analyzed and validated at a Stage 2A level in the data set:

Laboratory ID	Client ID
L18D079-01	BBS-CCR-1 (4/13/18)
L18D079-02	BBS-CCR-2 (4/13/18)
L18D079-03	BBS-CCR-3 (4/13/18)

Laboratory ID	Client ID
L18D079-04	BBS-CCR-BW-1 (4/13/18)
L18D079-05	BBS-CCR-BW-2 (4/13/18)
L18D116-01	BBS-CCR-2 (4/25/18)

The samples were received at the laboratories at 1.2°C and 1.8°C within the criteria of 0-6°C. No sample preservation or sample receipt issues were noted by the laboratories.

1.0 TOTAL METALS

The samples were analyzed for total metals per EPA Methods 200.8 and 6010B.

The areas of data review are listed below. A leading check mark (\checkmark) indicates an area of review in which the data were acceptable. A preceding crossed circle (\otimes) signifies areas where issues were raised during the course of the validation review and should be considered to determine the impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- \otimes Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ⊗ Laboratory Control Sample
- ✓ Serial Dilution
- ✓ Field Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The metals data reported in this package are considered usable for meeting project objectives. The results are considered valid; analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis for the data set is 100%.

1.2 <u>Holding Times</u>

The holding time for the metals analysis of waters is 180 days from sample collection to analysis. The holding times were met for the sample analyses.

1.3 <u>Method Blank</u>

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (method 200.8 batch 18D0100 and method 6010B batches 18D0095 and 394328). Metals were not detected in the method blanks above the method detection limits (MDLs), with the following exceptions.

Calcium was detected at an estimated concentration, greater than the MDL and less than the reporting limit (RL) in the method blank associated with batch 18D0095 and cadmium, cobalt, lead and thallium were detected at estimated concentrations, greater than the MDLs and less than the RLs in the method blank associated with batch 18D0100. Therefore, the estimated concentrations of cadmium, cobalt, lead and thallium in the associated samples were U qualified as not detected at the RLs. Since calcium was detected above the RL in the associated samples no qualifications were applied to the calcium data.

Client Sample ID	Compound	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
BBS-CCR-1 (4/13/18)	Cadmium	0.25	V,I	0.5	U	3
BBS-CCR-1 (4/13/18)	Cobalt	0.522	V,I	2.0	U	3
BBS-CCR-1 (4/13/18)	Lead	0.328	V,I	2.0	U	3
BBS-CCR-2 (4/13/18)	Cobalt	0.108	V,I	2.0	U	3
BBS-CCR-2 (4/13/18)	Lead	0. 167	V,I	2.0	U	3
BBS-CCR-3 (4/13/18)	Cobalt	0.154	V,I	2.0	U	3
BBS-CCR-3 (4/13/18)	Lead	0.0911	V,I	2.0	U	3
BBS-CCR-BW1 (4/13/18)	Cadmium	0.145	V,I	0.5	U	3
BBS-CCR-BW1 (4/13/18)	Cobalt	1.87	V,I	2.0	U	3
BBS-CCR-BW1 (4/13/18)	Lead	0.236	V,I	2.0	U	3

L18D079 L18D116 Bigbend DVR

Client Sample ID	Compound	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
BBS-CCR-BW1 (4/13/18)	Thallium	0.101	V,I	0.5	U	3
BBS-CCR-BW2 (4/13/18)	Cobalt	0.247	V,I	2.0	U	3
BBS-CCR-BW2 (4/13/18)	Lead	0.112	V,I	2.0	U	3

 μ g/L-micrograms per liter

I- laboratory flag indicating the reported value is estimated, greater than MDL and less than RL

V- laboratory flag indicating analyte was detected in both the sample and the associated method blank

* Validation qualifiers are defined in Attachment 1 at the end of this report

**Reason codes are defined in Attachment 2 at the end of this report

1.4 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSDs were analyzed at the proper frequency for the number and types of samples analyzed (one pair per batch of 20 samples). A sample set specific MS/MSD pair was reported for the method 200.8 data using sample BBS-CCR-1 (4/13/18). The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria.

Batch MS/MSD pairs were reported for the method 6010B data. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the data.

1.5 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported; one for method 200.8 and two for method 6010B. The recovery results were within the laboratory specified acceptance criteria; however, it was noted that calcium was not included in the LCS spike for batch 18D0095. Therefore, the concentrations of calcium in the associated samples were J qualified as estimated.

Client Sample ID	Compound	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
BBS-CCR-1 (4/13/18)	Calcium	577,000	V	577,000	J	5
BBS-CCR-2 (4/13/18)	Calcium	183,000	V	183,000	J	5
BBS-CCR-3 (4/13/18)	Calcium	206,000	V	206,000	J	5
BBS-CCR-BW1 (4/13/18)	Calcium	694,000	V	694,000	J	5
BBS-CCR-BW2 (4/13/18)	Calcium	297,000	V	297,000	J	5

µg/L-micrograms per liter

V- laboratory flag indicating analyte was detected in both the sample and the associated method blank

1.6 Serial Dilution

Serial dilutions were not reported.

1.7 <u>Field Duplicate</u>

Field duplicates were not reported with the sample sets.

1.8 <u>Sensitivity</u>

The samples were reported to the MDLs. The MDLs met the limits listed in Table 4 of the CCR Groundwater Monitoring Plan.

1.9 <u>Electronic Data Deliverable (EDD) Review</u>

The results and sample identifications (IDs) in the EDD were reviewed against the information provided by the associated level II reports at a minimum of 20% as part of the data validation process. The laboratory flags used in the laboratory report did not match the flags used in the EDD. No other discrepancies were identified between the level II reports and the EDD.

2.0 MERCURY

The samples were analyzed for mercury per EPA Method 7470A.

The areas of data review are listed below. A leading check mark (\checkmark) indicates an area of review in which the data were acceptable. A preceding crossed circle (\otimes) signifies areas where issues were raised during the course of the validation review and should be considered to determine the impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

2.1 <u>Overall Assessment</u>

The mercury data reported in this package are considered usable for meeting project objectives. The results are considered valid; analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis for the data set is 100%.

2.2 <u>Holding Times</u>

The holding time for the mercury analysis of a water sample is 28 days from sample collection to analysis. The holding times were met for the sample analyses.

2.3 <u>Method Blank</u>

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 18D0103). Mercury was not detected in the method blank above the MDL.

2.4 <u>Matrix Spike/Matrix Spike Duplicate</u>

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair, using sample BBS-CCR-BW-2 (4/13/18), was reported. The recoveries and RPD results were within the laboratory specified acceptance criteria.

2.5 <u>Laboratory Control Sample</u>

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the laboratory specified acceptance criteria.

2.6 Field Duplicate

Field duplicates were not reported with the sample sets.

2.7 <u>Sensitivity</u>

The samples were reported to the MDL. No elevated non-detect results were reported. The MDL for mercury met the limit listed in Table 4 of the CCR Groundwater Monitoring Plan.

L18D079 L18D116 Bigbend DVR

2.8 <u>Electronic Data Deliverable Review</u>

The results and sample IDs in the EDD were reviewed against the information provided by the associated level II reports at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level II reports and the EDD.

3.0 RADIUM-226 AND RADIUM-228

The samples were analyzed for radium 226 and radium 228 per EPA Methods 903.0 and RA-05, respectively.

The areas of data review are listed below. A leading check mark (\checkmark) indicates an area of review in which the data were acceptable. A preceding crossed circle (\otimes) signifies areas where issues were raised during the course of the validation review and should be considered to determine the impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Method Blank
- ✓ Matrix Spike
- ✓ Laboratory Control Sample
- ✓ Laboratory Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The radium-226 and radium-228 data reported in this package are considered usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis for the data set is 100%.

3.2 <u>Holding Times</u>

The holding times for radium-226 and radium-228 analysis of waters are 180 days from sample collection to analysis. The holding times were met for the sample analyses.

3.3 <u>Method Blank</u>

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Six method blanks were reported (three for the radium-226 and three for the radium-228). The method blanks were within validation criteria with the following exceptions.

Radium-226 was detected at concentrations greater than 1.65 times the combined standard uncertainty (CSU) in batches L18D079 and L18D116. Since the detections of radium-226 and combined radium data (radium-226 + radium-228) were greater than 10 times the blank concentrations in the associated samples, no qualifications were applied to the data.

3.4 <u>Matrix Spike</u>

MSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS, using sample BBS-CCR-BW-2 (4/13/18) was reported for radium-228. The recovery results were within the laboratory specified acceptance criteria.

Batch MSs were also reported for the radium-226 and radium-228 data. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the data.

3.5 <u>Laboratory Control Sample</u>

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported for radium-226 and three for radium-228. The recovery results were within the laboratory specified acceptance criteria.

3.6 <u>Laboratory Duplicate</u>

Laboratory duplicates were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific laboratory duplicate, using sample BBS-CCR-BW-2 (4/13/18) was reported for radium-228. The RPD result for the laboratory duplicate was within the laboratory acceptance criteria.

Batch laboratory duplicates were also reported for the radium-226 and radium-228. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the data.

3.7 <u>Sensitivity</u>

L18D079 L18D116 Bigbend DVR

The samples were reported to the minimum detectable concentrations (MDCs). The reported MDCs met the limits listed in Table 4 of the CCR Groundwater Monitoring Plan.

3.8 <u>Electronic Data Deliverable Review</u>

The results and sample IDs in the EDD were reviewed against the information provided by the associated level II reports at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level II reports and the EDD.

4.0 WET CHEMISTRY PARAMETERS

The samples were analyzed for chloride, fluoride and sulfate by EPA Method 300.0 and total dissolved solids by SM 2540C.

The areas of data review are listed below. A leading check mark (\checkmark) indicates an area of review in which the data were acceptable. A preceding crossed circle (\otimes) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ⊗ Overall Assessment
- ✓ Holding Times
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Laboratory Duplicate
- ✓ Field Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

4.1 <u>Overall Assessment</u>

The wet chemistry data reported in this package are considered usable for meeting project objectives. The results are considered to be valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the data set 100%.

4.1.1 <u>Analytical Anomalies</u>

The case narratives for laboratory report L18D079 noted that a constant weight could not be achieved after three consecutive weighing and drying cycles for the total dissolved solids analysis

L18D079 L18D116 Bigbend DVR

of samples BBS-CCR-3 (4/13/18). Therefore, the concentration of total dissolved solid in this sample was J qualified as estimated.

Client Sample ID	Compound	Laboratory Result (mg/L)	Laboratory Flag	Validation Result (mg/L)	Validation Qualifier	Reason Code
BBS-CCR-3 (4/13/18)	Total Dissolved Solids	1310	J-	1310	J	13

mg/L-milligrams per liter

J--the reported value is an estimated value

4.2 <u>Holding Times</u>

The holding times for chloride, fluoride and sulfate by EPA method 300.0 are 28 days from sample collection to analysis and the holding time for total dissolved solids by SM 2540C is 7 days from sample collection to analysis. The holding times were met for the sample analyses.

4.3 <u>Method Blanks</u>

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Method blanks were reported for each analysis as appropriate. The wet chemistry parameters were not detected in the method blanks above the MDLs, with the following exceptions.

Chloride and fluoride were detected at estimated concentrations greater than the MDLs and less than the RLs in the method blank for batch 18D0099. Since chloride and fluoride were detected above the RLs in the associated samples, no qualifications were applied to the data.

4.4 <u>Matrix Spike/Matrix Spike Duplicate</u>

MS/MSDs were analyzed at the proper frequency for the number and types of samples analyzed (one pair per batch of 20 samples). A sample set specific MS/MSD pair was reported for the method 300.0 data using sample BBS-CCR-1 (4/13/18). The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exceptions.

The recoveries of chloride and sulfate were low and outside the laboratory limits in the MS/MSD pair using sample BBS-CCR-1 (4/13/18). Based on the sample concentrations of chloride and sulfate compared to the spike amount (greater than four times the spike concentration), no qualifications were applied to the data based on technical and professional judgement.

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A batch MS/MSD pair was also reported for the method 300.0 data. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the data.

4.5 <u>Laboratory Control Sample</u>

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). LCSs were reported for each analysis as appropriate. The recovery results were within the laboratory specified acceptance criteria.

4.6 Laboratory Duplicate

Laboratory duplicates were reported for the total dissolved solids data. One sample set specific laboratory duplicate was reported for total dissolved solids using sample BBS-CCR-1 (4/13/18). The RPD results were within the laboratory specified acceptance criteria.

A batch laboratory duplicate was also reported for the total dissolved solids data. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the data.

4.7 <u>Field Duplicate</u>

Field duplicates were not reported with the sample sets.

4.8 <u>Sensitivity</u>

The samples were reported to the MDLs. The MDLs reported met the limits listed in Table 4 of the CCR Groundwater Monitoring Plan.

4.9 <u>Electronic Data Deliverables Review</u>

The results and sample identifications (IDs) in the EDD were reviewed against the information provided by the associated level II reports at a minimum of 20% as part of the data validation process. The laboratory flags used in the laboratory report did not match the flags used in the EDD. No other discrepancies were identified between the level II reports and the EDD.

* * * * *

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ATTACHMENT 1 DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

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ATTACHMENT 2 DATA VALIDATION REASON CODES Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS or RPD recovery outside limits (LCS/LCSD)
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other



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Memorandum

To: Todd Kafka

From: Chris Pracheil

CC: J. Caprio

Subject: Stage 2A Data Validation – Level II Data Deliverable – Tampa Electric Laboratory Service Work Order L18I055, TestAmerica Job ID 660-89608-1 and KNL Environmental Testing Order L18I055

SITE: Big Bend Power Station, Apollo Beach, Florida

INTRODUCTION

This report summarizes the findings of the Stage 2A data validation of five water samples, collected on September 12, 2018 as part of the Big Bend Power Station coal combustion residuals (CCR) groundwater monitoring program plan. The lithium analyses were performed by TestAmerica Tampa, Tampa, Florida (TA). The radium analyses were performed by KNL Environmental Testing, Tampa, Florida (KNL). The rest of the analyses were performed by Tampa Electric Laboratory Services, Tampa, Florida (TELS). The samples were analyzed for the following:

- Metals by EPA Methods 200.7 Rev. 4.4, 200.8 and 6010B
- Mercury by EPA Method 7470A
- Radium-226 by EPA Method 903.0
- Radium-228 by EPA Method Ra-05
- Chloride, Fluoride and Sulfate by EPA Method 300.0
- Total Dissolved Solids by Standard Method 2540C

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives. The qualified data should be used within the limitations of the qualifications.

The inorganic data were reviewed based on the following: CCR Groundwater Monitoring Program Plan, Big Bend Power Station, Apollo Beach, Florida, September 2016 (GWMP), USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, January 2017 (OLEM 9355.0-135, EPA 540-R-2017-001), as well as by the pertinent methods referenced by the data package and professional and technical judgment.

The following samples were analyzed and validated at a Stage 2A level in the data set:

Laboratory ID	Client ID
L18I055-01	BBS-CCR-1
L18I055-02	BBS-CCR-2
L18I055-03	BBS-CCR-3

Laboratory ID	Client ID
L18I055-04	BBS-CCR-BW1
L18I055-05	BBS-CCR-BW2

The samples were received at the laboratories within the criteria of 0-6°C. No sample preservation or sample receipt issues were noted by the laboratories.

The laboratory report was revised on November 15, 2018, to correct a typographical error on BBS-CCR-1 Rad-226/228 results and BBS-CCR-3 Rad 226/228 Counting Error.

1.0 TOTAL METALS

The samples were analyzed for total metals per EPA Methods 200.7 Rev. 4.4, 200.8 and 6010B.

The areas of data review are listed below. A leading check mark (\checkmark) indicates an area of review in which the data were acceptable. A preceding crossed circle (\otimes) signifies areas where issues were raised during the course of the validation review and should be considered to determine the impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Method Blank
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ⊗ Laboratory Control Sample
- ✓ Serial Dilution
- ✓ Field Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

1.1 <u>Overall Assessment</u>

The metals data reported in this package are considered usable for meeting project objectives. The results are considered valid; analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis for the data set is 100%.

1.2 <u>Holding Times</u>

The holding time for the metals analysis of waters is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

1.3 <u>Method Blank</u>

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (method 200.7 batch 412052, method 200.8 batch 18I0070 and method 6010B batch 18I0068). Metals were not detected in the method blanks above the method detection limits (MDLs), with the following exception.

Boron was detected at an estimated concentration, greater than the MDL and less than the reporting limit (RL) in the method blank associated with batch 18I0068. Since boron was detected above the RL in the associated samples, no qualifications were applied to the data.

1.4 <u>Matrix Spike/Matrix Spike Duplicate (MS/MSD)</u>

MS/MSDs were analyzed at the proper frequency for the number and types of samples analyzed (one pair per batch of 20 samples). Three sample set specific MS/MSD pairs were reported, two for the method 200.8 data using samples BBS-CCR-1 and BBS-CCR-BW2; and one for the method 6010B data using sample BBS-CCR-2. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria, with the following exceptions.

The recoveries of barium, beryllium, boron and chromium were low and the recoveries of molybdenum were high, outside laboratory specified acceptance criteria in the MS/MSD pair using sample BBS-CCR-2. Therefore, the concentrations of barium and boron were J- qualified as estimated with low biases and the non-detect results of beryllium and chromium were UJ qualified as estimated less than the MDLs. Since molybdenum was not detected in sample BBS-CCR-2, no qualifications were applied to the molybdenum data.

A batch MS/MSD pair was reported for the method 200.7 data. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the data.

It was noted that calcium was not included in the MS/MSD spike for the 6010B data. This did results in any qualifications to the data.

Client Sample ID	Compound	Laboratory Result (mg/L)	Laboratory Flag	Validation Result (mg/L)	Validation Qualifier*	Reason Code**
BBS-CCR-2	Barium	0.0652	J-	0.0652	J-	4
BBS-CCR-2	Boron	0.177	J-,V	0.177	J-	4

mg/L-milligrams per liter

J- the reported value is an estimated value

V-laboratory flag indicating analyte was detected in both the sample and the associated method blank

* Validation qualifiers are defined in Attachment 1 at the end of this report

**Reason codes are defined in Attachment 2 at the end of this report

Client Sample ID	Compound	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
BBS-CCR-2	Beryllium	0.500	J-,U	0.500	UJ	4
BBS-CCR-2	Chromium	1.60	J-,U	1.60	UJ	4

µg/L-micrograms per liter

J- the reported value is an estimated value

U-indicates that the compound was analyzed for but not detected

1.5 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery results were within the laboratory specified acceptance criteria; however, it was noted that calcium was not included in the LCS spike for batch 18I0068. Therefore, the concentrations of calcium in the associated samples were J qualified as estimated.

Client Sample ID	Compound	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
BBS-CCR-1	Calcium	549000	NA	549000	J	5
BBS-CCR-2	Calcium	218000	NA	218000	J	5
BBS-CCR-3	Calcium	191000	NA	191000	J	5
BBS-CCR-BW1	Calcium	664000	NA	664000	J	5
BBS-CCR-BW2	Calcium	344000	NA	344000	J	5

µg/L-micrograms per liter

NA-not applicable

1.6 <u>Serial Dilution</u>

Serial dilutions were not reported.

1.7 <u>Field Duplicate</u>

Field duplicates were not reported with the sample sets.

1.8 <u>Sensitivity</u>

The samples were reported to the MDLs. No elevated non-detect results were reported. The MDLs met the limits listed in Table 4 of the CCR Groundwater Monitoring Plan.

1.9 <u>Electronic Data Deliverable (EDD) Review</u>

The results and sample identifications (IDs) in the EDD were reviewed against the information provided by the associated level II reports at a minimum of 20% as part of the data validation process. The laboratory flags used in the laboratory report did not match the flags used in the EDD. No other discrepancies were identified between the level II reports and the EDD.

2.0 MERCURY

The samples were analyzed for mercury per EPA Method 7470A.

The areas of data review are listed below. A leading check mark (\checkmark) indicates an area of review in which the data were acceptable. A preceding crossed circle (\otimes) signifies areas where issues were raised during the course of the validation review and should be considered to determine the impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

2.1 <u>Overall Assessment</u>

The mercury data reported in this package are considered usable for meeting project objectives. The results are considered valid; analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis for the data set is 100%.

2.2 <u>Holding Times</u>

The holding time for the mercury analysis of a water sample is 28 days from sample collection to analysis. The holding times were met for the sample analyses.

2.3 <u>Method Blank</u>

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 1810091). Mercury was not detected in the method blank above the MDL.

2.4 <u>Matrix Spike/Matrix Spike Duplicate</u>

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair, using sample BBS-CCR-3, was reported. The recoveries and RPD results were within the laboratory specified acceptance criteria.

One batch MS was also reported, since this was batch QC the results do not affect the samples in this data set and qualifications were not applied to the data.

2.5 <u>Laboratory Control Sample</u>

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the laboratory specified acceptance criteria.

2.6 <u>Field Duplicate</u>

Field duplicates were not reported with the sample sets.

2.7 <u>Sensitivity</u>

The samples were reported to the MDL. No elevated non-detect results were reported. The MDL for mercury met the limit listed in Table 4 of the CCR Groundwater Monitoring Plan.

2.8 <u>Electronic Data Deliverable Review</u>

The results and sample IDs in the EDD were reviewed against the information provided by the associated level II reports at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level II reports and the EDD.

3.0 RADIUM-226 AND RADIUM-228

The samples were analyzed for radium 226 and radium 228 per EPA Methods 903.0 and RA-05, respectively.

The areas of data review are listed below. A leading check mark (\checkmark) indicates an area of review in which the data were acceptable. A preceding crossed circle (\otimes) signifies areas where issues were raised during the course of the validation review and should be considered to determine the impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Method Blank
- ✓ Matrix Spike
- ✓ Laboratory Control Sample
- ✓ Laboratory Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The radium-226 and radium-228 data reported in this package are considered usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis for the data set is 100%.

3.2 <u>Holding Times</u>

The holding times for radium-226 and radium-228 analysis of waters are 180 days from sample collection to analysis. The holding times were met for the sample analyses.

3.3 <u>Method Blank</u>

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (one for the radium-226 data and two for the radium-228 data). The method blanks were within the validation criteria.

3.4 <u>Matrix Spike</u>

MSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three batch MSs were reported. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the data.

3.5 <u>Laboratory Control Sample</u>

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported for radium-226 and two LCSs were reported for radium-228. The recovery results were within the laboratory specified acceptance criteria.

3.6 <u>Laboratory Duplicate</u>

Batch laboratory duplicates were reported for the radium-226 and radium-228 data. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the data.

3.7 <u>Sensitivity</u>

The samples were reported to the minimum detectable concentrations (MDCs). The reported MDCs met the limits listed in Table 4 of the CCR Groundwater Monitoring Plan.

3.8 <u>Electronic Data Deliverable Review</u>

The results and sample IDs in the EDD were reviewed against the information provided by the associated level II reports at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level II reports and the EDD.

4.0 WET CHEMISTRY PARAMETERS

The samples were analyzed for chloride, fluoride and sulfate by EPA Method 300.0 and total dissolved solids by SM 2540C.

The areas of data review are listed below. A leading check mark (\checkmark) indicates an area of review in which the data were acceptable. A preceding crossed circle (\otimes) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- \otimes Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Laboratory Duplicate
- ✓ Field Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

4.1 <u>Overall Assessment</u>

The wet chemistry data reported in this package are considered usable for meeting project objectives. The results are considered to be valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the data set is 100%.

4.2 <u>Holding Times</u>

The holding times for chloride, fluoride and sulfate by EPA method 300.0 are 28 days from sample collection to analysis and the holding time for total dissolved solids by SM 2540C is 7 days from sample collection to analysis. The holding times were met for the sample analyses.

4.3 <u>Method Blanks</u>

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Method blanks were reported for each analysis as appropriate. The wet chemistry parameters were not detected in the method blanks above the MDLs, with the following exception.

Fluoride was detected at an estimated concentration greater than the MDL and less than the RL in the method blank for batch 18I0170. Therefore, the estimated concentrations of fluoride in the associated samples were U qualified as not detected at the RL.

Client Sample ID	Compound	Laboratory Result (mg/L)	Laboratory Flag	Validation Result (mg/L)	Validation Qualifier	Reason Code
BBS-CCR-1	Fluoride	0.235	I,V	0.500	U	3
BBS-CCR-2	Fluoride	0.298	I,V	0.500	U	3
BBS-CCR-3	Fluoride	0.309	I,V	0.500	U	3
BBS-CCR-BW2	Fluoride	0.338	I,V	0.500	U	3

mg/L-milligrams per liter

I-the reported value is between the laboratory method detection limit and the laboratory practical quantitation limit V-analyte detected in the method blank

4.4 <u>Matrix Spike/Matrix Spike Duplicate</u>

MS/MSDs were analyzed at the proper frequency for the number and types of samples analyzed (one pair per batch of 20 samples). Two batch MS/MSD pairs were reported for the method 300.0 data. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the data.

4.5 <u>Laboratory Control Sample</u>

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). LCSs were reported for each analysis as appropriate. The recovery results were within the laboratory specified acceptance criteria.

4.6 Laboratory Duplicate

Laboratory duplicates were reported for the total dissolved solids data. One sample set specific laboratory duplicate was reported for total dissolved solids using sample BBS-CCR-1. The RPD results were within the laboratory specified acceptance criteria.

4.7 <u>Field Duplicate</u>

Field duplicates were not reported with the sample sets.

4.8 <u>Sensitivity</u>

The samples were reported to the MDLs. The MDLs reported met the limits listed in Table 4 of the CCR Groundwater Monitoring Plan.

4.9 <u>Electronic Data Deliverables Review</u>

The results and IDs in the EDD were reviewed against the information provided by the associated level II reports at a minimum of 20% as part of the data validation process. The laboratory flags used in the laboratory report did not match the flags used in the EDD. No other discrepancies were identified between the level II reports and the EDD.

* * * * *

ATTACHMENT 1 DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2 DATA VALIDATION REASON CODES Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS or RPD recovery outside limits (LCS/LCSD)
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other