Geosyntec consultants

engineers | scientists | innovators

TECO TAMPA ELECTRIC AN EMERA COMPANY

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

Prepared by
Geosyntec Consultants, Inc.
12802 Tampa Oaks Boulevard
Suite 151
Tampa, FL 33637

Project FR2814

January 10, 2020

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACRONYMS

BBS	Big Bend Station
CCR	Coal Combustion Residuals
CCR Rule	Coal Combustion Residuals Rule
CFR	Code of Federal Regulations
EAPPS	Economizer Ash and Pyrite Pond System
GWPS	Groundwater Protection Standard
PE	Professional Engineer
RCRA	Resource Conservation and Recovery Act
SP	Statistical Analysis Plan
SSI	Statistically Significant Increase
TEC	Tampa Electric Company
USEPA	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, 2019 through December 31, 2019. 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 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 EAPPS ceased operation in April 2018. Economizer ash from Unit 4 is now combined with bottom ash and the combined product is stored in the Bottom Ash Ponds at the site for beneficial reuse.

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. Closure activities, including dewatering, commenced on the EAPPS in December 2019 and will continue until completion in 2021.

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 § 257.91(a)(1) 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 has consistently been north to northeast, as shown in **Figure 3** from groundwater elevations generated during the September 2019 detection monitoring event.

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

[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.

to 27 feet per year. An approximate groundwater flow velocity of 20 feet per year was estimated using the September 17, 2019 groundwater level measurements.

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 were 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 the EAPPS. The statistical analyses of each semi-annual detection monitoring event confirm that elevated groundwater pH at downgradient monitoring wells are within the local background range of pH. Therefore, detection monitoring continued in March 2019 and September 2019, as assessment monitoring was not required.

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 2019 CCR RULE ACTIVITIES COMPLETED

4.1 Requirements Completed

The actions completed during this reporting period are summarized below.

- The evaluation of the semi-annual 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 January 2019 (third detection monitoring event), July 2019 (fourth detection monitoring event), and December 2019 (fifth detection monitoring event).
- Initial construction activities to support the EAPPs closure project commenced in December 2019.

4.2 Completion of Required Reports

The following reports were completed during the reporting period:

- Summary of Results – Third Detection Monitoring Event, Economizer Ash and Pyrite Pond System, Big Bend Station, January 2019.
- Annual Groundwater Monitoring and Corrective Action Report, Big Bend Power Station – Economizer Ash and Pyrite Pond System, January 2019.
- Summary of Results – Fourth Detection Monitoring Event, Economizer Ash and Pyrite Pond System, Big Bend Station, July 2019.
- Summary of Results – Fifth Detection Monitoring Event, Economizer Ash and Pyrite Pond System, Big Bend Station, December 2019.

4.3 Problems Encountered and Resolution

During preliminary closure design activities, several of the monitoring wells in the groundwater monitoring system were identified as requiring abandonment due to their locations in construction areas. The monitoring wells will be abandoned in accordance with state and federal requirements in 2020 to facilitate construction.

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 fourth and fifth detection monitoring events were conducted in March 2019 and September 2019. 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. Summary tables of the field parameters and Appendix III and Appendix IV groundwater monitoring results since June 2016 are provided in Table A-1 and Table A-2, respectively, in Appendix A. The analytical laboratory reports for the March 2019 and September 2019 are provided in **Appendix B** and **Appendix C**, 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 has been the only Appendix III constituent reported above background concentrations in each of the detection monitoring events conducted in 2019, which is consistent with the 2018 findings. Groundwater pH was documented above the 95% upper prediction limit (UPL) at BBS-CCR-1 in the fourth (March 2019) detection monitoring event and above the UPL at BBS-CCR-1 and BBS-CCR-2 in the fifth (September 2019) detection monitoring event; the fifth (September 2019) detection monitoring event also indicated a groundwater pH below the lower prediction limit (LPL) at BBS-CCR-3. These exceedances of groundwater pH do not represent an SSI due to the findings from the 2018 ASD discussed in Section 5.1.3.

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, which continued to be the case in 2019.

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 remained in detection monitoring.

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 fourth and fifth detection monitoring events are included with the statistical analysis summary memoranda in **Appendix C**.

7. DETECTION MONITORING STATISTICAL ANALYSIS

The statistical analysis of the fourth (March 2019) and fifth (September 2019) detection monitoring data 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.

The statistical analysis summary memoranda for each of the 2019 detection monitoring events are provided in **Appendix D**. As stated in Section 5.1.2, groundwater pH was reported above the UPL in downgradient monitoring well BBS-CCR-1 during both events and downgradient monitoring well BBS-CCR-2 during the September 2019 event; these findings are consistent with those observed during the first three detection monitoring events. Groundwater pH was below the LPL at the third downgradient monitoring well during the September 2019 event for the first time.

As stated in Section 5.1.3, the 2018 ASD documented that groundwater pH is influenced by sources unrelated to the EAPPS and measurement resolution, and therefore does not indicate a release of CCR from the EAPPS.

Detection monitoring will discontinue in 2020 due to well abandonment requirements during voluntary closure of the EAPPs by TEC.

8. ASSESSMENT MONITORING STATISTICAL ANALYSIS

Not applicable for this annual reporting period.

9. ACTIVITIES PLANNED FOR 2020

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

- The abandonment of several monitoring wells in the GMS will be conducted as necessitated by closure activities for the EAPPs.
- Continuation of EAPP closure in accordance with 40 C.F.R. § 257.102(c) (closure by removal).

10. CORRECTIVE MEASURES

Not applicable for this annual reporting period.

11. REMEDY SELECTION

Not applicable for this annual reporting period.

12. CORRECTIVE ACTION

Corrective action of the EAPPs is not required in accordance with the Rule. However, TEC has opted to pursue clean closure of the EAPPS in accordance with 40 C.F.R. § 257.102(c).

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.

Geosyntec Consultants, Inc. 2018. Alternate Source Demonstration, Economizer Ash and Pyrite Pond System, Big Bend Power Station, April 2018.

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 West-central 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	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	Background	1256638.34	528461.95	29.10	33.40	40	30-40	-0.90	-10.90
BBS-CCR-BW2	Background	1256966.67	527897.28	7.70	12.54	19	9-19	-1.30	-11.30
BBS-CCR-1	Detection	1257433.85	528211.74	5.00	9.82	17.5	7.5-17.5	-2.50	-12.50
BBS-CCR-2	Detection	1257429.29	528769.31	5.00	9.34	17.5	7.5-17.5	-2.50	-12.50
BBS-CCR-3	Detection	1257154.61	529023.26	4.90	9.20	18.5	8.5-18.5	-3.60	-13.60

Notes

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

Notes.

1. EPA = US Environmental Protection Agency
2. MCL = Maximum Contaminant Level
3. ug/L = Micrograms per liter
4. SU = Standard Units; *2018 Alternate Source Demonstration documented that background levels and field instrument error influence groundwater pH.
5. pCi/L = picoCuries per liter

FIGURES

400 200 0 400 Feet

Legend

Jackson Branch

Economizer Ash and Pyrite Pond System (EAPPS)

Note:
Source of 2017 Aerials: Florida Department of Transportation, Aerial Photo Look Up System website.

Economizer Ash and Pyrite Pond System Location Map

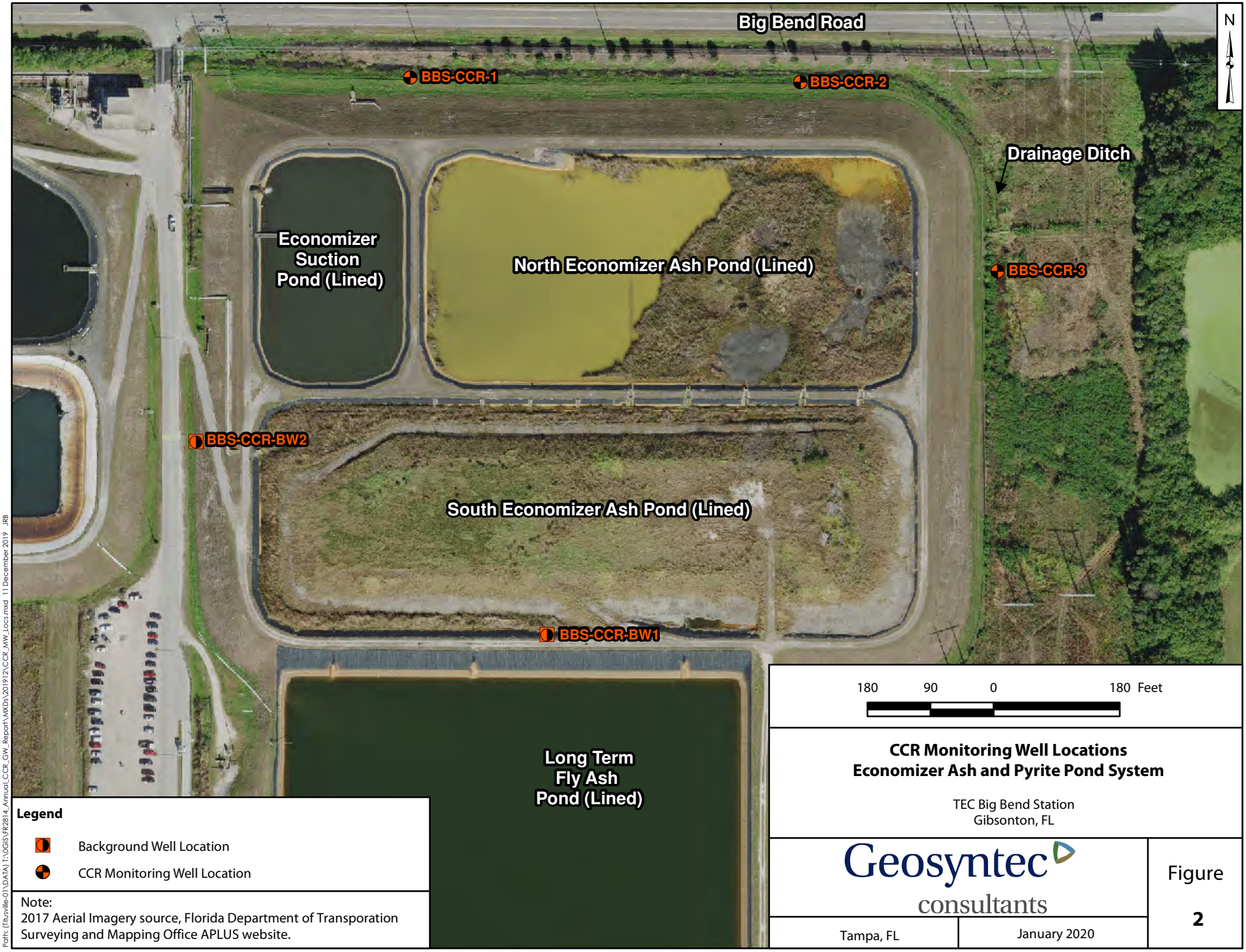
TEC Big Bend Station
Gibsonton, FL

Geosyntec consultants

Tampa, FL | January 2020

Figure 1

Path: (Tlusville-01\Data\T\GIS\FR2814 Annual CCR GW Report\MXDs\20191219\EAPPS.mxd 11 Dec 2019 JRB



Legend

- Background Well Location
- CCR Monitoring Well Location

Note:
2017 Aerial Imagery source, Florida Department of Transporation Surveying and Mapping Office APLUS website.

CCR Monitoring Well Locations
Economizer Ash and Pyrite Pond System

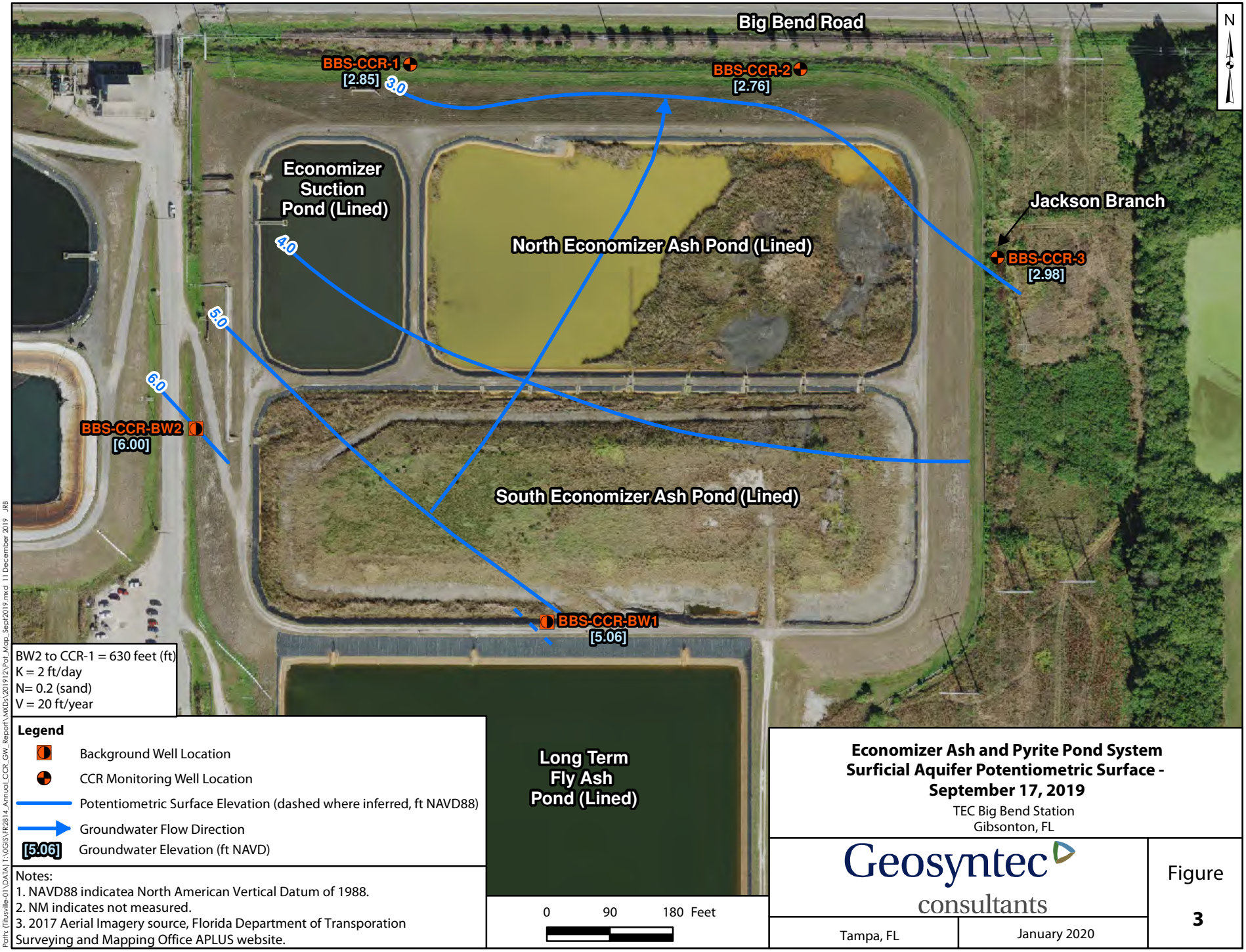
TEC Big Bend Station
Gibsonton, FL

Geosyntec consultants

Tampa, FL | January 2020

Figure **2**

Path: (Titusville-01\DATA) T:\GIS\FR2814_Annual_CCR_GW_Report\MXDs\2019\2\CCR_MW_Locs.mxd 11 December 2019 JRB


Big Bend Road
BBS-CCR-1
[2.85]
BBS-CCR-2
[2.76]
3.0
Economizer
Suction
Pond (Lined)
North Economizer Ash Pond (Lined)
Jackson Branch
BBS-CCR-3
[2.98]
4.0
5.0
6.0
BBS-CCR-BW2
[6.00]
South Economizer Ash Pond (Lined)
BBS-CCR-BW1
[5.06]
Long Term
Fly Ash
Pond (Lined)
N
BW2 to CCR-1 = 630 feet (ft)
K = 2 ft/day
N= 0.2 (sand)
V = 20 ft/year
Legend
Background Well Location
CCR Monitoring Well Location
Potentiometric Surface Elevation (dashed where inferred, ft NAVD88)
Groundwater Flow Direction
[5.06] Groundwater Elevation (ft NAVD)
Notes:
1. NAVD88 indicatea North American Vertical Datum of 1988.
2. NM indicates not measured.
3. 2017 Aerial Imagery source, Florida Department of Transporation Surveying and Mapping Office APLUS website.
0
90
180 Feet
Economizer Ash and Pyrite Pond System
Surficial Aquifer Potentiometric Surface -
September 17, 2019
TEC Big Bend Station
Gibsonton, FL
Geosyntec consultants
Tampa, FL
January 2020
Figure
3
Path: (Tillsville-01\DATA) T:\GIS\FR2814_Annual_CCR_GW_Report\MXDs\2019\2\Pot_Map_Sep\2019.mxd 11 December 2019 JRB

APPENDIX A

CCR Groundwater Monitoring Data – June 2016 through September 2019

TABLE A-1 EAPP CCR GROUNDWATER MONITORING FIELD PARAMETERS
TECO Big Bend Station

		Field Parameters								
		Top of Casing Elevation (a)	Depth to Water	Groundwater Elevation	Temperature	Specific Conductivity (field)	pH (field)	Dissolved Oxygen	Redox Potential	Turbidity(field)
	Units	ft NAVD 88	ft BTOC	ft NAVD 88	C	umhos/cm	SU	mg/L	mV	NTU
	MCL	--	--	--	NA	NA	6.5-6.8	NA	NA	NA
Well ID	Sample Date	--	Result	Result	Result	Result	Result	Result	Result	Result
BBS-CCR-BW1	6/24/2016	30.13	25.37	4.76	27.84	5620	6.51	0.18	-8.6	5.14
	7/27/2016	30.13	26.19	3.94	28.25	5420	6.38	0.17	-7.3	7.1
	8/26/2016	30.13	25.78	4.35	28.11	5140	6.41	0.12	-22.8	6.47
	10/28/2016	33.40	29.42	3.98	27.46	4860	6.50	0.13	-76.2	4.08
	11/10/2016	33.40	29.84	3.56	27.50	5000	6.52	0.13	-71.1	1.77
	1/26/2017	33.40	30.49	2.91	26.98	4940	6.46	0.20	-20.2	2.04
	4/13/2017	33.40	30.71	2.69	27.20	1580	6.49	0.14	-114	4.22
	6/28/2017	33.40	29.92	3.48	27.72	5010	6.47	0.42	-11.4	0.69
	7/20/2017	33.40	28.89	4.51	27.89	4960	6.49	0.60	-23	2.38
	8/16/2017	33.40	28.74	4.66	28.08	5000	6.52	0.45	3.6	6.03
	10/13/2017	33.40	29.60	3.80	28.16	4570	6.55	0.40	-18.4	2.51
	4/13/2018	33.40	29.37	4.03	27.64	4800	6.51	0.27	-10.3	4.26
	9/12/2018	33.40	28.42	4.98	27.71	4410	6.51	0.55	-11.1	2.62
	3/14/2019	33.40	29.03	4.37	27.89	4225	6.49	0.14	3	3.64
	9/17/2019	33.40	28.34	5.06	29.71	4172	6.52	0.100	-19	3.67
BBS-CCR-BW2	6/24/2016	9.81	4.72	5.09	26.42	1640	6.53	0.37	-59.4	6.7
	7/27/2016	9.81	5.52	4.29	27.56	1500	6.48	0.15	-84.1	4.86
	8/26/2016	9.81	5.22	4.59	27.74	1380	6.48	0.10	-59.5	1.73
	10/28/2016	12.54	8.06	4.48	27.22	1340	6.67	0.37	-91.5	3.99
	11/10/2016	12.54	8.45	4.09	27.10	1400	6.68	0.20	-73.8	5.86
	1/26/2017	12.54	9.13	3.41	25.25	1460	6.62	0.30	-74.1	16.4
	4/13/2017	12.54	9.24	3.30	30.71	1480	6.67	1.3	-42	19
	6/28/2017	12.54	8.53	4.01	26.69	1538	6.64	0.19	-82.4	6.09
	7/20/2017	12.54	7.45	5.09	27.20	1540	6.66	0.33	-94	5.27
	8/16/2017	12.54	7.33	5.21	27.69	1580	6.68	0.43	-53.3	3.66
	10/13/2017	12.54	7.38	5.16	27.95	1700	6.70	0.28	-72.1	3.96
	4/13/2018	12.54	8.02	4.52	24.90	1590	6.69	0.61	-36.3	17.3
	9/12/2018	12.54	7.05	5.49	27.46	1960	6.60	0.83	-44.2	4.34
	3/14/2019	12.54	7.68	4.86	24.7	1929	6.56	0.11	-12	16.8
	9/17/2019	12.54	6.54	6.00	27.36	1940	6.60	0.16	-26	5.54
BBS-CCR-1	6/24/2016	7.79	3.51	4.28	25.48	3940	6.80	0.10	-49.1	8.01
	7/27/2016	7.79	5.00	2.79	26.41	4180	6.67	0.22	-74.1	3.88
	8/26/2016	7.79	5.06	2.73	27.05	4000	6.71	0.14	-34.8	2.08
	10/28/2016	9.82	6.78	3.04	25.78	4060	6.83	0.10	-107	3.22
	11/10/2016	9.82	7.38	2.44	25.70	4290	6.82	0.10	-136	0.89
	1/26/2017	9.82	7.46	2.36	24.03	4320	6.79	0.10	-110	1.99
	4/13/2017	9.82	7.64	2.18	23.70	4170	6.84	0.10	-80.4	4.12
	6/28/2017	9.82	7.41	2.41	25.54	4063	6.78	0.27	-80.6	3.63
	7/20/2017	9.82	5.86	3.96	25.81	3960	6.81	0.10	-122	1.58
	8/16/2017	9.82	7.03	2.79	25.80	4110	6.82	0.28	-109	1.88
	10/13/2017	9.82	7.32	2.50	26.57	4260	6.83	0.24	-83.3	0.89
	4/13/2018	9.82	7.40	2.42	24.90	4170	6.83	0.11	-61.6	3.76
	9/12/2018	9.82	6.75	3.07	26.10	4120	6.80	0.20	-74.9	9.47
	3/14/2019	9.82	7.27	2.55	24.09	4040	6.81	0.10	-66	1.74
	9/17/2019	9.82	6.97	2.85	26.05	4266	6.82	0.15	-66	2.73

TABLE A-1 EAPP CCR GROUNDWATER MONITORING FIELD PARAMETERS
TECO Big Bend Station

		Field Parameters								
		Top of Casing Elevation (a)	Depth to Water	Groundwater Elevation	Temperature	Specific Conductivity (field)	pH (field)	Dissolved Oxygen	Redox Potential	Turbidity(field)
	Units	ft NAVD 88	ft BTOC	ft NAVD 88	C	umhos/cm	SU	mg/L	mV	NTU
	MCL	--	--	--	NA	NA	6.5-6.8	NA	NA	NA
Well ID	Sample Date	--	Result	Result	Result	Result	Result	Result	Result	Result
BBS-CCR-2	6/24/2016	8.14	3.45	4.69	25.62	1580	6.80	0.10	-71	4.9
	7/27/2016	8.14	5.30	2.84	26.42	1700	6.68	0.13	-67.4	7.16
	8/26/2016	8.14	5.35	2.79	27.35	1570	6.74	0.10	-27.3	3.31
	10/28/2016	9.34	6.78	2.56	25.64	1500	6.87	0.10	-183	3.73
	11/10/2016	9.34	6.88	2.46	25.66	1540	6.89	0.13	-186	7.1
	1/26/2017	9.34	6.93	2.41	24.27	1560	6.89	0.10	-182	4.93
	4/13/2017	9.34	7.15	2.19	23.95	1540	6.93	0.10	-138	3.43
	6/28/2017	9.34	6.97	2.37	25.12	1485	6.87	0.24	-131	4.71
	7/20/2017	9.34	5.06	4.28	25.74	1630	6.97	0.10	-154	4.56
	8/16/2017	9.34	6.53	2.81	26.43	1560	6.92	0.25	-233	3.22
	10/13/2017	9.34	6.88	2.46	26.46	1350	6.87	0.20	-188	3.03
	4/13/2018	9.34	6.89	2.45	24.60	1360	6.86	0.20	-92	2.96
	9/12/2018	9.34	6.23	3.11	26.74	1520	6.29	0.24	-38.8	3.43
	3/14/2019	9.34	6.76	2.58	23.92	1422	6.74	0.10	-118	8.5
	9/17/2019	9.34	6.58	2.76	26.13	1441	6.73	0.14	-56	2.49
BBS-CCR-3	6/24/2016	6.78	1.51	5.27	26.62	1580	6.42	0.54	-145	11.5
	7/27/2016	6.78	3.60	3.18	27.28	1740	6.19	0.10	-74.4	8.04
	8/26/2016	6.78	3.48	3.30	27.07	1690	6.29	0.15	-155	6.35
	10/28/2016	9.20	6.54	2.66	26.20	1640	6.42	0.10	-266	3.26
	11/10/2016	9.20	6.77	2.43	26.10	1650	6.46	0.10	-239	1.18
	1/26/2017	9.20	6.81	2.39	24.25	1510	6.42	0.11	-168	1.79
	4/13/2017	9.20	7.13	2.07	24.27	1580	6.49	0.14	-114	4.22
	6/28/2017	9.20	6.64	2.56	26.15	1755	6.38	0.28	-125	0.94
	7/20/2017	9.20	4.77	4.43	26.73	1750	6.36	0.17	-122	0.51
	8/16/2017	9.20	6.04	3.16	26.86	1790	6.42	0.29	-206	0.47
	10/13/2017	9.20	6.52	2.68	27.18	1750	6.44	0.37	-249	2.39
	4/13/2018	9.20	6.63	2.57	24.06	1810	6.41	0.19	-101	3.79
	9/12/2018	9.20	5.79	3.41	26.88	1690	6.41	0.52	-105	3.47
	3/14/2019	9.20	6.27	2.93	23.74	1830	6.43	0.1	-192	10.1
	9/17/2019	9.20	6.22	2.98	27.30	1802	6.33	0.2	-160	9.29

NOTES:

(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.

Abbreviations:

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
umhos/cm - micromohs per centimeter
mV - millivolts

TABLE A-2 - EAPP CCR GROUNDWATER APPENDIX III AND APPENDIX IV RESULTS
TECO Big Bend Station

		Appendix III Parameters												Appendix IV Parameters															
		Boron		Calcium		Chloride		Fluoride		Sulfate		TDS		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Cobalt	
	Units	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	
	MCL	1.4**		NA		*250*		*4****		*250*		*500*		6		10		2000		4		5		100		140**	
Well ID	**Sample Date**	**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	**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**	**I**
	7/27/2016	**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**	**I**
	8/26/2016	**53.7**	**V**	**729**		**1030**		**0.18**		**1420**		**4290**		**1.77**	**I**	**8.89**		**61.4**		0.200	U	0.100	U	1.60	U	**1.52**	**I**
	10/28/2016	**51.4**		**675**	**V**	**939**	**V**	**0.194**		**1400**		**4120**	**J-**	6.00	U	3.20	U	**60.0**		0.200	U	1.00	U	1.60	U	**0.963**	**I**
	11/10/2016	**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**	**I**
	1/26/2017	**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**	**I**
	4/13/2017	**49.0**		**693**		**934**		**0.256**		**1550**		**4060**	**J**	0.600	U	**8.61**		**53.6**		0.200	U	**0.108**	**I**	**3.23**	**I**	2.00	U
	6/28/2017	**51.7**		**781**		**995**		**0.298**		**1510**		**4430**		0.600	U	**7.68**		**55.4**		0.200	U	**0.124**	**I**	**2.29**	**I**	**1.71**	**I**
	7/20/2017	**47.0**		**744**	**V**	**915**	**V**	**0.255**	**J**	**1470**		**4160**	**J**	6.00	U	**8.48**	**I**	**51.7**		0.200	U	1.00	U	**2.16**	**I**	**1.97**	**I**
	8/16/2017	**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	**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	**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	**33.2**		**664**		**727**		**0.818**		**1290**		**3740**		0.600	U	**10.1**		**51.5**		0.500	U	**0.203**	**I**	**1.60**		**1.88**	**I**
	3/14/2019	**33.4**		**653**		**649**		**0.537**	**J+**	**1380**		**3160**		0.600	U	**9.60**		**48.0**		0.500	U	0.100	U	1.60	U	**1.75**	**J**
	9/17/2019	**33.5**		**619**		**622**		**0.34**		**1320**		**3180**		2.00	U	**7.81**		**43.9**		2.00	U	0.500	U	12.0	U	**2.14**	
BBS-CCR-BW2	6/24/2016	**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
	7/27/2016	**4.25**		**271**		**116**		**0.432**		**341**		**1060**		0.600	U	**1.75**	**I**	**49.8**		0.200	U	0.100	U	1.60	U	**0.14**	**I**
	8/26/2016	**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**	**I**
	10/28/2016	**3.90**		**238**	**J-,V**	**125**	**V**	**0.44**		**246**		**1010**		0.600	U	**1.62**	**I**	**46.3**		0.200	U	0.100	U	1.60	U	**0.151**	**I**
	11/10/2016	**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**	**I**
	1/26/2017	**3.27**		**240**		**145**	**V**	**0.472**		**255**		**1140**		0.600	U	**0.709**	**I**	**38.8**		0.200	U	0.100	U	1.60	U	**0.136**	**I**
	4/13/2017	**4.08**		**260**		**140**		**0.478**		**323**		**1120**		0.600	U	**1.45**	**I**	**42.7**		0.200	U	0.100	U	1.60	U	2.00	U
	6/28/2017	**4.54**	**J-**	**290**	**J-**	**135**		**0.559**		**402**		**1170**		0.600	U	**1.68**	**I**	**48.8**		0.200	U	0.100	U	**1.68**	**I**	**0.0959**	**I**
	7/20/2017	**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**	**I**	0.400	U
	8/16/2017	**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	**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	**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	**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**	**I**
	3/14/2019	**2.28**		**344**		**141**		0.495	U	**538**		**1380**		0.600	U	0.32	U	**55.0**		0.500	U	0.100	U	**4.07**	**J**	0.136	U
	9/17/2019	**2.83**		**367**		**118**		**0.378**		**630**		**1460**		2.00	U	**7.27**		**61.6**		2.00	U	0.500	U	12.0	U	**0.427**	**J**
BBS-CCR-1	6/24/2016	**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
	7/27/2016	**0.306**		**227**		**742**	**J-**	**0.128**		**1320**	**J-**	**3140**		**1.03**	**I**	**7.38**		**30.8**		0.200	U	0.100	U	1.60	U	**0.45**	**I**
	8/26/2016	**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	**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**	**I**
	11/10/2016	**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**	**I**
	1/26/2017	**15.5**	**J-**	**579**	**J-**	**820**	**V**	**0.184**		**1350**		**3670**	**J**	**0.602**	**I**	**9.04**		**115**		0.200	U	0.100	U	1.60	U	**0.489**	**I**
	4/13/2017	**16.4**		**555**		**124**		**0.17**		**443**		**3110**	**J**	0.600	U	**10.53**		**116**	**I**	2.00	U	0.100	U	1.60	U	2.00	U
	6/28/2017	**16.5**		**569**		**720**		**0.208**		**1120**		**3140**		0.600	U	**9.76**		**113**		0.200	U	0.100	U	**1.93**	**I**	**0.484**	**I**
	7/20/2017	**16.0**		**576**	**V**	**694**	**J-, V**	**0.157**	**J**	**1390**		**3400**	**J**	3.00	U	**10.3**		**112**		0.200	U	0.500	U	**1.62**	**I**	**0.495**	**I**
	8/16/2017	**17.0**		**572**		**710**		**0.2**		**1240**		**2960**	**J**	0.600	U	**9.33**		**122**		0.200	U	0.100	U	1.60	U	**0.473**	**J**
	10/13/2017	**19.9**		**596**		**716**		**0.201**		**1230**		**3470**		0.600	U	**9.03**		**129**		0.200	U	0.100	U	1.60	U	**0.453**	**J**
	4/13/2018	**19.6**		**577**		**714**		**0.21**		**1290**		**3230**		0.600	U	**8.44**		**117**		0.200	U	**0.25**		**1.60**	**I**	**0.522**	
	9/12/2018	**19.9**		**549**		**674**		**0.235**	**I,V**	**1220**		**3250**		0.600	U	**9.8**		**114**		0.500	U	0.100	U	1.60	U	**0.556**	**I**
	3/14/2019	**18.4**		**518**		**664**		0.415	U	**1160**		**3000**		0.600	U	**10.0**		**112**		0.500	U	0.100	U	1.60	U	**0.546**	**J**
	9/17/2019	**21.0**		**575**		**766**		**0.195**		**1140**		**3250**		2.00	U	**6.82**		**111**		2.00	U	0.500	U	12.0	U	**0.518**	**J**

TABLE A-2 - EAPP CCR GROUNDWATER APPENDIX III AND APPENDIX IV RESULTS
TECO Big Bend Station

		Appendix III Parameters												Appendix IV Parameters															
		Boron		Calcium		Chloride		Fluoride		Sulfate		TDS		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Cobalt	
	Units	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	
	MCL	1.4**		NA		*250*		*4****		*250*		*500*		6		10		2000		4		5		100		140**	
Well ID	**Sample Date**	**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	**1.55**		**198**		**118**		**0.148**		**471**		**1170**	J-	0.600	U	**1.83**	I	**65.0**		0.200	U	0.100	U	1.60	U	1.00	U
	7/27/2016	**2.81**		**193**		**140**		**0.183**		**542**		**1170**		**0.83**	I	**0.99**	I	**64.8**		0.200	U	0.100	U	1.60	U	**0.09**	I
	8/26/2016	**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	**2.08**		**181**	V	**112**	V	**0.171**		**468**		**1130**		0.600	U	**1.16**	I	**60.6**		0.200	U	0.100	U	1.60	U	**0.107**	I
	11/10/2016	**2.28**		**181**		**111**	V	**0.168**		**468**		**1110**		0.600	U	**1.37**	I	**62.4**		0.200	U	0.100	U	1.60	U	**0.105**	I
	1/26/2017	**3.86**		**172**		**115**	J+	**0.248**	J+	**490**	J-	**1140**		0.600	U	**1.09**	I	**54.6**		0.200	U	0.100	U	1.60	U	**0.0902**	I
	4/13/2017	**5.01**		**163**		**119**		**0.237**		**485**	J-	**1150**		0.600	U	**2.64**		**55.8**		0.200	U	0.100	U	**2.29**	I	2.00	U
	6/28/2017	**3.20**		**173**		**105**		**0.214**		**415**	J-	**1080**		0.600	U	**1.01**	I	**54.6**		0.200	U	0.100	U	**1.96**	I	**0.0875**	I
	7/20/2017	**4.94**		**178**	V	**114**	V	**0.166**	J	**481**		**1140**		0.600	U	**0.974**	I	**54.6**		0.423	U	0.100	U	**3.11**	I	**0.0857**	I
	8/16/2017	**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	**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	**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	**0.177**	J-, V	**218**		**88.7**		**0.298**	I,V	**375**		**1060**		0.600	U	**1.34**	I	**65.2**	J-	0.500	J-, U	0.100	U	1.60	J-, U	0.136	U
	3/14/2019	**0.279**		**208**		**77.2**		0.394	U	**445**		**1060**		0.600	U	**1.46**	J	**66.6**		0.500	U	0.100	U	1.60	U	0.136	U
	9/17/2019	**0.199**		**212**		**79.5**		**0.183**		**419**		**1040**		2.00	U	**2.51**		**61.4**		2.00	U	0.500	U	43.8	U	2.00	U
BBS-CCR-3	6/24/2016	**0.662**		**187**		**88.9**		**0.313**		**474**		**1200**		0.600	U	**1.23**	I	**65.3**		0.200	U	0.100	U	1.60	U	1.00	U
	7/27/2016	**13.2**		**196**		**140**		**0.262**		**516**		**1220**		**0.77**	I	**0.54**	I	**67.6**		0.200	U	0.100	U	1.60	U	**0.09**	I
	8/26/2016	**0.54**	V	**200**		**136**		**0.286**		**517**		**1210**		0.600	U	**0.603**	I	**63.6**		**0.272**	I	0.100	U	1.60	U	**0.125**	I
	10/28/2016	**0.532**		**201**	V	**140**	V	**0.299**		**541**		**1220**		0.600	U	**0.623**	I	**66.3**		0.200	U	0.100	U	1.60	U	**0.124**	I
	11/10/2016	**0.502**		**200**		**129**	V	**0.331**		**492**		**1220**		0.600	U	**0.765**	I	**63.0**		0.200	U	0.100	U	1.60	U	**0.117**	I
	1/26/2017	**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**	I
	4/13/2017	**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	**0.184**		**192**		**168**		**0.338**		**493**		**1280**		0.600	U	**0.525**	I	**61.8**		0.200	U	0.100	U	**3.12**	I	**0.119**	I
	7/20/2017	**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**	I	0.200	U
	8/16/2017	**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	**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	**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	**0.398**	V	**191**		**132**		**0.309**	I.V	**469**		**1200**		0.600	U	**0.613**	I	**62.8**		0.500	U	0.100	U	1.60	U	**0.136**	
	3/14/2019	**0.259**		**207**		**161**		**0.513**	J+	**534**		**1350**		0.600	U	0.365	J	**69.5**		0.500	U	0.100	U	**5.29**	J	**0.207**	J
	9/17/2019	**0.541**		**211**		**129**		**0.39**		**540**		**1300**		2.00	U	2.00	U	**64.3**		2.00	U	0.500	U	12.0	U	2.00	U

TABLE A-2 - EAPP CCR GROUNDWATER APPENDIX III AND APPENDIX IV RESULTS
TECO Big Bend Station

		Appendix IV Parameters													
		Lead		Lithium		Mercury		Molybdenum		Radium 226/228		Selenium		Thallium	
	Units	ug/L		ug/L		ug/L		ug/L		pCi/L		ug/L		ug/L	
	MCL	15		140**		2		35**		1		50		2	
Well ID	Sample Date	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
BBS-CCR-BW1	6/24/2016	0.080	U	**8.9**	**I**	0.050	U	**4.46**	**I**	**38.0**		**2.09**		**0.118**	**I**
	7/27/2016	**0.200**	**I**	**20**	**I**	0.050	U	**2.88**	**I**	**35.0**		**1.92**	**I**	0.100	U
	8/26/2016	**0.111**	**I**	**7.4**	**I**	0.050	U	**11.1**	**I**	**31.0**		**1.73**	**I**	0.100	U
	10/28/2016	0.800	U	**11**	**I**	0.050	U	**6.00**	**I**	**32.3**		2.00	U	1.00	U
	11/10/2016	**0.102**	**I**	**10**	**I**	0.050	U	**6.58**	**I**	**29.9**		**2.51**		0.100	U
	1/26/2017	**0.113**	**I**	**18**	**I**	0.050	U	**7.16**	**I**	**32.5**		0.2	U	0.100	U
	4/13/2017	**0.129**	**I**	**39.7**		0.050	U	**15.6**	**I**	**39.7**		**1.62**	**I**	0.100	U
	6/28/2017	0.080	U	15	U	0.050	U	16.3	U	**37.8**		**1.81**	**I**	0.100	U
	7/20/2017	0.800	U	**17**	**I**	0.050	U	**13.6**	**I**	**37.2**		2.00	U	1.00	U
	8/16/2017	**0.291**	**J**	0.05	U	0.050	U	**1.43**	**J**	**30.1**		**1.76**	**J**	0.100	U
	10/13/2017	**0.103**	**J**	**17**	**V**	0.050	U	**4.27**	**J**	**22.1**		**2.14**	**J**	0.100	U
	4/13/2018	**0.236**		**26**		0.050	U	**8.65**		**36.3**		**2.66**		**0.101**	
	9/12/2018	**0.141**	**I**	**17**	**I**	0.050	U	**22.5**		**23.6**		**1.83**	**I**	**0.126**	**I**
	3/14/2019	**0.234**	**J**	**19**	**J**	0.2000	U	**30.5**		**32.5**		**1.37**	**J**	0.100	U
	9/17/2019	**0.0895**	**J**	**23**	**J**	0.800	U	**21.8**		**29.9**		**3.09**		0.500	U
BBS-CCR-BW2	6/24/2016	0.080	U	**3.8**	**I**	0.050	U	**2.4**	**I**	**4.8**		**0.722**	**I**	0.100	U
	7/27/2016	0.080	U	**9.1**	**I**	0.050	U	1	U	**5.1**	**J**	**0.76**	**I**	0.100	U
	8/26/2016	0.080	U	**2**	**I**	0.050	U	**7.57**		**4.0**		**0.577**	**I**	0.100	U
	10/28/2016	0.080	U	**3.8**	**I**	0.050	U	**1.42**	**I**	**4.8**		**0.489**	**I**	0.100	U
	11/10/2016	0.080	U	**1.7**	**I**	0.050	U	1.00	U	**8.0**		**0.485**	**I**	0.100	U
	1/26/2017	0.080	U	**5.2**	**I**	0.050	U	**2.56**	**I**	**4.8**	**J**	**0.26**	**I**	0.100	U
	4/13/2017	0.080	U	**3.4**		0.050	U	**9.65**	**I**	**4.5**		**0.539**	**I**	0.100	U
	6/28/2017	0.080	U	**5.2**	**I**	0.050	U	10.2	U	**4.8**		**0.386**	**I**	0.100	U
	7/20/2017	0.800	U	**5.9**	**I**	0.050	U	**8.9**	**I**	**4.4**		2.00	U	1.00	U
	8/16/2017	**0.101**	**J**	0.05	U	0.050	U	**4.08**	**J**	**4.9**		**0.42**	**J**	0.100	U
	10/13/2017	0.080	U	**8.2**	**I,V**	0.050	U	**2.51**	**J**	**4.9**		**0.523**	**J**	0.100	U
	4/13/2018	**0.112**		**9.9**		0.050	U	**3.28**		**4.7**		**0.666**		0.100	U
	9/12/2018	0.080	U	**6.2**	**I**	0.050	U	2.5	U	**3.7**		**0.563**	**I**	0.100	U
	3/14/2019	0.0800	U	**8.2**	**J**	0.5000	U	**3.51**	**J**	**4.8**		**0.609**	**J**	0.100	U
	9/17/2019	2.00	U	50	U	0.800	U	**4.90**	**J**	**4.7**		**1.6**	**J**	0.500	U
BBS-CCR-1	6/24/2016	0.080	U	**8.3**	**I**	0.050	U	**106**		**39.0**		**0.696**	**I**	0.100	U
	7/27/2016	**0.110**	**I**	**15**	**I**	0.050	U	**105**		**33.0**		**0.96**	**I**	0.100	U
	8/26/2016	0.080	U	**7.4**	**I**	0.050	U	**80.3**		**15.0**		**0.385**		0.100	U
	10/28/2016	0.080	U	**12**	**I**	0.050	U	**95.5**		**42.6**		**0.69**	**I**	0.100	U
	11/10/2016	0.080	U	**8.4**	**I**	0.050	U	**98.4**		**37.3**		**1.04**	**I**	0.100	U
	1/26/2017	0.080	U	**14**	**I**	0.050	U	**92.4**		**32.5**		**0.653**	**I**	0.100	U
	4/13/2017	**0.0979**	**I**	**10**	**I**	0.050	U	**124**	**I**	**35.8**	**I**	**0.937**	**I**	0.100	U
	6/28/2017	0.080	U	**13**	**I**	0.050	U	**96.5**	**I**	**41.4**		**0.756**	**I**	0.100	U
	7/20/2017	0.400	U	**14**	**I, J3**	0.050	U	**99.6**		**34.7**		**2.25**	**I**	0.500	U
	8/16/2017	0.080	U	0.05	U	0.050	U	**86.4**		**33.4**		**0.918**	**J**	0.100	U
	10/13/2017	0.080	U	**15**	**I,V**	0.050	U	**82.5**		**35.6**		**0.99**	**J**	0.100	U
	4/13/2018	**0.328**		**22**		0.050	U	**74.8**		**34.0**		**0.908**		0.100	U
	9/12/2018	0.080	U	**16**	**I**	0.050	U	**73.4**		**34.7**		**0.721**	**I**	0.100	U
	3/14/2019	0.0800	U	**13**	**J**	0.2000	U	**84.3**		**33.9**		**0.943**	**J**	0.100	U
	9/17/2019	2.00	U	**18**	**J**	0.800	U	**83.8**		**30.4**		**2.51**		0.500	U

TABLE A-2 - EAPP CCR GROUNDWATER APPENDIX III AND APPENDIX IV RESULTS
TECO Big Bend Station

		Appendix IV Parameters													
		Lead		Lithium		Mercury		Molybdenum		Radium 226/228		Selenium		Thallium	
	Units	ug/L		ug/L		ug/L		ug/L		pCi/L		ug/L		ug/L	
	MCL	15		140**		2		35**		1		50		2	
Well ID	Sample Date	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
BBS-CCR-2	6/24/2016	0.080	U	**10**	**I**	0.050	U	**1.73**	**I**	**15.0**		**0.376**	**I**	0.100	U
	7/27/2016	**0.110**	**I**	**17**	**I**	0.050	U	1	U	**13.2**		**0.28**	**I**	0.100	U
	8/26/2016	0.080	U	**11**	**I**	0.050	U	**7.78**		**32.0**		0.200	U	0.100	U
	10/28/2016	**0.129**	**I**	**14**	**I**	0.050	U	1	U	**14.9**		**0.333**	**I**	0.100	U
	11/10/2016	**0.0955**	**I**	**11**	**I**	0.050	U	**1.43**	**I**	**14.8**		**0.259**	**I**	0.100	U
	1/26/2017	0.080	U	**13**	**I**	0.050	U	**2.52**	**I**	**13.9**		0.200	U	0.100	U
	4/13/2017	**0.176**	**I**	**13**	**I**	0.050	U	**9.82**	**I**	**14.2**		0.200	U	0.100	U
	6/28/2017	**0.144**	**I**	**14**	**I**	0.050	U	9.59	U	**14.7**		0.200	U	0.100	U
	7/20/2017	**0.127**	**I**	**16**	**I**	0.050	U	**9.88**	**I**	**14.4**		**0.474**	**I**	0.100	U
	8/16/2017	**0.244**	**J**	0.05	U	0.050	U	**3.02**	**J**	**12.1**		**0.662**	**J**	0.200	U
	10/13/2017	**0.150**	**J**	**16**	**I,V**	0.050	U	**1.99**	**J**	**13.5**		**0.474**	**J**	0.100	U
	4/13/2018	**0.167**		**17**		0.050	U	**2.69**		**17.4**		**0.395**		0.100	U
	9/12/2018	**0.102**	**I**	**13**	**I**	0.050	U	2.50	J-, U	**15.3**		0.509	U	0.100	U
	3/14/2019	**0.106**	**J**	**10**	**J**	0.2000	U	3.63	J-, U	**15.8**		0.509	U	0.100	U
	9/17/2019	2.00	U	**14**	**J**	0.800	U	**4.55**	**J**	**16.2**		**0.778**	**J**	0.500	U
BBS-CCR-3	6/24/2016	**0.125**	**I**	**3.7**	**I**	0.058	I	**4.09**	**I**	**10.3**		**0.262**	**I**	0.100	U
	7/27/2016	**0.080**	**I**	**11**	**I**	0.050	U	**2.23**	**I**	**12.3**		**0.27**	**I**	0.100	U
	8/26/2016	0.080	U	**6.1**	**I**	0.050	U	**8.1**		**15.0**		0.200	U	0.100	U
	10/28/2016	**0.107**	**I**	**8.2**	**I**	0.050	U	**3.63**	**I**	**18.1**		0.200	U	0.100	U
	11/10/2016	0.080	U	**6.1**	**I**	0.050	U	**3.9**	**I**	**17.5**		**0.253**	**I**	0.100	U
	1/26/2017	0.080	U	**7.7**	**I**	0.050	U	**5.42**	**I**	**15.0**		0.200	U	0.100	U
	4/13/2017	0.080	U	**6.3**	**I**	0.050	U	**11.7**	**I**	**14.4**		0.200	U	0.100	U
	6/28/2017	0.080	U	**5.2**	**I**	0.050	U	11.9	U	**17.7**		0.200	U	0.100	U
	7/20/2017	0.400	U	**10**	**I**	0.050	U	**10.6**	**I**	**20.3**		1.00	U	0.500	U
	8/16/2017	0.080	U	0.05	U	0.050	U	**3.14**	**J**	**19.6**		0.200	U	0.100	U
	10/13/2017	0.080	U	**11**	**I,V**	0.050	U	**3.82**	**J**	**20.0**		**0.285**	**J**	0.100	U
	4/13/2018	**0.0911**		**15**		0.050	U	**3.64**		**19.9**		**0.357**		0.100	U
	9/12/2018	0.080	U	**11**	**I**	0.050	U	**3.99**	**I**	**14.8**		0.509	U	0.100	U
	3/14/2019	**0.202**	**J**	**9.6**	**J**	0.2000	U	**7.69**	**J**	**19.0**		**0.526**	**J**	0.100	U
	9/17/2019	2.00	U	**13**	**J**	0.800	U	**12.7**	**J**	**17.7**		**0.983**	**J**	0.500	U

Abbreviations:
Q - Data qualifier
mg/L - milligrams per liter
ug/L - micrograms per liter
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 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 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 criteria.
10. MCLs - EPA Maximum Contaminant Levels; primary enforceable standards shown unless otherwise noted. Secondary (non-enforceable) standards shown in italics.
11. ** Florida GCTLs per FDEP Chapter 62-777 of the Florida Administrative Code.
12. *** Secondary MCL for fluoride is 2 mg/L but not enforceable.
13. Detections are shown in **bold** text.

APPENDIX B

Laboratory Analytical Data Report – Fourth Detection Monitoring Event (March 2019)

Tampa Electric Laboratory Services

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

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

Report Date: 04/01/19 10:37

Work Order - L19C024 **Project - CCR Wells Economizer Ash Pond**

Case Narrative

5 sample(s) were received on 03/14/19 15:21.

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 Boron and Calcium could not be accurately determined due to the amount of target analyte in the sample matrix. The parent sample is flagged with a J qualifier.

Tampa Electric Laboratory Services

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: **L19C024-01**

Sample Description: BBS-CCR-1

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 3/14/19 14:02

Date of Sample Receipt: 3/14/19 15:21

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Tampa Electric Company, Laboratory Services									
General Chemistry Parameters									
Chloride	**664**	mg/L	1.00	5.00		10	EPA 300.0	TMH	3/27/19 14:58
Specific Conductance	**4040**	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	3/14/19 14:02
Dissolved Oxygen	0.100	mg/L	0.100	0.100	U	1	FDEP SOP FT 1500	RAB	3/14/19 14:02
Fluoride	**0.415**	mg/L	0.100	0.500	I	10	EPA 300.0	TMH	3/27/19 14:58
pH	**6.81**	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	3/14/19 14:02
REDOX Potential	**-66.0**	mV	-999	-999		1	SM 2580B	RAB	3/14/19 14:02
Total Dissolved Solids	**3000**	mg/L	20.0	20.0		2	SM 2540C	ERS	3/18/19 11:30
Sulfate	**1160**	mg/L	50.0	200		100	EPA 300.0	TMH	3/27/19 15:08
Turbidity	**1.74**	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	3/14/19 14:02
Total Mercury by SW846 Method 7470/7471									
Mercury	0.200	ug/L	0.200	0.800	U	1	EPA 7470A	MCR	3/15/19 9:26
Total Recoverable Metals by 200 Series									
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	3/18/19 13:00
Arsenic	**10.0**	ug/L	0.320	2.00		1	EPA 200.8	MCR	3/18/19 13:00
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	3/18/19 13:00
Cobalt	**0.546**	ug/L	0.136	2.00	I	1	EPA 200.8	MCR	3/18/19 13:00
Lead	0.0800	ug/L	0.0800	2.00	U	1	EPA 200.8	MCR	3/18/19 13:00
Selenium	**0.943**	ug/L	0.509	2.00	I	1	EPA 200.8	MCR	3/18/19 13:00
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	3/18/19 13:00
Total Recoverable Metals by SW846 Method 6010B									
Barium	**0.112**	mg/L	0.000500	0.0200		1	EPA 6010B	RC	3/15/19 15:30
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RC	3/15/19 15:30
Boron	**18.4**	mg/L	0.0100	0.0500	J-	1	EPA 6010B	RC	3/15/19 15:30
Calcium	**518**	mg/L	0.0300	1.00	J-	1	EPA 6010B	RC	3/18/19 9:35
Chromium	1.60	ug/L	1.60	12.0	U	1	EPA 6010B	RC	3/15/19 15:30
Molybdenum	**84.3**	ug/L	2.50	20.0		1	EPA 6010B	RC	3/15/19 15:30
KNL Laboratory									
Radium - 226									
Rad - 226	**33.2**	pCi/L	0.3	0.3		1	EPA 903.0	KL1	3/21/19 12:18
Rad - 226 Counting Error +/-	**1.7**	pCi/L				1	EPA 903.0	KL1	3/21/19 12:18
Radium - 228									
Rad - 228	0.9	pCi/L	0.9	0.9	U	1	EPA Ra-05	KL1	3/28/19 12:22
Rad - 228 Counting Error +/-	**0.5**	pCi/L				1	EPA Ra-05	KL1	3/28/19 12:22

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.

Tampa Electric Laboratory Services

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: **L19C024-01**

Sample Description: BBS-CCR-1

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 3/14/19 14:02

Date of Sample Receipt: 3/14/19 15:21

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Radium-226/228									
Rad-226/228	**33.9**	pCi/L	0.9	0.9		1	Calc	KL1	3/28/19 12:22
Rad-226/228 Counting Error +/-	**1.7**	pCi/L				1	Calc	KL1	3/28/19 12:22
TestAmerica Pensacola									
Metals (ICP)									
Lithium	**0.013**	mg/L	0.0010	0.050	I	1	200.7 Rev 4.4 Z01	GESP	3/19/19 21:01

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.

TECO TAMPA ELECTRIC AN EMERA COMPANY

Tampa Electric Laboratory Services

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: **L19C024-02**

Sample Description: BBS-CCR-2

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 3/14/19 13:35

Date of Sample Receipt: 3/14/19 15:21

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Tampa Electric Company, Laboratory Services									
General Chemistry Parameters									
Chloride	**77.2**	mg/L	1.00	5.00		10	EPA 300.0	TMH	3/27/19 15:38
Specific Conductance	**1420**	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	3/14/19 13:35
Dissolved Oxygen	0.100	mg/L	0.100	0.100	U	1	FDEP SOP FT 1500	RAB	3/14/19 13:35
Fluoride	**0.394**	mg/L	0.100	0.500	I	10	EPA 300.0	TMH	3/27/19 15:38
pH	**6.74**	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	3/14/19 13:35
REDOX Potential	**-118**	mV	-999	-999		1	SM 2580B	RAB	3/14/19 13:35
Total Dissolved Solids	**1060**	mg/L	10.0	10.0		1	SM 2540C	ERS	3/18/19 11:30
Sulfate	**445**	mg/L	5.00	20.0		10	EPA 300.0	TMH	3/27/19 15:38
Turbidity	**8.50**	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	3/14/19 13:35
Total Mercury by SW846 Method 7470/7471									
Mercury	0.200	ug/L	0.200	0.800	U	1	EPA 7470A	MCR	3/15/19 9:27
Total Recoverable Metals by 200 Series									
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	3/18/19 13:02
Arsenic	**1.46**	ug/L	0.320	2.00	I	1	EPA 200.8	MCR	3/18/19 13:02
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	3/18/19 13:02
Cobalt	0.136	ug/L	0.136	2.00	U	1	EPA 200.8	MCR	3/18/19 13:02
Lead	**0.106**	ug/L	0.0800	2.00	I	1	EPA 200.8	MCR	3/18/19 13:02
Selenium	0.509	ug/L	0.509	2.00	U	1	EPA 200.8	MCR	3/18/19 13:02
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	3/18/19 13:02
Total Recoverable Metals by SW846 Method 6010B									
Barium	**0.0666**	mg/L	0.000500	0.0200		1	EPA 6010B	RC	3/15/19 15:34
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RC	3/15/19 15:34
Boron	**0.279**	mg/L	0.0100	0.0500		1	EPA 6010B	RC	3/15/19 15:34
Calcium	**208**	mg/L	0.0300	1.00		1	EPA 6010B	RC	3/18/19 9:38
Chromium	1.60	ug/L	1.60	12.0	U	1	EPA 6010B	RC	3/15/19 15:34
Molybdenum	**3.63**	ug/L	2.50	20.0	I	1	EPA 6010B	RC	3/15/19 15:34
KNL Laboratory									
Radium - 226									
Rad - 226	**15.4**	pCi/L	0.5	0.5		1	EPA 903.0	KL1	3/21/19 12:18
Rad - 226 Counting Error +/-	**1.2**	pCi/L				1	EPA 903.0	KL1	3/21/19 12:18
Radium - 228									
Rad - 228	0.6	pCi/L	0.6	0.6	U	1	EPA Ra-05	KL1	3/28/19 12:22
Rad - 228 Counting Error +/-	**0.5**	pCi/L				1	EPA Ra-05	KL1	3/28/19 12:22

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.

Tampa Electric Laboratory Services

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: **L19C024-02**

Sample Description: BBS-CCR-2

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 3/14/19 13:35

Date of Sample Receipt: 3/14/19 15:21

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Radium-226/228									
Rad-226/228	**15.8**	pCi/L	0.6	0.6		1	Calc	KL1	3/28/19 12:22
Rad-226/228 Counting Error +/-	**1.2**	pCi/L				1	Calc	KL1	3/28/19 12:22
TestAmerica Pensacola									
Metals (ICP)									
Lithium	**0.010**	mg/L	0.0010	0.050	I	1	200.7 Rev 4.4 Z01	GESP	3/19/19 21:04

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.

TECO TAMPA ELECTRIC AN EMERA COMPANY

Tampa Electric Laboratory Services

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: **L19C024-03**

Sample Description: BBS-CCR-3

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 3/14/19 13:04

Date of Sample Receipt: 3/14/19 15:21

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Tampa Electric Company, Laboratory Services									
General Chemistry Parameters									
Chloride	**161**	mg/L	1.00	5.00		10	EPA 300.0	TMH	3/27/19 15:59
Specific Conductance	**1830**	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	3/14/19 13:04
Dissolved Oxygen	0.100	mg/L	0.100	0.100	U	1	FDEP SOP FT 1500	RAB	3/14/19 13:04
Fluoride	**0.513**	mg/L	0.100	0.500		10	EPA 300.0	TMH	3/27/19 15:59
pH	**6.43**	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	3/14/19 13:04
REDOX Potential	**-192**	mV	-999	-999		1	SM 2580B	RAB	3/14/19 13:04
Total Dissolved Solids	**1350**	mg/L	10.0	10.0		1	SM 2540C	ERS	3/18/19 11:30
Sulfate	**534**	mg/L	5.00	20.0		10	EPA 300.0	TMH	3/27/19 15:59
Turbidity	**10.1**	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	3/14/19 13:04
Total Mercury by SW846 Method 7470/7471									
Mercury	0.200	ug/L	0.200	0.800	U	1	EPA 7470A	MCR	3/15/19 9:28
Total Recoverable Metals by 200 Series									
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	3/18/19 13:04
Arsenic	**0.365**	ug/L	0.320	2.00	I	1	EPA 200.8	MCR	3/18/19 13:04
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	3/18/19 13:04
Cobalt	**0.207**	ug/L	0.136	2.00	I	1	EPA 200.8	MCR	3/18/19 13:04
Lead	**0.202**	ug/L	0.0800	2.00	I	1	EPA 200.8	MCR	3/18/19 13:04
Selenium	**0.526**	ug/L	0.509	2.00	I	1	EPA 200.8	MCR	3/18/19 13:04
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	3/18/19 13:04
Total Recoverable Metals by SW846 Method 6010B									
Barium	**0.0695**	mg/L	0.000500	0.0200		1	EPA 6010B	RC	3/15/19 15:39
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RC	3/15/19 15:39
Boron	**0.259**	mg/L	0.0100	0.0500		1	EPA 6010B	RC	3/15/19 15:39
Calcium	**207**	mg/L	0.0300	1.00		1	EPA 6010B	RC	3/18/19 9:41
Chromium	**5.29**	ug/L	1.60	12.0	I	1	EPA 6010B	RC	3/15/19 15:39
Molybdenum	**7.69**	ug/L	2.50	20.0	I	1	EPA 6010B	RC	3/15/19 15:39
KNL Laboratory									
Radium - 226									
Rad - 226	**18.8**	pCi/L	0.7	0.7		1	EPA 903.0	KL1	3/22/19 11:46
Rad - 226 Counting Error +/-	**1.8**	pCi/L				1	EPA 903.0	KL1	3/22/19 11:46
Radium - 228									
Rad - 228	0.6	pCi/L	0.6	0.6	U	1	EPA Ra-05	KL1	3/28/19 12:22
Rad - 228 Counting Error +/-	**0.5**	pCi/L				1	EPA Ra-05	KL1	3/28/19 12:22

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.

Tampa Electric Laboratory Services

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: **L19C024-03**

Sample Description: BBS-CCR-3

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 3/14/19 13:04

Date of Sample Receipt: 3/14/19 15:21

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Radium-226/228									
Rad-226/228	**19.0**	pCi/L	0.7	0.7		1	Calc	KL1	3/28/19 12:22
Rad-226/228 Counting Error +/-	**1.8**	pCi/L				1	Calc	KL1	3/28/19 12:22
TestAmerica Pensacola									
Metals (ICP)									
Lithium	**0.0096**	mg/L	0.0010	0.050	I	1	200.7 Rev 4.4 Z01	GESP	3/19/19 21:08

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.

TECO TAMPA ELECTRIC AN EMERA COMPANY

Tampa Electric Laboratory Services

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: **L19C024-04**

Sample Description: BBS-CCR-BW1

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 3/14/19 12:33

Date of Sample Receipt: 3/14/19 15:21

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Tampa Electric Company, Laboratory Services									
General Chemistry Parameters									
Chloride	**649**	mg/L	1.00	5.00		10	EPA 300.0	TMH	3/26/19 19:30
Specific Conductance	**4220**	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	3/14/19 12:33
Dissolved Oxygen	**0.140**	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	3/14/19 12:33
Fluoride	**0.537**	mg/L	0.100	0.500		10	EPA 300.0	TMH	3/26/19 19:30
pH	**6.49**	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	3/14/19 12:33
REDOX Potential	**3.00**	mV	-999	-999		1	SM 2580B	RAB	3/14/19 12:33
Total Dissolved Solids	**3160**	mg/L	40.0	40.0		4	SM 2540C	ERS	3/18/19 11:30
Sulfate	**1380**	mg/L	50.0	200		100	EPA 300.0	TMH	3/26/19 19:40
Turbidity	**3.64**	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	3/14/19 12:33
Total Mercury by SW846 Method 7470/7471									
Mercury	0.200	ug/L	0.200	0.800	U	1	EPA 7470A	MCR	3/15/19 9:29
Total Recoverable Metals by 200 Series									
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	3/18/19 15:06
Arsenic	**9.60**	ug/L	0.320	2.00		1	EPA 200.8	MCR	3/18/19 15:06
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	3/18/19 15:06
Cobalt	**1.75**	ug/L	0.136	2.00	I	1	EPA 200.8	MCR	3/18/19 15:06
Lead	**0.234**	ug/L	0.0800	2.00	I	1	EPA 200.8	MCR	3/18/19 15:06
Selenium	**1.37**	ug/L	0.509	2.00	I	1	EPA 200.8	MCR	3/18/19 15:06
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	3/18/19 15:06
Total Recoverable Metals by SW846 Method 6010B									
Barium	**0.0480**	mg/L	0.000500	0.0200		1	EPA 6010B	RC	3/15/19 15:43
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RC	3/15/19 15:43
Boron	**33.4**	mg/L	0.0100	0.0500		1	EPA 6010B	RC	3/15/19 15:43
Calcium	**653**	mg/L	0.0300	1.00		1	EPA 6010B	RC	3/18/19 9:44
Chromium	1.60	ug/L	1.60	12.0	U	1	EPA 6010B	RC	3/15/19 15:43
Molybdenum	**30.5**	ug/L	2.50	20.0		1	EPA 6010B	RC	3/15/19 15:43
KNL Laboratory									
Radium - 226									
Rad - 226	**29.5**	pCi/L	0.5	0.5		1	EPA 903.0	KL1	3/22/19 11:46
Rad - 226 Counting Error +/-	**1.8**	pCi/L				1	EPA 903.0	KL1	3/22/19 11:46
Radium - 228									
Rad - 228	**3.0**	pCi/L	0.6	0.6		1	EPA Ra-05	KL1	3/28/19 12:22
Rad - 228 Counting Error +/-	**0.6**	pCi/L				1	EPA Ra-05	KL1	3/28/19 12:22

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.

Tampa Electric Laboratory Services

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: **L19C024-04**

Sample Description: BBS-CCR-BW1

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 3/14/19 12:33

Date of Sample Receipt: 3/14/19 15:21

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Radium-226/228									
Rad-226/228	**32.5**	pCi/L	0.6	0.6		1	Calc	KL1	3/28/19 12:22
Rad-226/228 Counting Error +/-	**1.8**	pCi/L				1	Calc	KL1	3/28/19 12:22
TestAmerica Pensacola									
Metals (ICP)									
Lithium	**0.019**	mg/L	0.0010	0.050	I	1	200.7 Rev 4.4 Z01	GESP	3/19/19 21:12

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.

TECO TAMPA ELECTRIC AN EMERA COMPANY

Tampa Electric Laboratory Services

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: **L19C024-05**

Sample Description: BBS-CCR-BW2

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 3/14/19 12:02

Date of Sample Receipt: 3/14/19 15:21

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Tampa Electric Company, Laboratory Services									
General Chemistry Parameters									
Chloride	**141**	mg/L	1.00	5.00		10	EPA 300.0	TMH	3/26/19 19:51
Specific Conductance	**1930**	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	3/14/19 12:02
Dissolved Oxygen	**0.110**	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	3/14/19 12:02
Fluoride	**0.495**	mg/L	0.100	0.500	I	10	EPA 300.0	TMH	3/26/19 19:51
pH	**6.56**	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	3/14/19 12:02
REDOX Potential	**-12.0**	mV	-999	-999		1	SM 2580B	RAB	3/14/19 12:02
Total Dissolved Solids	**1380**	mg/L	10.0	10.0		1	SM 2540C	ERS	3/18/19 11:30
Sulfate	**538**	mg/L	5.00	20.0		10	EPA 300.0	TMH	3/26/19 19:51
Turbidity	**16.8**	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	3/14/19 12:02
Total Mercury by SW846 Method 7470/7471									
Mercury	0.200	ug/L	0.200	0.800	U	1	EPA 7470A	MCR	3/15/19 9:33
Total Recoverable Metals by 200 Series									
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	3/18/19 15:09
Arsenic	0.320	ug/L	0.320	2.00	U	1	EPA 200.8	MCR	3/18/19 15:09
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	3/18/19 15:09
Cobalt	0.136	ug/L	0.136	2.00	U	1	EPA 200.8	MCR	3/18/19 15:09
Lead	0.0800	ug/L	0.0800	2.00	U	1	EPA 200.8	MCR	3/18/19 15:09
Selenium	**0.609**	ug/L	0.509	2.00	I	1	EPA 200.8	MCR	3/18/19 15:09
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	3/18/19 15:09
Total Recoverable Metals by SW846 Method 6010B									
Barium	**0.0550**	mg/L	0.000500	0.0200		1	EPA 6010B	RC	3/15/19 15:47
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RC	3/15/19 15:47
Boron	**2.28**	mg/L	0.0100	0.0500		1	EPA 6010B	RC	3/15/19 15:47
Calcium	**344**	mg/L	0.0300	1.00		1	EPA 6010B	RC	3/18/19 9:47
Chromium	**4.07**	ug/L	1.60	12.0	I	1	EPA 6010B	RC	3/15/19 15:47
Molybdenum	**3.51**	ug/L	2.50	20.0	I	1	EPA 6010B	RC	3/15/19 15:47
KNL Laboratory									
Radium - 226									
Rad - 226	**4.8**	pCi/L	0.5	0.5		1	EPA 903.0	KL1	3/22/19 11:46
Rad - 226 Counting Error +/-	**0.8**	pCi/L				1	EPA 903.0	KL1	3/22/19 11:46
Radium - 228									
Rad - 228	0.6	pCi/L	0.6	0.6	U	1	EPA Ra-05	KL1	3/28/19 12:22
Rad - 228 Counting Error +/-	**0.4**	pCi/L				1	EPA Ra-05	KL1	3/28/19 12:22

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.

Tampa Electric Laboratory Services

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: **L19C024-05**

Sample Description: BBS-CCR-BW2

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 3/14/19 12:02

Date of Sample Receipt: 3/14/19 15:21

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Radium-226/228									
Rad-226/228	**4.8**	pCi/L	0.6	0.6		1	Calc	KL1	3/28/19 12:22
Rad-226/228 Counting Error +/-	**0.8**	pCi/L				1	Calc	KL1	3/28/19 12:22
				TestAmerica Pensacola					
Metals (ICP)									
Lithium	**0.0082**	mg/L	0.0010	0.050	I	1	200.7 Rev 4.4 Z01	GESP	3/19/19 21:15

Comments

U Indicates that the compound was analyzed for but not detected.

J- The reported value is an estimated value, see the case narrative for specifics.

I Estimated value

I The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Subcontract Laboratories:

KNL Laboratory E84025

TestAmerica Pensacola E81010

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.

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 19C0106 - EPA 6010B											
Blank (19C0106-BLK1)					Prepared & Analyzed: 03/15/19						
Barium	0.000500	0.000500	0.0200	mg/L							U
Beryllium	0.500	0.500	2.00	ug/L							U
Boron	0.0100	0.0100	0.0500	mg/L							U
Calcium	0.0300	0.0300	1.00	mg/L							U
Chromium	1.60	1.60	12.0	ug/L							U
Molybdenum	2.50	2.50	20.0	ug/L							U
LCS (19C0106-BS1)					Prepared & Analyzed: 03/15/19						
Barium	1.06	0.000500	0.0200	mg/L	1.0000		106	80-120			
Beryllium	1080	0.500	2.00	ug/L	1000.0		108	80-120			
Boron	1.09	0.0100	0.0500	mg/L	1.0000		109	80-120			
Chromium	1070	1.60	12.0	ug/L	1000.0		107	80-120			
Molybdenum	1080	2.50	20.0	ug/L	1000.0		108	80-120			
Matrix Spike (19C0106-MS1)		**Source: L19C024-01**			Prepared & Analyzed: 03/15/19						
Barium	1.11	0.000500	0.0200	mg/L	1.0000	0.112	100	75-125			
Beryllium	1020	0.500	2.00	ug/L	1000.0	U	102	75-125			
Boron	19.0	0.0100	0.0500	mg/L	1.0000	18.4	57.1	75-125			J-
Chromium	1020	1.60	12.0	ug/L	1000.0	U	102	75-125			
Molybdenum	1140	2.50	20.0	ug/L	1000.0	84.3	105	75-125			
Matrix Spike Dup (19C0106-MSD1)		**Source: L19C024-01**			Prepared & Analyzed: 03/15/19						
Barium	1.14	0.000500	0.0200	mg/L	1.0000	0.112	103	75-125	2.45	20	
Beryllium	1040	0.500	2.00	ug/L	1000.0	U	104	75-125	1.97	20	
Boron	19.6	0.0100	0.0500	mg/L	1.0000	18.4	118	75-125	3.14	20	
Chromium	1050	1.60	12.0	ug/L	1000.0	U	105	75-125	2.46	20	
Molybdenum	1170	2.50	20.0	ug/L	1000.0	84.3	109	75-125	2.80	20	

Total Mercury by SW846 Method 7470/7471 - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
Batch 19C0109 - EPA 7470A											
Blank (19C0109-BLK1)					Prepared & Analyzed: 03/15/19						
Mercury	0.200	0.200	0.800	ug/L							U
LCS (19C0109-BS1)					Prepared & Analyzed: 03/15/19						
Mercury	1.99	0.200	0.800	ug/L	2.0000		99.6	80-120			
Matrix Spike (19C0109-MS1)		**Source: L19C024-05**			Prepared & Analyzed: 03/15/19						
Mercury	1.93	0.200	0.800	ug/L	2.0000	U	96.4	75-125			
Matrix Spike (19C0109-MS2)		**Source: L19C065-01**			Prepared & Analyzed: 03/15/19						
Mercury	1.86	0.200	0.800	ug/L	2.0000	U	93.0	75-125			
Matrix Spike Dup (19C0109-MSD1)		**Source: L19C024-05**			Prepared & Analyzed: 03/15/19						
Mercury	1.90	0.200	0.800	ug/L	2.0000	U	95.0	75-125	1.57	20	
Matrix Spike Dup (19C0109-MSD2)		**Source: L19C065-01**			Prepared & Analyzed: 03/15/19						
Mercury	1.81	0.200	0.800	ug/L	2.0000	U	90.4	75-125	2.89	20	

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 19C0102 - EPA 200.8											
Blank (19C0102-BLK1)					Prepared: 03/15/19 Analyzed: 03/18/19						
Antimony	0.600	0.600	2.00	ug/L							U
Arsenic	0.320	0.320	2.00	ug/L							U
Cadmium	0.100	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 (19C0102-BS1)					Prepared: 03/15/19 Analyzed: 03/18/19						
Antimony	112	0.600	2.00	ug/L	100.00		112	85-115			
Arsenic	101	0.320	2.00	ug/L	100.00		101	85-115			
Cadmium	100	0.100	0.500	ug/L	100.00		100	85-115			
Cobalt	111	0.136	2.00	ug/L	100.00		111	85-115			
Lead	94.5	0.0800	2.00	ug/L	100.00		94.5	85-115			
Selenium	105	0.509	2.00	ug/L	100.00		105	85-115			
Thallium	96.6	0.100	0.500	ug/L	100.00		96.6	85-115			
Matrix Spike (19C0102-MS1)		**Source: L19C024-04**			Prepared: 03/15/19 Analyzed: 03/18/19						
Antimony	110	0.600	2.00	ug/L	100.00	U	110	70-130			
Arsenic	96.0	0.320	2.00	ug/L	100.00	9.60	86.4	70-130			
Cadmium	75.8	0.100	0.500	ug/L	100.00	U	75.8	70-130			
Cobalt	91.9	0.136	2.00	ug/L	100.00	1.75	90.1	70-130			
Lead	81.4	0.0800	2.00	ug/L	100.00	0.234	81.2	70-130			
Selenium	90.8	0.509	2.00	ug/L	100.00	1.37	89.4	70-130			
Thallium	85.4	0.100	0.500	ug/L	100.00	U	85.4	70-130			
Matrix Spike (19C0102-MS2)		**Source: L19C065-01**			Prepared: 03/15/19 Analyzed: 03/18/19						
Antimony	112	0.600	2.00	ug/L	100.00	2.24	110	70-130			
Arsenic	101	0.320	2.00	ug/L	100.00	6.23	94.5	70-130			
Cadmium	81.1	0.100	0.500	ug/L	100.00	U	81.1	70-130			
Cobalt	96.7	0.136	2.00	ug/L	100.00	0.616	96.1	70-130			
Lead	82.8	0.0800	2.00	ug/L	100.00	0.970	81.8	70-130			
Selenium	96.0	0.509	2.00	ug/L	100.00	1.66	94.4	70-130			
Thallium	84.6	0.100	0.500	ug/L	100.00	U	84.6	70-130			

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 19C0102 - EPA 200.8											
Matrix Spike Dup (19C0102-MSD1)		**Source: L19C024-04**			Prepared: 03/15/19 Analyzed: 03/18/19						
Antimony	110	0.600	2.00	ug/L	100.00	U	110	70-130	0.132	20	
Arsenic	98.5	0.320	2.00	ug/L	100.00	9.60	88.9	70-130	2.57	20	
Cadmium	78.1	0.100	0.500	ug/L	100.00	U	78.1	70-130	3.05	20	
Cobalt	93.9	0.136	2.00	ug/L	100.00	1.75	92.1	70-130	2.12	20	
Lead	82.3	0.0800	2.00	ug/L	100.00	0.234	82.1	70-130	1.09	20	
Selenium	94.4	0.509	2.00	ug/L	100.00	1.37	93.0	70-130	3.86	20	
Thallium	85.3	0.100	0.500	ug/L	100.00	U	85.3	70-130	0.0916	20	
Matrix Spike Dup (19C0102-MSD2)		**Source: L19C065-01**			Prepared: 03/15/19 Analyzed: 03/18/19						
Antimony	114	0.600	2.00	ug/L	100.00	2.24	112	70-130	1.52	20	
Arsenic	99.5	0.320	2.00	ug/L	100.00	6.23	93.3	70-130	1.22	20	
Cadmium	80.8	0.100	0.500	ug/L	100.00	U	80.8	70-130	0.462	20	
Cobalt	93.3	0.136	2.00	ug/L	100.00	0.616	92.7	70-130	3.57	20	
Lead	83.7	0.0800	2.00	ug/L	100.00	0.970	82.7	70-130	1.03	20	
Selenium	94.3	0.509	2.00	ug/L	100.00	1.66	92.6	70-130	1.85	20	
Thallium	85.3	0.100	0.500	ug/L	100.00	U	85.3	70-130	0.824	20	

General Chemistry Parameters - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
Batch 19C0118 - SM 2540C											
Blank (19C0118-BLK1)					Prepared & Analyzed: 03/18/19						
Total Dissolved Solids	10.0	10.0	10.0	mg/L							U
LCS (19C0118-BS1)					Prepared & Analyzed: 03/18/19						
Total Dissolved Solids	998	10.0	10.0	mg/L	1000.0		99.8	80-120			
Duplicate (19C0118-DUP1)			**Source: L19C024-01**		Prepared & Analyzed: 03/18/19						
Total Dissolved Solids	2980	20.0	20.0	mg/L		3000			0.870	10	
Duplicate (19C0118-DUP2)			**Source: L19C024-02**		Prepared & Analyzed: 03/18/19						
Total Dissolved Solids	1070	10.0	10.0	mg/L		1060			1.12	10	
Batch 19C0184 - EPA 300.0											
Blank (19C0184-BLK1)					Prepared & Analyzed: 03/27/19						
Chloride	0.100	0.100	0.500	mg/L							U
Fluoride	0.0299	0.0100	0.0500	mg/L							I
Sulfate	0.500	0.500	2.00	mg/L							U
LCS (19C0184-BS1)					Prepared & Analyzed: 03/27/19						
Chloride	5.08	0.100	0.500	mg/L	5.0000		102	90-110			
Fluoride	4.95	0.0100	0.0500	mg/L	5.0000		99.0	90-110			
Sulfate	5.26	0.500	2.00	mg/L	5.0000		105	90-110			
Matrix Spike (19C0184-MS1)			**Source: L19C024-01**		Prepared & Analyzed: 03/27/19						
Chloride	1160	10.0	50.0	mg/L	500.00	664	98.6	90-110			
Fluoride	484	1.00	5.00	mg/L	500.00	U	96.7	90-110			
Sulfate	1670	50.0	200	mg/L	500.00	1160	103	90-110			

General Chemistry Parameters - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
Batch 19C0184 - EPA 300.0											
Matrix Spike (19C0184-MS2)		**Source: L19C053-05**			Prepared & Analyzed: 03/26/19						
Chloride	22.9	0.100	0.500	mg/L	5.0000	18.8	83.3	90-110			J-
Fluoride	5.66	0.0100	0.0500	mg/L	5.0000	0.875	95.8	90-110			
Sulfate	6.71	0.500	2.00	mg/L	5.0000	1.75	99.1	90-110			
Matrix Spike Dup (19C0184-MSD1)		**Source: L19C024-01**			Prepared & Analyzed: 03/27/19						
Chloride	1170	10.0	50.0	mg/L	500.00	664	101	90-110	1.25	20	
Fluoride	490	1.00	5.00	mg/L	500.00	U	98.1	90-110	1.41	20	
Sulfate	1700	50.0	200	mg/L	500.00	1160	108	90-110	1.66	20	
Matrix Spike Dup (19C0184-MSD2)		**Source: L19C053-05**			Prepared & Analyzed: 03/26/19						
Chloride	23.0	0.100	0.500	mg/L	5.0000	18.8	84.7	90-110	0.304	20	J-
Fluoride	5.67	0.0100	0.0500	mg/L	5.0000	0.875	95.9	90-110	0.168	20	
Sulfate	6.72	0.500	2.00	mg/L	5.0000	1.75	99.4	90-110	0.226	20	

Tampa Electric Laboratory Services

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

Metals (ICP) - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
Batch 433799 - 200.7 Rev 4.4 Z01											
Blank (433931-84)					Prepared & Analyzed: 03/19/19						
Lithium	0.0010	0.0010	0.050	mg/L				-			U
LCS (433931-85)					Prepared & Analyzed: 03/19/19						
Lithium	0.983	0.0010	0.050	mg/L	1.00		98	85-115			

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

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.

Site: **Big Bend** Date: 03/14/19 File Name: Weather: Partly Cloudy & Mild Sampler(s) / Initials RAB /TECO Initials RAB

LIMS #	Loction Code	Time	FE^2	pH (SU)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor	NGVD Time	NGVD LEVEL
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	$COLOR-W	$ODOR-W		
L19C024-01 A	BBS-CCR-1	14:02		6.8	24.1	4040	0.1	1.7	-66		CLEAR	NONE		
L19C024-02 A	BBS-CCR-2	13:35		6.7	23.9	1422	0.0	8.5	-118		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
L19C024-01 A	☐		1		☐	☑ 2	☑ 2	☐	☐	☐	☐	☐	☐	10
L19C024-02 A	☐		1		☐	☑ 2	☑ 2	☐	☐	☐	☐	☐	☐	

(1) 1L plastic (PP)	(2) 500ml plastic (PP)	(3) 250ml plastic (PP)	(4) 100ml coliform bottle	(5) 1L amber glass (AG)	(6) 40ml VOA vial (CG)	Samples On Ice	Sample Reciept
ESS 0115801D	ESS 0221301C	ESS 0315801D	ESS	ESS	ESS	☑ Yes ☐ No	Time 15:21

Preservation	Pres ID	Preservation	Pres ID	Preservation	Pres ID	Temp 2.9 C
1L bottles (rads): 5 ml HNO3 to pH <2	L 023922C	250ml bottles (nuts): 1 ml H2SO4 to pH <2	L ☐	500 ml bottles(Sulfide) 2ml NAOH/Zinc Acet. to pH >12	L ☐	
500 ml bottles (metals): 2 ml HNO3 to pH <2	L ☐	40 ml Vial (TOC): 0.5 ml H2SO4 to pH <2	L ☐	250 ml bottles (Cyan) 1g NAOH to pH >12	L ☐	
250 ml bottles (metal): 1 ml HNO3 to pH <2	L 023922C ☑	1L bottles (diss. rads): filtered with 0.45um, 5 ml HNO3 to pH <2	L ☐	A checked box indicates that the sample 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 025352G	7	7.01	8:02			7.00	15:17	Meter ID:	7:51	22.4	234.0	234.9
FDEP FT 1100	L 023838D	10	10.04	8:02	QC: (pH +/- 0.2) (Cond +/- 5%) (DO +/- 0.3mg/L) (Redox +/- 10mv)				MPM08	15:15	22.8	233.0	234.9
Units: SU	L 024158G	4	4.00	8:02	A checked box indicates ICV / CCV passed				Zobell Sol ID:				
Conductivity Meter Calib.	Standard ID	Std Value	Cal	Time	ICV	Time	CCV	Time	L 025481B ☑				
Meter ID: MPM08	L 025419A	1000	1000	8:18					DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg/l
FDEP FT 1200, Units: uMHOS	L 023919G	10000			10138	8:19	10095	15:12	Meter ID:	7:50	23.3	8.53	8.546
Turbidity Meter Calibration	Standard ID	Std Value	Acceptability Range		ICV	Time	CCV	Time	MPM08	15:35	22.2	8.80	8.710
Meter ID: TM07	L 023441	4.75	4.28	5.23	4.76	7:56			Barom. Pres				
FDEP FT 1600, Units: NTU	L 023442	48.10	44.97	51.23			48.00	15:16	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	Iodate/Iodide ID	Therm ID	pH	Conduct.(%)	DO (mg/l)	Redox (mv)
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 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) x	Well Capacity (gal) =	1 Well Volume (gal)	(Tubing Capacity (gal/ft.) x	Tubing Length (ft)) +	Pump Volume (gal) +	Cell Volume (gal) =	1 Eqpt. Volume (gal)	
BBS-CCR-1	2	10	17.32	22.32	7.27	15.05	0.16	2.41	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. Table
1A	13:51	620	1.47	1.47	7.44	6.84	24.06	4047	0.02	3.13	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	13:53	620	0.33	1.80	7.45	6.81	24.04	4033	0.02	1.68	Temp°C+/- 0.2	STABLE	Pump:	PP
13:42	13:55	600	0.32	2.12	7.44	6.81	24.09	4040	0.08	1.74	Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:											DO % Sat.< 20	STABLE	Dedicated ☑	Yes
13:55											Turb. NTU < 20	STABLE	Tubing? ☐	No
Purge Complete At	**13:43**	**Gallons to Purge**	**0.12**	Stablility Values =		6.81	24.09	4040	0.08	1.74				

Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Well Depth (ft) -	Depth to Water (ft) =	Water Column (ft) x	Well Capacity (gal) =	1 Well Volume (gal)	(Tubing Capacity (gal/ft.) x	Tubing Length (ft)) +	Pump Volume (gal) +	Cell Volume (gal) =	1 Eqpt. Volume (gal)	
BBS-CCR-2	2	10	16.84	21.84	6.76	15.08	0.16	2.41	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	Eqpt. Table
1A	13:24	600	1.74	1.74	6.92	6.74	23.87	1424	0.04	5.18	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	13:26	580	0.31	2.05	6.90	6.74	23.88	1422	0.03	7.37	Temp°C+/- 0.2	STABLE	Pump:	PP
13:13	13:28	600	0.32	2.37	6.90	6.74	23.92	1422	0.02	8.50	Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:											DO % Sat.< 20	STABLE	Dedicated ☑	Yes
13:28											Turb. NTU < 20	STABLE	Tubing? ☐	No
Purge Complete At	**13:14**	**Gallons to Purge**	**0.12**	Stablility Values =		6.74	23.92	1422	0.02	8.50				

Comments:

Total Time Total Miles

Site: **Big Bend** Date: 03/14/19 File Name: 01/00/00 Weather: Partly Cloudy & Mild Sampler(s) / Initials RAB /TECO Initials RAB

LIMS #	Loction Code	Time	FE^2	pH (SU)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor	NGVD	
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	$COLOR-W	$ODOR-W	Time	LEVEL
L19C024-03 B	BBS-CCR-3	13:04		6.4	23.7	1834	0.0	10.1	-192		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
L19C024-03 B	☐		1		☐	☑ 2	☑ 2	☐	☐	☐	☐	☐	☐	5
	☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	

(1) 1L plastic (PP)	(2) 500ml plastic (PP)	(3) 250ml plastic (PP)	(4) 100ml coliform bottle	(5) 1L amber glass (AG)	(6) 40ml VOA vial (CG)		Samples On Ice	Sample Reciept
ESS 0115801D	ESS 0221301C	ESS 0315801D	ESS	ESS	ESS		☑ Yes ☐ No	Time 15:21
								Temp 2.9 C

Preservation		Pres ID	Preservation	Pres ID	Preservation	Pres ID
1L bottles (rads): 5 ml HNO3 to pH <2		L 023922C ☑	250ml bottles (nuts): 1 ml H2SO4 to pH <2	L ☐	500 ml bottles(Sulfide) 2ml NAOH/Zinc Acet. to pH >12	L ☐
500 ml bottles (metals): 2 ml HNO3 to pH <2		L ☐	40 ml Vial (TOC): 0.5 ml H2SO4 to pH <2	L ☐	250 ml bottles (Cyan) 1g NAOH to pH >12	L ☐
250 ml bottles (metal): 1 ml HNO3 to pH <2		L 023922C ☑	1L bottles (diss. rads): filtered with 0.45um, 5 ml HNO3 to pH <2	L ☐	A checked box indicates that the sample 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 025352G	7	7	8:02			7.00	15:17	Meter ID:	7:51	22.4	234.0	234.9
FDEP FT 1100	L 023838D	10	10	8:02	QC: (pH +/- 0.2) (Cond +/- 5%) (DO +/- 0.3mg/L) (Redox +/- 10mv)				MPM08	15:15	22.8	233.0	234.9
Units: SU	L 024158G	4	4	8:02	A checked box indicates ICV / CCV passed				Zobell Sol ID:				
Conductivity Meter Calib.	**Standard ID**	**Std Value**	**Cal**	**Time**	**ICV**	**Time**	**CCV**	**Time**	L 025418B				
Meter ID: MPM08	L 025419A	1000	1000	8:18					**DO Meter Cal**	**Time**	**Temp °C**	**Reading mg/l**	**Theo Value mg/l**
FDEP FT 1200, Units: uMHOS	L 023919G	10000			10138	8:19	10095	15:12	Meter ID:	7:50	23.3	8.53	8.546
Turbidity Meter Calibration	**Standard ID**	**Std Value**	**Acceptability Range**		**ICV**	**Time**	**CCV**	**Time**	MPM08	15:35	22.2	8.80	8.710
Meter ID: TM07	L 023441	4.75	4.28	5.23	4.76	7:56			Barom. Pres				
FDEP FT 1600, Units: NTU	L 023442	48.10	44.97	51.23			48.00	15:16	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	Iodate/Iodide ID	Therm ID	pH	Conduct.(%)	DO (mg/l)	Redox (mv)
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 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) x	Well Capacity (gal) =	1 Well Volume (gal)	(Tubing Capacity (gal/ft.) x	Tubing Length (ft)) +	Pump Volume (gal) +	Cell Volume (gal) =	1 Eqpt. Volume (gal)	
BBS-CCR-3	2	10	18.23	23.23	6.27	16.96	0.16	2.71	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	12:49	400	0.63	0.63	6.76	6.50	23.83	1847	0.05	11.30	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	12:51	400	0.21	0.84	6.75	6.45	23.75	1842	0.03	11.00	Temp°C+/- 0.2	STABLE	Pump:	PP
12:43	12:53	420	0.22	1.06	6.76	6.43	23.74	1834	0.02	10.10	Cond-%+/- 5	STABLE	Tubing:	PE/S
Purge End:											DO % Sat.< 20	STABLE	Dedicated ☑	Yes
12:53											Turb. NTU < 20	STABLE	Tubing? ☐	No
Purge Complete At	**12:44**	**Gallons to Purge**	**0.12**	Stablility Values =		6.43	23.74	1834	0.02	10.10				

Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Well Depth (ft) -	Depth to Water (ft) =	Water Column (ft) x	Well Capacity (gal) =	1 Well Volume (gal)	(Tubing Capacity (gal/ft.) x	Tubing Length (ft)) +	Pump Volume (gal) +	Cell Volume (gal =	1 Eqpt. Volume (gal)	
0	2	10	14	18		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
											ph:+/- 0.2		Level Meter:	WLM08
Purge Start:											Temp°C+/- 0.2		Pump:	PP
											Cond % +/- 5		Tubing:	PE/S
Purge End:											DO % Sat.< 20		Dedicated ☐	Yes
											Turb. NTU < 20		Tubing? ☐	No
Purge Complete At		**Gallons to Purge**	**0.32**	Stablity Values =										

Comments:

Total Time Total Miles

Site: **Big Bend** Date: 03/14/19 File Name: 01/00/00 Weather: Partly Cloudy & Mild Sampler(s) / Initials RAB /TECO Initials

LIMS #	Loction Code	Time	FE²	pH (SU)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor	NGVD Time	NGVD LEVEL
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	$COLOR-W	$ODOR-W		
L19C024-04 A	BBS-CCR-BW-1	12:33		6.5	27.9	4225	0.1	3.6	3		YELLOW	MILD		
L19C024-05 A	BBS-CCR-BW-2	12:02		6.6	24.7	1929	0.1	16.8	-12		LT. YELLOW	NONE		

LIMS #	250ml Cyan (3)	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
L19C024-04 A	☐	1		☐	☑ 2	☑ 2	☐	☐	☐	☐	☐	☐	10
L19C024-05 A	☐	1		☐	☑ 2	☑ 2	☐	☐	☐	☐	☐	☐	

(1) 1L plastic (PP)	(2) 500ml plastic (PP)	(3) 250ml plastic (PP)	(4) 100ml coliform bottle	(5) 1L amber glass (AG)	(6) 40ml VOA vial (CG)	Samples On Ice	Sample Reciept
ESS 0115801D	ESS 0221301C	ESS 0315801D	ESS	ESS	ESS	☑ Yes ☐ No	Time 15:21
							Temp 2.9 C

Preservation	Pres ID	Preservation	Pres ID	Preservation	Pres ID
1L bottles (rads): 5 ml HNO3 to pH <2	L 023922C ☑	250ml bottles (nuts): 1 ml H2SO4 to pH <2	L ☐	500 ml bottles(Sulfide) 2ml NAOH/Zinc Acet. to pH >12	L ☐
500 ml bottles (metals): 2 ml HNO3 to pH <2	L ☐	40 ml Vial (TOC): 0.5 ml H2SO4 to pH <2	L ☐	250 ml bottles (Cyan) 1g NAOH to pH >12	L ☐
250 ml bottles (metal): 1 ml HNO3 to pH <2	L 023922C ☑	1L bottles (diss. rads): filtered with 0.45um, 5 ml HNO3 to pH <2	L ☐	A checked box indicates that the sample 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 025352G	7	7	8:02			7.00	15:17	Meter ID:	7:51	22.4	234.0	234.9
FDEP FT 1100	L 023838D	10	10	8:02	QC: (pH +/- 0.2) (Cond +/- 5%) (DO +/- 0.3mg/L) (Redox +/- 10mv)				MPM08	15:15	22.8	233.0	234.9
Units: SU	L 024158G	4	4	8:02	A checked box indicates ICV / CCV passed				Zobell Sol ID:				
Conductivity Meter Calib.	**Standard ID**	**Std Value**	**Cal**	**Time**	**ICV**	**Time**	**CCV**	**Time**	L 025418B				
Meter ID: MPM08	L 025419A	1000	1000	8:18					**DO Meter Cal**	**Time**	**Temp °C**	**Reading mg/l**	**Theo Value mg/l**
FDEP FT 1200, Units: uMHOS	L 023919G	10000			10138	8:19	10095	15:12	Meter ID:	7:50	23.3	8.53	8.546
Turbidity Meter Calibration	**Standard ID**	**Std Value**	**Acceptability Range**		**ICV**	**Time**	**CCV**	**Time**	MPM08	15:35	22.2	8.80	8.710
Meter ID: TM07	L 023441	4.75	4.28	5.23	4.76	7:56			Barom. Pres				
FDEP FT 1600, Units: NTU	L 023442	48.10	44.97	51.23			48.00	15:16	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	Iodate/Iodide ID	Therm ID	pH	Conduct.(%)	DO (mg/l)	Redox (mv)
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 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) x	Well Capacity (gal) =	1 Well Volume (gal)	(Tubing Capacity (gal/ft.) x	Tubing Length (ft)) +	Pump Volume (gal) +	Cell Volume (gal) =	1 Eqpt. Volume (gal)	
BBS-CCR-BW-1	2	10	39.3	44.3	29.03	15.27	0.16	2.44	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
1A	12:24	1300	3.43	3.43	29.77	6.49	27.75	4205	0.15	7.98	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	12:26	1330	0.70	4.13	29.82	6.50	27.80	4190	0.12	4.34	Temp°C+/- 0.2	STABLE	Pump:	ESP
12:14	12:28	1320	0.70	4.83	29.85	6.49	27.89	4225	0.14	3.64	Cond % +/- 5	STABLE	Tubing:	PE
Purge End:											DO % Sat.< 20	STABLE	Dedicated ☐	Yes
12:28											Turb. NTU < 20	STABLE	Tubing? ☑	No
Purge Complete At	**12:15**	**Gallons to Purge**	**0.32**	Stability Values =		6.49	27.89	4225	0.14	3.64				

Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Well Depth (ft) -	Depth to Water (ft) =	Water Column (ft) x	Well Capacity (gal) =	1 Well Volume (gal)	(Tubing Capacity (gal/ft.) x	Tubing Length (ft)) +	Pump Volume (gal) +	Cell Volume (gal) =	1 Eqpt. Volume (gal)	
BBS-CCR-BW-2	2	10	18.49	23.84	7.68	16.16	0.16	2.59	0.0026	24.64	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	11:48	410	6.07	6.07	7.88	6.57	24.64	1929	0.09	19.40	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	11:50	400	0.21	6.28	7.86	6.57	24.67	1933	0.08	18.10	Temp°C+/- 0.2	STABLE	Pump:	PP
10:52	11:52	400	0.21	6.49	7.86	6.56	24.70	1929	0.11	16.80	Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:											DO % Sat.< 20	STABLE	Dedicated ☑	Yes
11:52											Turb. NTU < 20	STABLE	Tubing? ☐	No
Purge Complete At	**10:53**	**Gallons to Purge**	**0.12**	Stability Values =		6.56	24.70	1929	0.11	16.80				

Comments:

Total Time Total Miles

GROUNDWATER WELL SAMPLING EQUIPMENT CALIBRATION

Date: 03/14/19 Sampler(s): RAB Initials RAB

pH Meter Calibration		Buffer ID	Buffer Value	Cal	Time				CCV	Time	Pass/Fail
Meter ID: MPM08	L	025352G ☑	7.01	7.01	8:02				7.00	15:17	Pass
FDEP FT 1100	L	023838D ☑	10.04	10.04	8:02			QC (pH +/- 0.2) (Cond +/- 5%) (DO +/- 0.3mg/L) (Redox +/- 10mv)			
Units: SU	L	024158G ☐	4.00	4.00	8:02	ICV	Time	Pass/Fail	A checked box indicates ICV / CCV passed		
ICV Check	L	023163L ☑	7.01			7.03	8:05	Pass			
Conductivity Meter Calib.		**Standard ID**	**Std Value**	**Cal**	**Time**	**ICV**	**Time**	**Pass/Fail**	**CCV**	**Time**	**Pass/Fail**
Meter ID: MPM08	L	025419A ☑	1000	1000	8:18						
FDEP FT 1200, Units: uMHOS	L	023919G ☑	10000			10138	8:19	Pass	10095	15:12	Pass
Turbidity Meter Calibration		**Standard ID**	**Std Value**	**Acceptability Range**		**CCV**	**Time**	**Pass/Fail**	**CCV**	**Time**	**Pass/Fail**
Meter ID: TM07	L	023441 ☑	4.75	4.28	5.23	4.76	7:56	Pass			
FDEP FT 1600, Units: NTU	L	023442 ☑	48.10	44.97	51.23				48.00	15:16	Pass
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)/500ml DI=10mg/L						L	L	L	L		

Redox Cal	Time	Temp °C	Reading mv	Theo Value mv	Pass / Fail	DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg/l	Pass / Fail
						FDEP FT 1500					
Meter ID:	7:51	22.4	234.0	234.9	Pass	Meter ID:	7:50	23.3	8.53	8.546	Pass
MPM08	15:15	22.8	233.0	234.9	Pass	MPM08	15:35	22.2	8.80	8.710	Pass
Zobell Sol ID:						Barom. Pres					
L 025418B ☑						760					

Therm ID	pH	Conduct. %	DO mg/l	Redox mv	CL2	Calibration	Ferrous Iron		
MPM08	0.2	5	0.3	10	0.2	Criterion	Comparator ID:	Reagent ID: L- ☐	

ClO_2 DPD Check must read +/- 10% of the Calculated Std. Concentration, multiplied by 2.4. Glycene check should read < 0.10 mg/l ClO_2.

Chlorine Dioxide (mg/l)	Std. Conc. (mg/l)	Std. Spike Volume (ml)	Cal Sample Volume (ml)	Calc. Std. Conc. (mg/l)	Initial Calibration Verification ICV: DPD Check (mg/l)	Glycene Check	Time	Pass/Fail	Continuous Calibration Verification CCV: DPD Check (mg/l)	Time	Pass/Fail
Meter ID:		1.0	100								

☐ DPD ID: L ☐ Glycene ID: L ☐ A checked box indicates reagent expiration date has been verified.

Method 10126*

*Equivalent to Standard Methods, 4500 ClO_2 D.

COMMENTS: CL2 Std. ID: L

DEP-SOP-001/01

FS 2200 Groundwater Sampling

Form FD 9000-24

GROUNDWATER SAMPLING LOG

FACILITY NAME:	Big Bend	SITE LOCATION:	Apollo Beach, FL.
WELL NO:	BBS-CCR-1	SAMPLE ID:	L19C024-01 A
		DATE:	3/14/19

PURGING DATA

WELL DIAMETER (inches)	TUBING DIAMETER (inches)	WELL SCREEN INTERVAL (NGVD)	STATIC DEPTH TO WATER (feet):	PURGE PUMP TYPE OR BAILER:
	1/4	DEPTH 12.32 feet to 22.32 (feet)	7.27	PP

WELL VOLUME PURGE: (only fillout if applicable)
1 WELL VOLUME = (TOTAL WELL DEPTH - STATIC DEPTH TO WATER) X WELL CAPACITY
= (feet - feet) x gallons/foot = gallons

EQUIPMENT VOLUME PURGE: (only fillout if applicable)
1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
=(0 gallons + (0.0026 gallons/foot X 2[illegible].3 feet) + 0.06 gallons = 0.12 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet):	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):
17.32	17.32	13:42	13:55	2.12

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 or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
13:51	1.47	1.47	0.16	7.44	6.84	24.06	4047	0.02	3.13	CLEAR	NONE
13:53	0.33	1.80	0.17	7.45	6.81	24.04	4033	0.02	1.68	CLEAR	NONE
13:55	0.32	2.12	0.16	7.44	6.81	24.09	4040	0.08	1.74	CLEAR	NONE

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.0[illegible] 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; 1/2" = 0.010; 5/8" = 0.016

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER (S) SIGNATURES:	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
RAB TECO		13:55	14:02

PUMP OR TUBING DEPTH IN WELL (feet):	SAMPLE PUMP FLOW RATE (mL per minute):	TUBING MATERIAL CODE:
17.3	613	PE/S

FIELD DECONTAMINATION: Y ☐ N ☑ FIELD-FILTERED: Y ☐ N ☑ Filtration Equipment Type: FILTER SIZE: µm DUPLICATE: Y ☐ N ☑

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL. ADDED IN FIELD (ml) (1)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
@Ino-500	1	PE	500ml	NONE	NONE	N/A	Inorganics	PP
@Met-250	2	PE	250ml	HNO3	1ml	<2	Metals	PP
@Rad-1L	2	PE	1L	HNO3	5ml	<2	Radiologicals	PP

REMARKS:
(1) Sample bottles pre-preserved at laboratory prior to sample collection.

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submirsable Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

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)

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)

DEP-SOP-001/01

FS 2200 Groundwater Sampling

Form FD 9000-24

GROUNDWATER SAMPLING LOG

SITE NAME:	Big Bend	SITE LOCATION:	Apollo Beach, FL.
WELL NO:	BBS-CCR-2	SAMPLE ID: L19C024-02 A	DATE: 3/14/19

PURGING DATA

WELL DIAMETER (inches)	TUBING DIAMETER (inches)	WELL SCREEN INTERVAL DEPTH	STATIC DEPTH TO WATER (feet)	PURGE PUMP TYPE OR BAILER:
	1/4	11.84 feet to 21.84 (feet)	6.76	PP

WELL VOLUME PURGE: (only fillout if applicable) 1 WELL VOLUME = (TOTAL WELL DEPTH - STATIC DEPTH TO WATER) X WELL CAPACITY

= (feet - feet) x gallons/foot = gallons

EQUIPMENT VOLUME PURGE: (only fillout if applicable) 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME

=(0 gallons + (0.0026 gallons/foot X 22.84 feet) + 0.06 gallons = 0.12 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet):	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):
16.84	16.84	13:13	13:28	2.37

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 or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
13:24	1.74	1.74	0.16	6.92	6.74	23.87	1424	0.04	5.18	YELLOW	MILD
13:26	0.31	2.05	0.16	6.90	6.74	23.88	1422	0.03	7.37	YELLOW	MILD
13:28	0.32	2.37	0.16	6.90	6.74	23.92	1422	0.02	8.50	YELLOW	MILD

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.0 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; 1/2" = 0.010 5/8" = 0.016

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER (S) SIGNATURES:	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
RAB TECO		13:28	13:35

PUMP OR TUBING DEPTH IN WELL (feet):	SAMPLE PUMP FLOW RATE (mL per minute):	TUBING MATERIAL CODE:
16.8	593	PE/S

FIELD DECONTAMINATION: Y ☐ N ☑ FIELD-FILTERED: Y ☐ N ☑ Filtration Equipment Type: FILTER SIZE: µm DUPLICATE: Y ☐ N ☑

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL. ADDED IN FIELD (ml) (1)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
@Ino-500	1	PE	500ml	NONE	NONE	N/A	Inorganics	PP
@Met-250	2	PE	250ml	HNO3	1ml	<2	Metals	PP
@Rad-1L	2	PE	1L	HNO3	5ml	<2	Radiologicals	PP

REMARKS:

(1) Sample bottles pre-preserved at laboratory prior to sample collection.

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O= Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submirsable Pump; PP = Peristaltic Pump RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

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)

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)

DEP-SOP-001/01

FS 2200 Groundwater Sampling

Form FD 9000-24

GROUNDWATER SAMPLING LOG

SITE NAME:	Big Bend	SITE LOCATION:	Apollo Beach, FL.
WELL NO:	BBS-CCR-3	SAMPLE ID: L19C024-03 B	DATE: 3/14/19

PURGING DATA

WELL DIAMETER (inches)	TUBING DIAMETER (inches) 1/4	WELL SCREEN INTERVAL DEPTH 13.23 feet to 23.23 (feet)	STATIC DEPTH TO WATER (feet): 6.27	PURGE PUMP TYPE OR BAILER: PP

WELL VOLUME PURGE: (only fillout if applicable) 1 WELL VOLUME = (TOTAL WELL DEPTH - STATIC DEPTH TO WATER) X WELL CAPACITY

= (feet - feet) x gallons/foot = gallons

EQUIPMENT VOLUME PURGE: (only fillout if applicable) 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME

= (0 gallons + (0.0026 gallons/foot X 24.23 feet) + 0.06 gallons = 0.12 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 18.23	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 18.23	PURGING INITIATED AT: 12:43	PURGING ENDED AT: 12:53	TOTAL VOLUME PURGED (gallons): 1.06

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 or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
12:49	0.63	0.63	0.11	6.76	6.50	23.83	1847	0.05	11.30	YELLOW	NONE
12:51	0.21	0.84	0.11	6.75	6.45	23.75	1842	0.03	11.00	YELLOW	NONE
12:53	0.22	1.06	0.11	6.76	6.43	23.74	1834	0.02	10.10	YELLOW	NONE

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.0; 6" = 1.47; 12" = 5.88

TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.00005; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: RAB TECO	SAMPLER (S) SIGNATURES:	SAMPLING INITIATED AT: 12:53	SAMPLING ENDED AT: 13:04
PUMP OR TUBING DEPTH IN WELL (feet): 18.2	SAMPLE PUMP FLOW RATE (mL per minute): 407	TUBING MATERIAL CODE: PE/S	
FIELD DECONTAMINATION: Y ☐ N ☑	FIELD-FILTERED: Y ☐ N ☑ Filtration Equipment Type:	FILTER SIZE: µm	DUPLICATE: Y ☐ N ☑

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL. ADDED IN FIELD (ml) (1)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
@Ino-500	1	PE	500ml	NONE	NONE	N/A	Inorganics	PP
@Met-250	2	PE	250ml	HNO3	1ml	<2	Metals	PP
@Rad-1L	2	PE	1L	HNO3	5ml	<2	Radiologicals	PP

REMARKS:

(1) Sample bottles pre-preserved at laboratory prior to sample collection.

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O= Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submirsable Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

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)

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)

DEP-SOP-001/01

FS 2200 Groundwater Sampling

Form FD 9000-24

GROUNDWATER SAMPLING LOG

SITE NAME:	Big Bend	SITE LOCATION:	Apollo Beach, FL.	
WELL NO:	BBS-CCR-BW-1	SAMPLE ID:	L19C024-04 A	DATE: 3/14/19

PURGING DATA

WELL DIAMETER (inches)	TUBING DIAMETER (inches)	WELL SCREEN INTERVAL DEPTH	STATIC DEPTH TO WATER (feet):	PURGE PUMP TYPE OR BAILER:
	1/4	34.30 feet to 44.30 (feet)	29.03	ESP

WELL VOLUME PURGE: (only fillout if applicable)
1 WELL VOLUME = (TOTAL WELL DEPTH - STATIC DEPTH TO WATER) X WELL CAPACITY
= (feet - feet) x gallons/foot = gallons

EQUIPMENT VOLUME PURGE: (only fillout if applicable)
1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
=(0 gallons + (0.0026 gallons/foot X 100 feet) + 0.06 gallons = 0.32 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet):	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):
39.30	39.30	12:14	12:28	4.83

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 or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
12:24	3.43	3.43	0.34	29.77	6.49	27.75	4205	0.15	7.98	YELLOW	MILD
12:26	0.70	4.13	0.35	29.82	6.50	27.80	4190	0.12	4.34	YELLOW	MILD
12:28	0.70	4.83	0.35	29.85	6.49	27.89	4225	0.14	3.64	YELLOW	MILD

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = (5; 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; 1/2" = 0.010; 5/8" = 0.016

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER (S) SIGNATURE:	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
RAB TECO		12:28	12:33

PUMP OR TUBING DEPTH IN WELL (feet):	SAMPLE PUMP FLOW RATE (mL per minute):	TUBING MATERIAL CODE:
39.3	1317	PE

FIELD DECONTAMINATION: Y ☐ N ☑ | FIELD-FILTERED: Y ☐ N ☑ Filtration Equipment Type: | FILTER SIZE: µm | DUPLICATE: Y ☐ N ☑

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL. ADDED IN FIELD (ml) (1)	FINAL pH		
@Ino-500	1	PE	500ml	NONE	NONE	N/A	Inorganics	ESP
@Met-250	2	PE	250ml	HNO3	1ml	<2	Metals	ESP
@Rad-1L	2	PE	1L	HNO3	5ml	<2	Radiologicals	ESP

REMARKS:
(1) Sample bottles pre-preserved at laboratory prior to sample collection.

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O= Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersable Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

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)
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)

DEP-SOP-001/01

FS 2200 Groundwater Sampling

Form FD 9000-24

GROUNDWATER SAMPLING LOG

SITE NAME:	Big Bend	SITE LOCATION:	Apollo Beach, FL.	
WELL NO:	BBS-CCR-BW-2	SAMPLE ID:	L19C024-05 A	DATE: 3/14/19

PURGING DATA

WELL DIAMETER (inches)	TUBING DIAMETER (inches)	WELL SCREEN INTERVAL DEPTH	STATIC DEPTH TO WATER (feet):	PURGE PUMP TYPE OR BAILER:
	1/4	13.64 feet to 23.34 (feet)	7.68	PP

WELL VOLUME PURGE: (only fillout if applicable) 1 WELL VOLUME = (TOTAL WELL DEPTH - STATIC DEPTH TO WATER) X WELL CAPACITY

= (feet - feet) x gallons/foot = gallons

EQUIPMENT VOLUME PURGE: (only fillout if applicable) 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME

=(0 gallons + (0.0026 gallons/foot X 24.64 feet) + 0.06 gallons = 0.12 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet):	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):
18.49	18.49	10:52	11:52	6.49

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 or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
11:48	6.07	6.07	0.11	7.88	6.57	24.64	1929	0.09	19.40	LT. YELLOW	NONE
11:50	0.21	6.28	0.11	7.86	6.57	24.67	1933	0.08	18.10	LT. YELLOW	NONE
11:52	0.21	6.49	0.11	7.86	6.56	24.70	1929	0.11	16.80	LT. YELLOW	NONE

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = (.5; 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; 1/2" = 0.010; 5/8" = 0.016

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER (S) SIGNATURE:	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
RAB TECO		11:52	12:02

PUMP OR TUBING DEPTH IN WELL (feet):	SAMPLE PUMP FLOW RATE (mL per minute):	TUBING MATERIAL CODE:
18.5	403	PE/S

FIELD DECONTAMINATION: Y ☐ N ☑ FIELD-FILTERED: Y ☐ N ☑ Filtration Equipment Type: FILTER SIZE: µm DUPLICATE: Y ☐ N ☑

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL. ADDED IN FIELD (ml) (1)	FINAL pH		
@Ino-500	1	PE	500ml	NONE	NONE	N/A	Inorganics	PP
@Met-250	2	PE	250ml	HNO3	1ml	<2	Metals	PP
@Rad-1L	2	PE	1L	HNO3	5ml	<2	Radiologicals	PP

REMARKS:

(1) Sample bottles pre-preserved at laboratory prior to sample collection.

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O= Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersable Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

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 221.. 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)

TestAmerica
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: 660-93234-1
Client Project/Site: L19C024

For:
Tampa Electric Company
5012 Causeway Boulevard
Tampa, Florida 33619

Attn: Ms. Peggy Penner

Authorized for release by:
3/21/2019 7:33:06 AM

Keaton Conner, Project Manager I
(813)885-7427
keaton.conner@testamericainc.com

Table of Contents

Sample Summary

Client: Tampa Electric Company
Project/Site: L19C024

TestAmerica Job ID: 660-93234-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-93234-1	L19C024-01	Water	03/14/19 14:02	03/15/19 09:50
660-93234-2	L19C024-02	Water	03/14/19 13:35	03/15/19 09:50
660-93234-3	L19C024-03	Water	03/14/19 13:04	03/15/19 09:50
660-93234-4	L19C024-04	Water	03/14/19 12:33	03/15/19 09:50
660-93234-5	L19C024-05	Water	03/14/19 12:02	03/15/19 09:50

Definitions/Glossary

Client: Tampa Electric Company
Project/Site: L19C024

TestAmerica Job ID: 660-93234-1

Qualifiers

Metals

Qualifier	Qualifier Description
I	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
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
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)
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: 660-93234-1

Laboratory: TestAmerica Tampa

Narrative

CASE NARRATIVE
Client: Tampa Electric Company
Project: L19C024

Report Number: 660-93234-1

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 03/15/2019; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 3.2º C.

TOTAL METALS (ICP)

Samples L19C024-01 (660-93234-1), L19C024-02 (660-93234-2), L19C024-03 (660-93234-3), L19C024-04 (660-93234-4) and L19C024-05 (660-93234-5) were analyzed for total metals (ICP) in accordance with EPA Method 200.7. The samples were prepared and analyzed on 03/19/2019.

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

Detection Summary

Client: Tampa Electric Company
Project/Site: L19C024

TestAmerica Job ID: 660-93234-1

Client Sample ID: L19C024-01 — Lab Sample ID: 660-93234-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.013	I	0.050	0.0010	mg/L	1		200.7 Rev 4.4	Total/NA

Client Sample ID: L19C024-02 — Lab Sample ID: 660-93234-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.010	I	0.050	0.0010	mg/L	1		200.7 Rev 4.4	Total/NA

Client Sample ID: L19C024-03 — Lab Sample ID: 660-93234-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.0096	I	0.050	0.0010	mg/L	1		200.7 Rev 4.4	Total/NA

Client Sample ID: L19C024-04 — Lab Sample ID: 660-93234-4

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.019	I	0.050	0.0010	mg/L	1		200.7 Rev 4.4	Total/NA

Client Sample ID: L19C024-05 — Lab Sample ID: 660-93234-5

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.0082	I	0.050	0.0010	mg/L	1		200.7 Rev 4.4	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Tampa Electric Company
Project/Site: L19C024

TestAmerica Job ID: 660-93234-1

Client Sample ID: L19C024-01
Lab Sample ID: 660-93234-1
Date Collected: 03/14/19 14:02
Matrix: Water
Date Received: 03/15/19 09:50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.013	I	0.050	0.0010	mg/L		03/19/19 10:39	03/19/19 21:01	1

Client Sample ID: L19C024-02
Lab Sample ID: 660-93234-2
Date Collected: 03/14/19 13:35
Matrix: Water
Date Received: 03/15/19 09:50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.010	I	0.050	0.0010	mg/L		03/19/19 10:39	03/19/19 21:04	1

Client Sample ID: L19C024-03
Lab Sample ID: 660-93234-3
Date Collected: 03/14/19 13:04
Matrix: Water
Date Received: 03/15/19 09:50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.0096	I	0.050	0.0010	mg/L		03/19/19 10:39	03/19/19 21:08	1

Client Sample ID: L19C024-04
Lab Sample ID: 660-93234-4
Date Collected: 03/14/19 12:33
Matrix: Water
Date Received: 03/15/19 09:50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.019	I	0.050	0.0010	mg/L		03/19/19 10:39	03/19/19 21:12	1

Client Sample ID: L19C024-05
Lab Sample ID: 660-93234-5
Date Collected: 03/14/19 12:02
Matrix: Water
Date Received: 03/15/19 09:50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.0082	I	0.050	0.0010	mg/L		03/19/19 10:39	03/19/19 21:15	1

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 400-433799/1-A
Matrix: Water
Analysis Batch: 433931

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 433799

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.0010	U	0.050	0.0010	mg/L		03/19/19 10:39	03/19/19 20:26	1

Lab Sample ID: LCS 400-433799/2-A
Matrix: Water
Analysis Batch: 433931

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 433799

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lithium			1.00	0.983		mg/L		98	85 - 115		

Lab Sample ID: 400-167383-B-1-B MS
Matrix: Water
Analysis Batch: 433931

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 433799

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lithium	0.0032	I	1.00	0.991		mg/L		99	70 - 130		

Lab Sample ID: 400-167383-B-1-C MSD
Matrix: Water
Analysis Batch: 433931

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 433799

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	0.0032	I	1.00	0.939		mg/L		94	70 - 130	5	20

QC Association Summary

Client: Tampa Electric Company
Project/Site: L19C024

TestAmerica Job ID: 660-93234-1

Metals

Prep Batch: 433799

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-93234-1	L19C024-01	Total/NA	Water	200.7	
660-93234-2	L19C024-02	Total/NA	Water	200.7	
660-93234-3	L19C024-03	Total/NA	Water	200.7	
660-93234-4	L19C024-04	Total/NA	Water	200.7	
660-93234-5	L19C024-05	Total/NA	Water	200.7	
MB 400-433799/1-A	Method Blank	Total/NA	Water	200.7	
LCS 400-433799/2-A	Lab Control Sample	Total/NA	Water	200.7	
400-167383-B-1-B MS	Matrix Spike	Total/NA	Water	200.7	
400-167383-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	

Analysis Batch: 433931

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-93234-1	L19C024-01	Total/NA	Water	200.7 Rev 4.4	433799
660-93234-2	L19C024-02	Total/NA	Water	200.7 Rev 4.4	433799
660-93234-3	L19C024-03	Total/NA	Water	200.7 Rev 4.4	433799
660-93234-4	L19C024-04	Total/NA	Water	200.7 Rev 4.4	433799
660-93234-5	L19C024-05	Total/NA	Water	200.7 Rev 4.4	433799
MB 400-433799/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	433799
LCS 400-433799/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	433799
400-167383-B-1-B MS	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	433799
400-167383-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	433799

Lab Chronicle

Client: Tampa Electric Company
Project/Site: L19C024

TestAmerica Job ID: 660-93234-1

Client Sample ID: L19C024-01
Date Collected: 03/14/19 14:02
Date Received: 03/15/19 09:50

Lab Sample ID: 660-93234-1
Matrix: Water

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	433799	03/19/19 10:39	KWN	TAL PEN
Total/NA	Analysis	200.7 Rev 4.4		1			433931	03/19/19 21:01	GESP	TAL PEN
	Instrument ID: 6500 ICP Duo									

Client Sample ID: L19C024-02
Date Collected: 03/14/19 13:35
Date Received: 03/15/19 09:50

Lab Sample ID: 660-93234-2
Matrix: Water

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	433799	03/19/19 10:39	KWN	TAL PEN
Total/NA	Analysis	200.7 Rev 4.4		1			433931	03/19/19 21:04	GESP	TAL PEN
	Instrument ID: 6500 ICP Duo									

Client Sample ID: L19C024-03
Date Collected: 03/14/19 13:04
Date Received: 03/15/19 09:50

Lab Sample ID: 660-93234-3
Matrix: Water

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	433799	03/19/19 10:39	KWN	TAL PEN
Total/NA	Analysis	200.7 Rev 4.4		1			433931	03/19/19 21:08	GESP	TAL PEN
	Instrument ID: 6500 ICP Duo									

Client Sample ID: L19C024-04
Date Collected: 03/14/19 12:33
Date Received: 03/15/19 09:50

Lab Sample ID: 660-93234-4
Matrix: Water

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	433799	03/19/19 10:39	KWN	TAL PEN
Total/NA	Analysis	200.7 Rev 4.4		1			433931	03/19/19 21:12	GESP	TAL PEN
	Instrument ID: 6500 ICP Duo									

Client Sample ID: L19C024-05
Date Collected: 03/14/19 12:02
Date Received: 03/15/19 09:50

Lab Sample ID: 660-93234-5
Matrix: Water

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	433799	03/19/19 10:39	KWN	TAL PEN
Total/NA	Analysis	200.7 Rev 4.4		1			433931	03/19/19 21:15	GESP	TAL PEN
	Instrument ID: 6500 ICP Duo									

Laboratory References:

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

Accreditation/Certification Summary

Client: Tampa Electric Company
Project/Site: L19C024

TestAmerica Job ID: 660-93234-1

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

Method Summary

Client: Tampa Electric Company
Project/Site: L19C024

TestAmerica Job ID: 660-93234-1

Method	Method Description	Protocol	Laboratory
200.7 Rev 4.4	Metals (ICP)	EPA	TAL PEN
200.7	Preparation, Total Metals	EPA	TAL PEN

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

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

SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Services

L19C024

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: 03/28/19 16:00

Analysis		Expires		Laboratory ID	Comments
Sample ID: L19C024-01	**BBS-CCR-1**		**Water**		
Sampled: 03/14/19 14:02					
Lithium, Total EPA 6010		09/10/19 14:02			
Containers Supplied:					
Poly HNO3 - 250mL (A)					
Sample ID: L19C024-02	**BBS-CCR-2**		**Water**		
Sampled: 03/14/19 13:35					
Lithium, Total EPA 6010		09/10/19 13:35			
Containers Supplied:					
Poly HNO3 - 250mL (A)					
Sample ID: L19C024-03	**BBS-CCR-3**		**Water**		
Sampled: 03/14/19 13:04					
Lithium, Total EPA 6010		09/10/19 13:04			
Containers Supplied:					
Poly HNO3 - 250mL (A)					
Sample ID: L19C024-04	**BBS-CCR-BW1**		**Water**		
Sampled: 03/14/19 12:33					
Lithium, Total EPA 6010		09/10/19 12:33			
Containers Supplied:					
Poly HNO3 - 250mL (A)					
Sample ID: L19C024-05	**BBS-CCR-BW2**		**Water**		
Sampled: 03/14/19 12:02					
Lithium, Total EPA 6010		09/10/19 12:02			
Containers Supplied:					
Poly HNO3 - 250mL (A)					

Loc: 660
93234
660-93234 Chain of Custody

Released By	Date & Time	Received By	Date & Time
[signature]	3-14-19 1612	[signature]	3/15/19 9:50
Released By	Date & Time	Received By	Date & Time
		3.2 Cu-09	

Page 3 of 3

TestAmerica Tampa
6712 Benjamin Road Suite 100
Tampa, FL 33634
Phone (813) 885-7427 Fax (813) 885-7049

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Conner, Keaton	Carrier Tracking No(s):	COC No: 660-112252.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: keaton.conner@testamericainc.com	State of Origin: Florida	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): NELAP - Florida; NELAP - Texas		Job #: 660-93234-1
Address: 3355 McLemore Drive, ,	Due Date Requested: 3/22/2019			
City: Pensacola	TAT Requested (days):			
State, Zip: FL, 32514				
Phone: 850-474-1001(Tel) 850-478-2671(Fax)	PO #:			
Email:	WO #:			
Project Name: L19C024	Project #: 66004821			
Site:	SSOW#:			

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Analysis Requested

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	200.7/200.7_P_TOT Lithium	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
L19C024-01 (660-93234-1)	3/14/19	14:02 Eastern		Water			X	1	
L19C024-02 (660-93234-2)	3/14/19	13:35 Eastern		Water			X	1	
L19C024-03 (660-93234-3)	3/14/19	13:04 Eastern		Water			X	1	
L19C024-04 (660-93234-4)	3/14/19	12:33 Eastern		Water			X	1	
L19C024-05 (660-93234-5)	3/14/19	12:02 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Jeremy Davis	March 15, 2019	TA Tampa		3/16/19 921	TA Tam
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 0.0°C IR8

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Tampa Electric Company

Job Number: 660-93234-1

Login Number: 93234
List Number: 1
Creator: Redding, Charles S

List Source: TestAmerica Tampa

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	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	

Login Sample Receipt Checklist

Client: Tampa Electric Company

Job Number: 660-93234-1

Login Number: 93234
List Number: 2
Creator: Perez, Trina M

List Source: TestAmerica Pensacola
List Creation: 03/16/19 11:25 AM

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

KNL ENVIRONMENTAL TESTING

FL DOH Certification #E84025

Report Date: March 29, 2019

TECO
5012 Causeway Blvd.
Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client
Client/Field ID: L19C024-01
BBS-CCR-1
Sample Collection: 03-14-19/1402
Lab ID No: 19.3119
Lab Custody Date: 03-15-19/0940
Sample description: Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Results	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	33.9 ± 1.7	Calc	Calc	0.9
Radium-226	pCi/l	33.2 ± 1.7	3-21-19/1218	EPA 903.0	0.3
Radium-228	pCi/l	0.7 ± 0.5	3-28-19/1222	EPA Ra-05	0.9

Alpha Standard: Th-230

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.

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

KNL ENVIRONMENTAL TESTING

FL DOH Certification #E84025

Report Date: March 29, 2019

TECO
5012 Causeway Blvd.
Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client
Client/Field ID: L19C024-02
BBS-CCR-2
Sample Collection: 03-14-19/1335
Lab ID No: 19.3120
Lab Custody Date: 03-15-19/0940
Sample description: Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Results	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	15.8 ± 1.2	Calc	Calc	0.6
Radium-226	pCi/l	15.4 ± 1.2	3-21-19/1218	EPA 903.0	0.5
Radium-228	pCi/l	0.4 ± 0.5	3-28-19/1222	EPA Ra-05	0.6

Thomas J. Weeks
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: Thomas Weeks (813) 229-2879.

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

KNL ENVIRONMENTAL TESTING

FL DOH Certification #E84025

Report Date: March 29, 2019

TECO
5012 Causeway Blvd.
Tampa, FL 33619

Attn: Peggy Penner

Field Custody:	Client
Client/Field ID:	L19C024-03 BBS-CCR-3
Sample Collection:	03-14-19/1304
Lab ID No:	19.3121
Lab Custody Date:	03-15-19/0940
Sample description:	Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Results	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	19.0 ± 1.8	Calc	Calc	0.7
Radium-226	pCi/l	18.8 ± 1.8	3-22-19/1146	EPA 903.0	0.7
Radium-228	pCi/l	0.2 ± 0.5	3-28-19/1222	EPA Ra-05	0.6

Thomas J. Weeks
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: Thomas Weeks (813) 229-2879.

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

KNL ENVIRONMENTAL TESTING

FL DOH Certification #E84025

Report Date: March 29, 2019

TECO
5012 Causeway Blvd.
Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client
Client/Field ID: L19C024-04
BBS-CCR-BW1
Sample Collection: 03-14-19/1233
Lab ID No: 19.3122
Lab Custody Date: 03-15-19/0940
Sample description: Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Results	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	32.5 ± 1.8	Calc	Calc	0.6
Radium-226	pCi/l	29.5 ± 1.8	3-22-19/1146	EPA 903.0	0.5
Radium-228	pCi/l	3.0 ± 0.6	3-28-19/1222	EPA Ra-05	0.6

Thomas J. Weeks
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: Thomas Weeks (813) 229-2879.

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

KNL ENVIRONMENTAL TESTING

FL DOH Certification #E84025

Report Date: March 29, 2019

TECO
5012 Causeway Blvd.
Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client
Client/Field ID: L19C024-05
BBS-CCR-BW2
Sample Collection: 03-14-19/1202
Lab ID No: 19.3123
Lab Custody Date: 03-15-19/0940
Sample description: Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Results	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	4.8 ± 0.8	Calc	Calc	0.6
Radium-226	pCi/l	4.8 ± 0.8	3-22-19/1146	EPA 903.0	0.5
Radium-228	pCi/l	0.0 ± 0.4	3-28-19/1222	EPA Ra-05	0.6

Thomas J. Weeks
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: Thomas Weeks (813) 229-2879.

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

SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Service:

L19C024

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: 03/28/19 16:00

Analysis	Expires	Laboratory ID	Comments
Sample ID: L19C024-01 BBS-CCR-1		**Water** 19.3119	
Sampled: 03/14/19 14:02			
Radium 226+228, Total	09/10/19 14:02	Level 2 Data requred	
Radium 228 Ra-05	09/10/19 14:02	Level 2 Data requred	
Radium 226 EPA 903.0	09/10/19 14:02	Level 2 Data requred	
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000mL (D)		
Sample ID: L19C024-02 BBS-CCR-2		**Water** 19.3120	
Sampled: 03/14/19 13:35			
Radium 226 EPA 903.0	09/10/19 13:35	Level 2 Data requred	
Radium 226+228, Total	09/10/19 13:35	Level 2 Data requred	
Radium 228 Ra-05	09/10/19 13:35	Level 2 Data requred	
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000mL (D)		
Sample ID: L19C024-03 BBS-CCR-3		**Water** 19.3121	
Sampled: 03/14/19 13:04			
Radium 228 Ra-05	09/10/19 13:04	Level 2 Data requred	
Radium 226+228, Total	09/10/19 13:04	Level 2 Data requred	
Radium 226 EPA 903.0	09/10/19 13:04	Level 2 Data requred	
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000mL (D)		
Sample ID: L19C024-04 BBS-CCR-BW1		**Water** 19.3122	
Sampled: 03/14/19 12:33			
Radium 226 EPA 903.0	09/10/19 12:33	Level 2 Data requred	
Radium 226+228, Total	09/10/19 12:33	Level 2 Data requred	
Radium 228 Ra-05	09/10/19 12:33	Level 2 Data requred	
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000mL (D)		

Released By	Date & Time	Received By	Date & Time
[signature]	3-14-19	[signature]	3-14-19
[signature]	3-15-19	KNL	3-15-19 0440

SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Services

L19C024

Analysis	Expires	Laboratory ID	Comments
Sample ID: L19C024-05 BBS-CCR-BW2	**Water**	193123	
Sampled: 03/14/19 12:02			
Radium 228 Ra-05	09/10/19 12:02	Level 2 Data requred	
Radium 226 EPA 903.0	09/10/19 12:02	Level 2 Data requred	
Radium 226+228, Total	09/10/19 12:02	Level 2 Data requred	
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000mL (D)		

Released By	Date & Time	Received By	Date & Time
	3-14-19		3-14-19
	3-15-19		3-15-19 0940

APPENDIX C

Laboratory Analytical Data Report – Fifth Detection Monitoring Event (September 2019)

Tampa Electric Laboratory Services

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

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

Report Date: 10/04/19 13:59

Work Order - L19I017 **Project - CCR Wells Economizer Ash Pond**

Case Narrative

5 sample(s) were received on 09/17/19 14:00.

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 Calcium could not be accurately determined due to the amount of target analyte in the sample matrix. The parent sample BBS-CCR-BW-2 is flagged with a J qualifier.

TECO TAMPA ELECTRIC AN EMERA COMPANY

Tampa Electric Laboratory Services

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: **L19I017-01**

Sample Description: BBS-CCR-1

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 9/17/19 11:15

Date of Sample Receipt: 9/17/19 14:00

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Tampa Electric Company, Laboratory Services									
General Chemistry Parameters									
Chloride	**766**	mg/L	8.00	20.0		20	EPA 300.0	ERS	9/23/19 17:55
Specific Conductance	**4270**	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	9/17/19 11:15
Dissolved Oxygen	**0.150**	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	9/17/19 11:15
Fluoride	**0.195**	mg/L	0.0100	0.0500		1	EPA 300.0	ERS	9/23/19 17:45
pH	**6.82**	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	9/17/19 11:15
REDOX Potential	**-66.0**	mV	-999	-999		1	SM 2580B	RAB	9/17/19 11:15
Total Dissolved Solids	**3250**	mg/L	40.0	40.0		4	SM 2540C	TMH	9/19/19 11:50
Sulfate	**1140**	mg/L	10.0	40.0		20	EPA 300.0	ERS	9/23/19 17:55
Turbidity	**2.73**	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	9/17/19 11:15
Total Mercury by SW846 Method 7470/7471									
Mercury	0.200	ug/L	0.200	0.800	U	1	EPA 7470A	MCR	9/19/19 10:03
Total Recoverable Metals by 200 Series									
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	9/19/19 11:24
Arsenic	**6.82**	ug/L	0.320	2.00		1	EPA 200.8	MCR	9/19/19 11:24
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/19/19 11:24
Cobalt	**0.518**	ug/L	0.136	2.00	I	1	EPA 200.8	MCR	9/19/19 11:24
Lead	0.0800	ug/L	0.0800	2.00	U	1	EPA 200.8	MCR	9/19/19 11:24
Selenium	**2.51**	ug/L	0.509	2.00		1	EPA 200.8	MCR	9/19/19 11:24
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/19/19 11:24
Total Recoverable Metals by SW846 Method 6010B									
Barium	**0.111**	mg/L	0.000500	0.0200		1	EPA 6010B	RLC	9/18/19 14:04
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RLC	9/18/19 14:04
Boron	**21.0**	mg/L	0.0100	0.0500		1	EPA 6010B	RLC	9/18/19 14:04
Calcium	**575000**	ug/L	30.0	1000	V	1	EPA 6010B	RLC	9/19/19 11:44
Chromium	1.60	ug/L	1.60	12.0	U	1	EPA 6010B	RLC	9/18/19 14:04
Molybdenum	**83.8**	ug/L	2.50	20.0		1	EPA 6010B	RLC	9/18/19 14:04
Eurofins TestAmerica, Tampa									
Metals (ICP)									
Lithium	**0.018**	mg/L	0.011	0.050	I	1	200.7 Rev 4.4 Z01	GESP	10/1/19 19:32
KNL Laboratory									
Radium - 226									
Rad - 226	**28.3**	pCi/L	0.6	0.6		1	EPA 903.0	KL1	9/27/19 14:35
Rad - 226 Counting Error +/-	**2.2**	pCi/L				1	EPA 903.0	KL1	9/27/19 14:35

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.

Tampa Electric Laboratory Services

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: **L19I017-01**

Sample Description: BBS-CCR-1

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 9/17/19 11:15

Date of Sample Receipt: 9/17/19 14:00

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Radium - 228									
Rad - 228	**2.1**	pCi/L	0.6	0.6		1	EPA Ra-05	KL1	10/1/19 9:45
Rad - 228 Counting Error +/-	**0.5**	pCi/L				1	EPA Ra-05	KL1	10/1/19 9:45
Radium-226/228									
Rad-226/228	**30.4**	pCi/L	0.6	0.6		1	Calc	KL1	10/1/19 9:45
Rad-226/228 Counting Error +/-	**2.2**	pCi/L				1	Calc	KL1	10/1/19 9:45

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.

TECO TAMPA ELECTRIC AN EMERA COMPANY

Tampa Electric Laboratory Services

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: **L19I017-02**

Sample Description: BBS-CCR-2

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 9/17/19 11:44

Date of Sample Receipt: 9/17/19 14:00

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Tampa Electric Company, Laboratory Services									
General Chemistry Parameters									
Chloride	**79.5**	mg/L	0.400	1.00		1	EPA 300.0	ERS	9/23/19 18:25
Specific Conductance	**1440**	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	9/17/19 11:44
Dissolved Oxygen	**0.140**	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	9/17/19 11:44
Fluoride	**0.183**	mg/L	0.0100	0.0500		1	EPA 300.0	ERS	9/23/19 18:25
pH	**6.73**	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	9/17/19 11:44
REDOX Potential	**-56.0**	mV	-999	-999		1	SM 2580B	RAB	9/17/19 11:44
Total Dissolved Solids	**1040**	mg/L	10.0	10.0		1	SM 2540C	TMH	9/19/19 11:50
Sulfate	**419**	mg/L	5.00	20.0		10	EPA 300.0	ERS	9/23/19 18:36
Turbidity	**2.49**	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	9/17/19 11:44
Total Mercury by SW846 Method 7470/7471									
Mercury	0.200	ug/L	0.200	0.800	U	1	EPA 7470A	MCR	9/19/19 10:04
Total Recoverable Metals by 200 Series									
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	9/19/19 11:27
Arsenic	**2.51**	ug/L	0.320	2.00		1	EPA 200.8	MCR	9/19/19 11:27
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/19/19 11:27
Cobalt	0.136	ug/L	0.136	2.00	U	1	EPA 200.8	MCR	9/19/19 11:27
Lead	0.0800	ug/L	0.0800	2.00	U	1	EPA 200.8	MCR	9/19/19 11:27
Selenium	**0.778**	ug/L	0.509	2.00	I	1	EPA 200.8	MCR	9/19/19 11:27
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/19/19 11:27
Total Recoverable Metals by SW846 Method 6010B									
Barium	**0.0614**	mg/L	0.000500	0.0200		1	EPA 6010B	RLC	9/18/19 14:08
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RLC	9/18/19 14:08
Boron	**0.199**	mg/L	0.0100	0.0500		1	EPA 6010B	RLC	9/18/19 14:08
Calcium	**212000**	ug/L	30.0	1000	V	1	EPA 6010B	RLC	9/19/19 11:47
Chromium	**43.8**	ug/L	1.60	12.0		1	EPA 6010B	RLC	9/18/19 14:08
Molybdenum	**4.55**	ug/L	2.50	20.0	I	1	EPA 6010B	RLC	9/18/19 14:08
Eurofins TestAmerica, Tampa									
Metals (ICP)									
Lithium	**0.014**	mg/L	0.011	0.050	I	1	200.7 Rev 4.4 Z01	GESP	10/1/19 19:36
KNL Laboratory									
Radium - 226									
Rad - 226	**16.0**	pCi/L	0.5	0.5		1	EPA 903.0	KL1	9/27/19 14:35
Rad - 226 Counting Error +/-	**1.7**	pCi/L				1	EPA 903.0	KL1	9/27/19 14:35

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.

Tampa Electric Laboratory Services

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: **L19I017-02**

Sample Description: BBS-CCR-2

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 9/17/19 11:44

Date of Sample Receipt: 9/17/19 14:00

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Radium - 228									
Rad - 228	0.6	pCi/L	0.6	0.6	U	1	EPA Ra-05	KL1	10/1/19 9:45
Rad - 228 Counting Error +/-	**0.4**	pCi/L				1	EPA Ra-05	KL1	10/1/19 9:45
Radium-226/228									
Rad-226/228	**16.2**	pCi/L	0.6	0.6		1	Calc	KL1	10/1/19 9:45
Rad-226/228 Counting Error +/-	**1.7**	pCi/L				1	Calc	KL1	10/1/19 9:45

TECO TAMPA ELECTRIC AN EMERA COMPANY

Tampa Electric Laboratory Services

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: **L19I017-03**

Sample Description: BBS-CCR-3

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 9/17/19 12:24

Date of Sample Receipt: 9/17/19 14:00

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Tampa Electric Company, Laboratory Services									
General Chemistry Parameters									
Chloride	**129**	mg/L	4.00	10.0		10	EPA 300.0	ERS	9/23/19 18:56
Specific Conductance	**1800**	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	9/17/19 12:24
Dissolved Oxygen	**0.200**	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	9/17/19 12:24
Fluoride	**0.390**	mg/L	0.0100	0.0500		1	EPA 300.0	ERS	9/23/19 18:46
pH	**6.33**	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	9/17/19 12:24
REDOX Potential	**-160**	mV	-999	-999		1	SM 2580B	RAB	9/17/19 12:24
Total Dissolved Solids	**1300**	mg/L	10.0	10.0		1	SM 2540C	TMH	9/19/19 11:50
Sulfate	**540**	mg/L	5.00	20.0		10	EPA 300.0	ERS	9/23/19 18:56
Turbidity	**9.29**	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	9/17/19 12:24
Total Mercury by SW846 Method 7470/7471									
Mercury	0.200	ug/L	0.200	0.800	U	1	EPA 7470A	MCR	9/19/19 10:05
Total Recoverable Metals by 200 Series									
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	9/19/19 11:31
Arsenic	0.320	ug/L	0.320	2.00	U	1	EPA 200.8	MCR	9/19/19 11:31
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/19/19 11:31
Cobalt	0.136	ug/L	0.136	2.00	U	1	EPA 200.8	MCR	9/19/19 11:31
Lead	0.0800	ug/L	0.0800	2.00	U	1	EPA 200.8	MCR	9/19/19 11:31
Selenium	**0.983**	ug/L	0.509	2.00	I	1	EPA 200.8	MCR	9/19/19 11:31
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/19/19 11:31
Total Recoverable Metals by SW846 Method 6010B									
Barium	**0.0643**	mg/L	0.000500	0.0200		1	EPA 6010B	RLC	9/18/19 14:13
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RLC	9/18/19 14:13
Boron	**0.541**	mg/L	0.0100	0.0500		1	EPA 6010B	RLC	9/18/19 14:13
Calcium	**211000**	ug/L	30.0	1000	V	1	EPA 6010B	RLC	9/19/19 11:54
Chromium	1.60	ug/L	1.60	12.0	U	1	EPA 6010B	RLC	9/18/19 14:13
Molybdenum	**12.7**	ug/L	2.50	20.0	I	1	EPA 6010B	RLC	9/18/19 14:13
Eurofins TestAmerica, Tampa									
Metals (ICP)									
Lithium	**0.013**	mg/L	0.011	0.050	I	1	200.7 Rev 4.4 Z01	GESP	10/1/19 19:51
KNL Laboratory									
Radium - 226									
Rad - 226	**15.6**	pCi/L	0.4	0.4		1	EPA 903.0	KL1	9/30/19 13:44
Rad - 226 Counting Error +/-	**1.3**	pCi/L				1	EPA 903.0	KL1	9/30/19 13:44

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.

Tampa Electric Laboratory Services

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: **L19I017-03**

Sample Description: BBS-CCR-3

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 9/17/19 12:24

Date of Sample Receipt: 9/17/19 14:00

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Radium - 228									
Rad - 228	**2.1**	pCi/L	0.6	0.6		1	EPA Ra-05	KL1	10/1/19 9:45
Rad - 228 Counting Error +/-	**0.5**	pCi/L				1	EPA Ra-05	KL1	10/1/19 9:45
Radium-226/228									
Rad-226/228	**17.7**	pCi/L	0.6	0.6		1	Calc	KL1	10/1/19 9:45
Rad-226/228 Counting Error +/-	**1.3**	pCi/L				1	Calc	KL1	10/1/19 9:45

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.

TECO TAMPA ELECTRIC AN EMERA COMPANY

Tampa Electric Laboratory Services

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: **L19I017-04**

Sample Description: BBS-CCR-BW1

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 9/17/19 10:23

Date of Sample Receipt: 9/17/19 14:00

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Tampa Electric Company, Laboratory Services									
General Chemistry Parameters									
Chloride	**622**	mg/L	8.00	20.0		20	EPA 300.0	ERS	9/23/19 19:16
Specific Conductance	**4170**	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	9/17/19 10:23
Dissolved Oxygen	0.100	mg/L	0.100	0.100	U	1	FDEP SOP FT 1500	RAB	9/17/19 10:23
Fluoride	**0.340**	mg/L	0.0100	0.0500		1	EPA 300.0	ERS	9/23/19 19:06
pH	**6.52**	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	9/17/19 10:23
REDOX Potential	**-19.0**	mV	-999	-999		1	SM 2580B	RAB	9/17/19 10:23
Total Dissolved Solids	**3180**	mg/L	40.0	40.0		4	SM 2540C	TMH	9/19/19 11:50
Sulfate	**1320**	mg/L	10.0	40.0		20	EPA 300.0	ERS	9/23/19 19:16
Turbidity	**3.67**	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	9/17/19 10:23
Total Mercury by SW846 Method 7470/7471									
Mercury	0.200	ug/L	0.200	0.800	U	1	EPA 7470A	MCR	9/19/19 10:06
Total Recoverable Metals by 200 Series									
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	9/19/19 11:35
Arsenic	**7.81**	ug/L	0.320	2.00		1	EPA 200.8	MCR	9/19/19 11:35
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/19/19 11:35
Cobalt	**2.14**	ug/L	0.136	2.00		1	EPA 200.8	MCR	9/19/19 11:35
Lead	**0.0895**	ug/L	0.0800	2.00	I	1	EPA 200.8	MCR	9/19/19 11:35
Selenium	**3.09**	ug/L	0.509	2.00		1	EPA 200.8	MCR	9/19/19 11:35
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/19/19 11:35
Total Recoverable Metals by SW846 Method 6010B									
Barium	**0.0439**	mg/L	0.000500	0.0200		1	EPA 6010B	RLC	9/18/19 14:17
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RLC	9/18/19 14:17
Boron	**33.5**	mg/L	0.0100	0.0500		1	EPA 6010B	RLC	9/18/19 14:17
Calcium	**619000**	ug/L	30.0	1000	V	1	EPA 6010B	RLC	9/19/19 11:57
Chromium	1.60	ug/L	1.60	12.0	U	1	EPA 6010B	RLC	9/18/19 14:17
Molybdenum	**21.8**	ug/L	2.50	20.0		1	EPA 6010B	RLC	9/18/19 14:17
Eurofins TestAmerica, Tampa									
Metals (ICP)									
Lithium	**0.023**	mg/L	0.011	0.050	I	1	200.7 Rev 4.4 Z01	GESP	10/1/19 19:40
KNL Laboratory									
Radium - 226									
Rad - 226	**26.9**	pCi/L	0.3	0.3		1	EPA 903.0	KL1	9/30/19 13:44
Rad - 226 Counting Error +/-	**1.7**	pCi/L				1	EPA 903.0	KL1	9/30/19 13:44

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.

Tampa Electric Laboratory Services

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: **L19I017-04**

Sample Description: BBS-CCR-BW1

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 9/17/19 10:23

Date of Sample Receipt: 9/17/19 14:00

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Radium - 228									
Rad - 228	**3.0**	pCi/L	0.6	0.6		1	EPA Ra-05	KL1	10/1/19 9:45
Rad - 228 Counting Error +/-	**0.6**	pCi/L				1	EPA Ra-05	KL1	10/1/19 9:45
Radium-226/228									
Rad-226/228	**29.9**	pCi/L	0.6	0.6		1	Calc	KL1	10/1/19 9:45
Rad-226/228 Counting Error +/-	**1.7**	pCi/L				1	Calc	KL1	10/1/19 9:45

TECO TAMPA ELECTRIC AN EMERA COMPANY

Tampa Electric Laboratory Services

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: **L19I017-05**

Sample Description: BBS-CCR-BW2

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 9/17/19 9:46

Date of Sample Receipt: 9/17/19 14:00

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Tampa Electric Company, Laboratory Services									
General Chemistry Parameters									
Chloride	**118**	mg/L	2.00	5.00		5	EPA 300.0	ERS	9/23/19 19:37
Specific Conductance	**1940**	umhos/cm	100	100		1	FDEP SOP FT 1200	RAB	9/17/19 9:46
Dissolved Oxygen	**0.160**	mg/L	0.100	0.100		1	FDEP SOP FT 1500	RAB	9/17/19 9:46
Fluoride	**0.378**	mg/L	0.0100	0.0500		1	EPA 300.0	ERS	9/23/19 19:26
pH	**6.60**	pH Units	1.00	1.00		1	FDEP SOP FT 1100	RAB	9/17/19 9:46
REDOX Potential	**-26.0**	mV	-999	-999		1	SM 2580B	RAB	9/17/19 9:46
Total Dissolved Solids	**1460**	mg/L	10.0	10.0		1	SM 2540C	TMH	9/19/19 11:50
Sulfate	**630**	mg/L	5.00	20.0		10	EPA 300.0	ERS	9/26/19 16:22
Turbidity	**5.54**	NTU	0.100	0.100		1	FDEP SOP FT 1600	RAB	9/17/19 9:46
Total Mercury by SW846 Method 7470/7471									
Mercury	0.200	ug/L	0.200	0.800	U	1	EPA 7470A	MCR	9/19/19 10:07
Total Recoverable Metals by 200 Series									
Antimony	0.600	ug/L	0.600	2.00	U	1	EPA 200.8	MCR	9/19/19 11:39
Arsenic	**7.27**	ug/L	0.320	2.00		1	EPA 200.8	MCR	9/19/19 11:39
Cadmium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/19/19 11:39
Cobalt	**0.427**	ug/L	0.136	2.00	I	1	EPA 200.8	MCR	9/19/19 11:39
Lead	0.0800	ug/L	0.0800	2.00	U	1	EPA 200.8	MCR	9/19/19 11:39
Selenium	**1.60**	ug/L	0.509	2.00	I	1	EPA 200.8	MCR	9/19/19 11:39
Thallium	0.100	ug/L	0.100	0.500	U	1	EPA 200.8	MCR	9/19/19 11:39
Total Recoverable Metals by SW846 Method 6010B									
Barium	**0.0616**	mg/L	0.000500	0.0200		1	EPA 6010B	RLC	9/18/19 14:21
Beryllium	0.500	ug/L	0.500	2.00	U	1	EPA 6010B	RLC	9/18/19 14:21
Boron	**2.83**	mg/L	0.0100	0.0500		1	EPA 6010B	RLC	9/18/19 14:21
Calcium	**367000**	ug/L	30.0	1000	J-,V	1	EPA 6010B	RLC	9/19/19 12:08
Chromium	1.60	ug/L	1.60	12.0	U	1	EPA 6010B	RLC	9/18/19 14:21
Molybdenum	**4.90**	ug/L	2.50	20.0	I	1	EPA 6010B	RLC	9/18/19 14:21
Eurofins TestAmerica, Tampa									
Metals (ICP)									
Lithium	0.011	mg/L	0.011	0.050	U	1	200.7 Rev 4.4 Z01	GESP	10/1/19 19:44
KNL Laboratory									
Radium - 226									
Rad - 226	**3.8**	pCi/L	0.4	0.4		1	EPA 903.0	KL1	9/30/19 13:44
Rad - 226 Counting Error +/-	**0.7**	pCi/L				1	EPA 903.0	KL1	9/30/19 13:44

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.

Tampa Electric Laboratory Services

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: **L19I017-05**

Sample Description: BBS-CCR-BW2

Sample Collection Method: Grab

Sampled By: Robert Barthelette

Date and Time Collected: 9/17/19 9:46

Date of Sample Receipt: 9/17/19 14:00

Laboratory Results

Sample Qualifier:

Parameter	Result	Units	MDL	PQL	Qualifier Code	Dil	Test Method	Analyst	Analysis Date & Time
Radium - 228									
Rad - 228	**0.9**	pCi/L	0.8	0.8		1	EPA Ra-05	KL1	9/30/19 12:18
Rad - 228 Counting Error +/-	**0.6**	pCi/L				1	EPA Ra-05	KL1	9/30/19 12:18
Radium-226/228									
Rad-226/228	**4.7**	pCi/L	0.8	0.8		1	Calc	KL1	9/30/19 13:44
Rad-226/228 Counting Error +/-	**0.7**	pCi/L				1	Calc	KL1	9/30/19 13:44

Comments

U	Indicates that the compound was analyzed for but not detected.
J-	The reported value is an estimated value, see the case narrative for specifics.
I	Estimated value
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
V	Analyte detected in the method blank

Subcontract Laboratories:

Eurofins TestAmerica, Tampa	E84282
KNL Laboratory	E84025

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.

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 19I0130 - EPA 6010B											
Blank (19I0130-BLK1)					Prepared & Analyzed: 09/18/19						
Barium	0.000500	0.000500	0.0200	mg/L							U
Beryllium	0.500	0.500	2.00	ug/L							U
Boron	0.0100	0.0100	0.0500	mg/L							U
Calcium	36.6	30.0	1000	ug/L							I
Chromium	1.60	1.60	12.0	ug/L							U
Molybdenum	2.50	2.50	20.0	ug/L							U
LCS (19I0130-BS1)					Prepared & Analyzed: 09/18/19						
Barium	1.01	0.000500	0.0200	mg/L	1.0000		101	80-120			
Beryllium	1010	0.500	2.00	ug/L	1000.0		101	80-120			
Boron	1.04	0.0100	0.0500	mg/L	1.0000		104	80-120			
Calcium	10900	30.0	1000	ug/L	10000		109	80-120			V
Chromium	1020	1.60	12.0	ug/L	1000.0		102	80-120			
Molybdenum	1040	2.50	20.0	ug/L	1000.0		104	80-120			
Matrix Spike (19I0130-MS1)		**Source: L19I017-05**			Prepared & Analyzed: 09/18/19						
Barium	1.03	0.000500	0.0200	mg/L	1.0000	0.0616	96.8	75-125			
Beryllium	999	0.500	2.00	ug/L	1000.0	U	99.9	75-125			
Boron	3.83	0.0100	0.0500	mg/L	1.0000	2.83	100	75-125			
Calcium	358000	30.0	1000	ug/L	10000	367000	NR	75-125			J-,V
Chromium	995	1.60	12.0	ug/L	1000.0	U	99.5	75-125			
Molybdenum	1050	2.50	20.0	ug/L	1000.0	4.90	105	75-125			
Matrix Spike Dup (19I0130-MSD1)		**Source: L19I017-05**			Prepared & Analyzed: 09/18/19						
Barium	1.04	0.000500	0.0200	mg/L	1.0000	0.0616	97.6	75-125	0.726	20	
Beryllium	1000	0.500	2.00	ug/L	1000.0	U	100	75-125	0.494	20	
Boron	3.86	0.0100	0.0500	mg/L	1.0000	2.83	103	75-125	0.728	20	
Calcium	358000	30.0	1000	ug/L	10000	367000	NR	75-125	0.0420	20	J-,V
Chromium	1000	1.60	12.0	ug/L	1000.0	U	100	75-125	0.684	20	
Molybdenum	1060	2.50	20.0	ug/L	1000.0	4.90	105	75-125	0.640	20	

Total Mercury by SW846 Method 7470/7471 - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
Batch 19I0129 - EPA 7470A											
Blank (19I0129-BLK1)					Prepared & Analyzed: 09/19/19						
Mercury	0.200	0.200	0.800	ug/L							U
LCS (19I0129-BS1)					Prepared & Analyzed: 09/19/19						
Mercury	1.95	0.200	0.800	ug/L	2.0000		97.4	80-120			
Matrix Spike (19I0129-MS1)		**Source: L19I017-05**			Prepared & Analyzed: 09/19/19						
Mercury	1.90	0.200	0.800	ug/L	2.0000	U	95.0	75-125			
Matrix Spike Dup (19I0129-MSD1)		**Source: L19I017-05**			Prepared & Analyzed: 09/19/19						
Mercury	1.92	0.200	0.800	ug/L	2.0000	U	95.8	75-125	0.891	20	

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 19I0128 - EPA 200.8											
Blank (19I0128-BLK1)					Prepared: 09/17/19 Analyzed: 09/19/19						
Antimony	0.600	0.600	2.00	ug/L							U
Arsenic	0.320	0.320	2.00	ug/L							U
Cadmium	0.100	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 (19I0128-BS1)					Prepared: 09/17/19 Analyzed: 09/19/19						
Antimony	95.9	0.600	2.00	ug/L	100.00		95.9	85-115			
Arsenic	93.4	0.320	2.00	ug/L	100.00		93.4	85-115			
Cadmium	97.7	0.100	0.500	ug/L	100.00		97.7	85-115			
Cobalt	97.0	0.136	2.00	ug/L	100.00		97.0	85-115			
Lead	96.6	0.0800	2.00	ug/L	100.00		96.6	85-115			
Selenium	101	0.509	2.00	ug/L	100.00		101	85-115			
Thallium	95.9	0.100	0.500	ug/L	100.00		95.9	85-115			
Matrix Spike (19I0128-MS1)		**Source: L19I017-01**			Prepared: 09/17/19 Analyzed: 09/19/19						
Antimony	96.6	0.600	2.00	ug/L	100.00	U	96.6	70-130			
Arsenic	93.1	0.320	2.00	ug/L	100.00	6.82	86.3	70-130			
Cadmium	81.9	0.100	0.500	ug/L	100.00	U	81.9	70-130			
Cobalt	85.2	0.136	2.00	ug/L	100.00	0.518	84.7	70-130			
Lead	84.7	0.0800	2.00	ug/L	100.00	U	84.7	70-130			
Selenium	91.7	0.509	2.00	ug/L	100.00	2.51	89.2	70-130			
Thallium	87.9	0.100	0.500	ug/L	100.00	U	87.9	70-130			
Matrix Spike Dup (19I0128-MSD1)		**Source: L19I017-01**			Prepared: 09/17/19 Analyzed: 09/19/19						
Antimony	96.3	0.600	2.00	ug/L	100.00	U	96.3	70-130	0.346	20	
Arsenic	89.1	0.320	2.00	ug/L	100.00	6.82	82.3	70-130	4.43	20	
Cadmium	80.2	0.100	0.500	ug/L	100.00	U	80.2	70-130	2.13	20	
Cobalt	81.0	0.136	2.00	ug/L	100.00	0.518	80.4	70-130	5.08	20	
Lead	85.2	0.0800	2.00	ug/L	100.00	U	85.2	70-130	0.544	20	
Selenium	84.9	0.509	2.00	ug/L	100.00	2.51	82.4	70-130	7.72	20	
Thallium	88.3	0.100	0.500	ug/L	100.00	U	88.3	70-130	0.439	20	

General Chemistry Parameters - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
Batch 19I0139 - SM 2540C											
Blank (19I0139-BLK1)					Prepared & Analyzed: 09/19/19						
Total Dissolved Solids	10.0	10.0	10.0	mg/L							U
LCS (19I0139-BS1)					Prepared & Analyzed: 09/19/19						
Total Dissolved Solids	995	10.0	10.0	mg/L	1000.0		99.5	80-120			
Duplicate (19I0139-DUP1)			**Source: L19I002-01**		Prepared & Analyzed: 09/19/19						
Total Dissolved Solids	855	10.0	10.0	mg/L		845			1.18	10	
Duplicate (19I0139-DUP2)			**Source: L19I016-05**		Prepared & Analyzed: 09/19/19						
Total Dissolved Solids	1600	10.0	10.0	mg/L		1610			0.809	10	
Batch 19I0161 - EPA 300.0											
Blank (19I0161-BLK1)					Prepared & Analyzed: 09/23/19						
Chloride	0.400	0.400	1.00	mg/L							U
Fluoride	0.0100	0.0100	0.0500	mg/L							U
Sulfate	0.500	0.500	2.00	mg/L							U
LCS (19I0161-BS1)					Prepared & Analyzed: 09/23/19						
Chloride	5.21	0.400	1.00	mg/L	5.0000		104	90-110			
Fluoride	4.96	0.0100	0.0500	mg/L	5.0000		99.2	90-110			
Sulfate	4.99	0.500	2.00	mg/L	5.0000		99.7	90-110			
Matrix Spike (19I0161-MS1)			**Source: L19I002-01**		Prepared & Analyzed: 09/23/19						
Chloride	196	2.00	5.00	mg/L	25.000	174	89.4	90-110			J-
Fluoride	26.7	0.0500	0.250	mg/L	25.000	1.25	102	90-110			
Sulfate	311	2.50	10.0	mg/L	25.000	295	62.8	90-110			J-

General Chemistry Parameters - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
Batch 19I0161 - EPA 300.0											
Matrix Spike (19I0161-MS2)		**Source: L19I011-01**			Prepared & Analyzed: 09/23/19						
Chloride	38.2	2.00	5.00	mg/L	25.000	10.6	111	90-110			J-
Fluoride	26.1	0.0500	0.250	mg/L	25.000	0.450	102	90-110			
Sulfate	58.8	2.50	10.0	mg/L	25.000	33.9	99.4	90-110			
Matrix Spike Dup (19I0161-MSD1)		**Source: L19I002-01**			Prepared & Analyzed: 09/23/19						
Chloride	195	2.00	5.00	mg/L	25.000	174	87.5	90-110	0.246	20	J-
Fluoride	26.6	0.0500	0.250	mg/L	25.000	1.25	101	90-110	0.317	20	
Sulfate	310	2.50	10.0	mg/L	25.000	295	60.8	90-110	0.163	20	J-
Matrix Spike Dup (19I0161-MSD2)		**Source: L19I011-01**			Prepared & Analyzed: 09/23/19						
Chloride	37.2	2.00	5.00	mg/L	25.000	10.6	107	90-110	2.56	20	
Fluoride	25.9	0.0500	0.250	mg/L	25.000	0.450	102	90-110	0.458	20	
Sulfate	59.1	2.50	10.0	mg/L	25.000	33.9	101	90-110	0.635	20	
Batch 19I0174 - EPA 300.0											
Blank (19I0174-BLK1)					Prepared & Analyzed: 09/26/19						
Sulfate	0.500	0.500	2.00	mg/L							U
LCS (19I0174-BS1)					Prepared & Analyzed: 09/26/19						
Sulfate	4.69	0.500	2.00	mg/L	5.0000		93.8	90-110			
Matrix Spike (19I0174-MS1)		**Source: L19I016-03RE1**			Prepared & Analyzed: 09/26/19						
Sulfate	921	5.00	20.0	mg/L	50.000	915	12.4	90-110			J-
Matrix Spike Dup (19I0174-MSD1)		**Source: L19I016-03RE1**			Prepared & Analyzed: 09/26/19						
Sulfate	925	5.00	20.0	mg/L	50.000	915	19.5	90-110	0.379	20	J-

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.

Tampa Electric Laboratory Services

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

Metals (ICP) - Quality Control

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%Rec	%Rec Limits	RPD	RPD Limit	Qualifier
Batch 459401 - 200.7 Rev 4.4 Z01											
Blank (459652-81)					Prepared: 09/30/19 Analyzed: 10/01/19						
Lithium	0.011	0.011	0.050	mg/L				-			U
LCS (459652-82)					Prepared: 09/30/19 Analyzed: 10/01/19						
Lithium	1.01	0.011	0.050	mg/L	1.00		101	85-115			

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

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.

DEP-SOP-001/01

FS 2200 Groundwater Sampling

Form FD 9000-24

GROUNDWATER SAMPLING LOG

SITE NAME:	Big Bend	SITE LOCATION:	Apollo Beach, FL.	
WELL NO:	BBS-CCR-2	SAMPLE ID:	L19I017-02 A	DATE:

PURGING DATA

WELL DIAMETER (inches)	TUBING DIAMETER (inches)	1/4	WELL SCREEN INTERVAL DEPTH	11.84	feet to	21.84 (feet)	STATIC DEPTH TO WATER (feet)	6.58	PURGE PUMP TYPE OR BAILER:	PP

WELL VOLUME PURGE: (only fillout if applicable)
1 WELL VOLUME = (TOTAL WELL DEPTH - STATIC DEPTH TO WATER) X WELL CAPACITY
= (feet - feet) x gallons/foot = gallons

EQUIPMENT VOLUME PURGE: (only fillout if applicable)
1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
=(0 gallons + (0.0026 gallons/foot X 22.84 feet) + 0.06 gallons = 0.12 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet):	16.84	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	16.84	PURGING INITIATED AT:	11:20	PURGING ENDED AT:	11:33	TOTAL VOLUME PURGED (gallons):	1.77

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 or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
11:29	1.24	1.24	0.14	6.69	6.80	26.12	1443	0.13	2.68	LT. YELLOW	NONE
11:31	0.26	1.50	0.13	6.69	6.75	26.11	1443	0.13	2.05	LT. YELLOW	NONE
11:33	0.27	1.77	0.14	6.68	6.73	26.13	1441	0.14	2.49	LT. YELLOW	NONE

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.0; 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; 1/2" = 0.010; 5/8" = 0.016

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	TECO	SAMPLER (S) SIGNATURES:		SAMPLING INITIATED AT:	11:33	SAMPLING ENDED AT:	11:44
PUMP OR TUBING DEPTH IN WELL (feet):	16.8	SAMPLE PUMP FLOW RATE (mL per minute):	510	TUBING MATERIAL CODE:	PE/S		
FIELD DECONTAMINATION:	Y ☐ N ☑	FIELD-FILTERED: Y ☐ N ☑ Filtration Equipment Type:		FILTER SIZE:	µm	DUPLICATE:	Y ☐ N ☑

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL. ADDED IN FIELD (ml) (1)	FINAL pH		
@Ino-500	1	PE	500ml	NONE	NONE	N/A	Inorganics	PP
@Met-250	2	PE	250ml	HNO3	1ml	<2	Metals	PP
@Rad-1L	2	PE	1L	HNO3	5ml	<2	Radiologicals	PP

REMARKS:
(1) Sample bottles pre-preserved at laboratory prior to sample collection.

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O= Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submirsable Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

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)
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)

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

GROUNDWATER SAMPLING LOG

SITE NAME:	Big Bend	SITE LOCATION:	Apollo Beach, FL.
WELL NO:	BBS-CCR3	SAMPLE ID: L19I017-03A	DATE:

PURGING DATA

WELL DIAMETER (inches)	TUBING DIAMETER (inches) 1/4	WELL SCREEN INTERVAL DEPTH 13.23 feet to 23.23 (feet)	STATIC DEPTH TO WATER (feet): 6.22	PURGE PUMP TYPE OR BAILER: PP

WELL VOLUME PURGE: (only fillout if applicable)
1 WELL VOLUME = (TOTAL WELL DEPTH - STATIC DEPTH TO WATER) X WELL CAPACITY
= (feet - feet) x gallons/foot = gallons

EQUIPMENT VOLUME PURGE: (only fillout if applicable)
1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
=(0 gallons + (0.0026 gallons/foot X 24.23 feet) + 0.06 gallons = 0.12 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 18.23	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 18.23	PURGING INITIATED AT: 11:59	PURGING ENDED AT: 12:12	TOTAL VOLUME PURGED (gallons): 1.09

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 or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
12:08	0.76	0.76	0.08	6.52	6.33	27.28	1839	0.51	11.50	DK. YELLOW	MODERATE
12:10	0.16	0.92	0.08	6.51	6.32	27.28	1818	0.27	9.87	DK. YELLOW	MODERATE
12:12	0.17	1.09	0.09	6.53	6.33	27.30	1802	0.20	9.29	DK. YELLOW	MODERATE

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.0 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; 1/2" = 0.010 5/8" = 0.016

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: TECO	SAMPLER (S) SIGNATURES:	SAMPLING INITIATED AT: 12:12	SAMPLING ENDED AT: 12:24
PUMP OR TUBING DEPTH IN WELL (feet): 18.2	SAMPLE PUMP FLOW RATE (mL per minute): 317	TUBING MATERIAL CODE: PE/S	
FIELD DECONTAMINATION: Y ☐ N ☑	FIELD-FILTERED: Y ☐ N ☑ Filtration Equipment Type:	FILTER SIZE: µm	DUPLICATE: Y ☐ N ☑

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL. ADDED IN FIELD (ml) (1)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
@Ino-500	1	PE	500ml	NONE	NONE	N/A	Inorganics	PP
@Met-250	2	PE	250ml	HNO3	1ml	<2	Metals	PP
@Rad-1L	2	PE	1L	HNO3	5ml	<2	Radiologicals	PP

REMARKS:
(1) Sample bottles pre-preserved at laboratory prior to sample collection.

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicon T = Teflon; O= Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submirsable Pump; PP = Peristaltic Pump RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

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)
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)

DEP-SOP-001/01

FS 2200 Groundwater Sampling

Form FD 9000-24

GROUNDWATER SAMPLING LOG

SITE NAME:	Big Bend	SITE LOCATION:	Apollo Beach, FL.	
WELL NO:	BBS-CCR-BW-1	SAMPLE ID:	L19I017-04 A	DATE:

PURGING DATA

WELL DIAMETER (inches)	TUBING DIAMETER (inches)	WELL SCREEN INTERVAL DEPTH				STATIC DEPTH TO WATER (feet):	PURGE PUMP TYPE OR BAILER:
	1/4	34.30	feet to	44.30	(feet)	28.34	ESP

WELL VOLUME PURGE: (only fillout if applicable)
1 WELL VOLUME = (TOTAL WELL DEPTH - STATIC DEPTH TO WATER) X WELL CAPACITY
= (feet - feet) x gallons/foot = gallons

EQUIPMENT VOLUME PURGE: (only fillout if applicable)
1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
=(0 gallons + (0.0026 gallons/foot X 100 feet) + 0.06 gallons = 0.32 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet):	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):
39.30	39.30	10:00	10:20	14.79

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 or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
10:16	11.83	11.83	0.74	29.70	6.52	27.85	4133	0.08	10.30	CLEAR	NONE
10:18	1.48	13.31	0.74	29.72	6.52	27.86	4144	0.08	5.09	CLEAR	NONE
10:20	1.48	14.79	0.74	29.71	6.52	27.86	4172	0.08	3.67	CLEAR	NONE

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 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; 1/2" = 0.010; 5/8" = 0.016

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER (S) SIGNATURES:	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
TECO	RSButtry	10:20	10:23

PUMP OR TUBING DEPTH IN WELL (feet):	SAMPLE PUMP FLOW RATE (mL per minute):	TUBING MATERIAL CODE:
39.3	2800	PE

FIELD DECONTAMINATION: Y ☐ N ☑
FIELD-FILTERED: Y ☐ N ☑ Filtration Equipment Type: FILTER SIZE: µm DUPLICATE: Y ☐ N ☑

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL. ADDED IN FIELD (ml) (1)	FINAL pH		
@Ino-500	1	PE	500ml	NONE	NONE	N/A	Inorganics	ESP
@Met-250	2	PE	250ml	HNO3	1ml	<2	Metals	ESP
@Rad-1L	2	PE	1L	HNO3	5ml	<2	Radiologicals	ESP

REMARKS:
(1) Sample bottles pre-preserved at laboratory prior to sample collection.

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicon; T = Teflon; O= Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submirsable Pump; PP = Peristaltic Pump RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

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)
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)

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

GROUNDWATER SAMPLING LOG

SITE NAME:	Big Bend	SITE LOCATION:	Apollo Beach, FL.
WELL NO:	BBS-CCR-BW-2	SAMPLE ID:	L19I017-05 A
DATE:			

PURGING DATA

WELL DIAMETER (inches)	TUBING DIAMETER (inches)	WELL SCREEN INTERVAL DEPTH	STATIC DEPTH TO WATER (feet)	PURGE PUMP TYPE OR BAILER:
	1/4	13.64 feet to 23.34 (feet)	6.54	PP

WELL VOLUME PURGE: (only fillout if applicable)
1 WELL VOLUME = (TOTAL WELL DEPTH - STATIC DEPTH TO WATER) X WELL CAPACITY
= (feet - feet) x gallons/foot = gallons

EQUIPMENT VOLUME PURGE: (only fillout if applicable)
1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
=(0 gallons + (0.0026 gallons/foot X 24.64 feet) + 0.06 gallons = 0.12 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet):	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):
18.49	18.49	9:26	9:39	2.41

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 or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
9:35	1.66	1.66	0.18	6.84	6.60	27.35	1948	0.14	8.09	LT. YELLOW	NONE
9:37	0.38	2.04	0.19	6.86	6.60	27.35	1942	0.14	6.06	LT. YELLOW	NONE
9:39	0.37	2.41	0.19	6.85	6.60	27.36	1938	0.16	5.54	LT. YELLOW	NONE

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 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; 1/2" = 0.010; 5/8" = 0.016

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER (S) SIGNATURES:	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
TECO		9:39	9:46

PUMP OR TUBING DEPTH IN WELL (feet):	SAMPLE PUMP FLOW RATE (mL per minute):	TUBING MATERIAL CODE:
18.5	707	PE/S

FIELD DECONTAMINATION: Y ☐ N ☑
FIELD-FILTERED: Y ☐ N ☑ FILTER SIZE: µm DUPLICATE: Y ☐ N ☑
Filtration Equipment Type:

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL. ADDED IN FIELD (ml) (1)	FINAL pH		
@Ino-500	1	PE	500ml	NONE	NONE	N/A	Inorganics	PP
@Met-250	2	PE	250ml	HNO3	1ml	<2	Metals	PP
@Rad-1L	2	PE	1L	HNO3	5ml	<2	Radiologicals	PP

REMARKS:
(1) Sample bottles pre-preserved at laboratory prior to sample collection.

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicon; T = Teflon; O= Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersable Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

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)
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: **Big Bend** Date: File Name: Weather: Sampler(s) / Initials /TECO 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	NGVD	
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	$COLOR-W	$ODOR-W	Time	LEVEL
L19I017-01 A	BBS-CCR-1	11:15		6.82	26.05	4266	0.15	2.73	-66.0		CLEAR	NONE		
L19I017-02 A	BBS-CCR-2	11:44		6.73	26.13	1441	0.14	2.49	-56.0		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
L19I017-01 A	☐		1		☐	☑ 2	☑ 2	☐	☐	☐	☐	☐	☐	10
L19I017-02 A	☐		1		☐	☑ 2	☑ 2	☐	☐	☐	☐	☐	☐	

(1) 1L plastic (PP)	(2) 500ml plastic (PP)	(3) 250ml plastic (PP)	(4) 100ml coliform bottle	(5) 1L amber glass (AG)	(6) 40ml VOA vial (CG)	Samples On Ice	Sample Reciept
ESS 0114801E	ESS 0200401E	ESS 0300401E	ESS	ESS	ESS	☑ Yes ☐ No	Time 14:00
							Temp 4.8 C

Preservation	Pres ID	Preservation	Pres ID	Preservation	Pres ID
1L bottles (rads): 5 ml HNO3 to pH <2	L 023922N ☑	250ml bottles (nuts): 1 ml H2SO4 to pH <2	L ☐	500 ml bottles(Sulfide) 2ml NAOH/Zinc Acet. to pH >12	L ☐
500 ml bottles (metals): 2 ml HNO3 to pH <2	L ☐	40 ml Vial (TOC): 0.5 ml H2SO4 to pH <2	L ☐	250 ml bottles (Cyan) 1g NAOH to pH >12	L ☐
250 ml bottles (metal): 1 ml HNO3 to pH <2	L 023922N ☑	1L bottles (diss. rads): filtered with 0.45um, 5 ml HNO3 to pH <2	L ☐	A checked box indicates that the sample 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 027553K	7	7.01	7:34			7.04	14:09	Meter ID:	7:17	22.00	234.0	234.9
FDEP FT 1100	L 026262D	10	10.04	7:34	QC: (pH +/- 0.2) (Cond +/- 5%) (DO +/- 0.3mg/L) (Redox +/- 10mv)				RM01	14:04	22.10	232.0	234.9
Units: SU	L 027378A	4	3.99	7:34	A checked box indicates ICV / CCV passed				Zobell Sol ID:				

Conductivity Meter Calib.	Standard ID	Std Value	Cal	Time	ICV	Time	CCV	Time	L 026839				
Meter ID: MPM08	L 026445E	1000	1000	7:38					DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg/l
FDEP FT 1200, Units: uMHOS	L 026125A	10000			10070	7:40	10066	14:02	Meter ID:	7:19	22.82	8.61	8.611

Turbidity Meter Calibration	Standard ID	Std Value	Acceptability Range		ICV	Time	CCV	Time	MPM08	15:04	22.26	8.87	8.710
Meter ID: TM07	L 026862	4.53	4.08	4.98	4.52	7:20			Barom. Pres				
FDEP FT 1600, Units: NTU	L 26863	47.50	44.41	50.59			47.70	14:05	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	Iodate/Iodide ID	Therm ID	pH	Conduct.(%)	DO (mg/l)	Redox (mv)
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 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)	x Well Capacity (gal)	= 1 Well Volume (gal)	(Tubing Capacity (gal/ft.)	x Tubing Length (ft)	) + Pump Volume (gal)	+ Cell Volume (gal)	= 1 Eqpt. Volume (gal)	
BBS-CCR-1	2	10	17.32	22.32	6.97	15.35	0.16	2.46	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. Table
1A	11:03	450	1.31	1.31	7.12	6.82	26.09	4270	0.16	2.22	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	11:05	450	0.24	1.55	7.11	6.82	26.07	4260	0.15	2.02	Temp°C+/- 0.2	STABLE	Pump:	PP
10:52	11:07	470	0.25	1.80	7.10	6.82	[illegible]	4266	0.15	2.73	Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:											DO % Sat.< 20	STABLE	Dedicated	☑ Yes
11:07											Turb. NTU < 20	STABLE	Tubing?	☐ No

Purge Complete At 10:53	Gallons to Purge 0.12	Stablility Values =	6.82	26.05	4266	0.15	2.73

Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Well Depth (ft)	- Depth to Water (ft)	= Water Column (ft)	x Well Capacity (gal)	= 1 Well Volume (gal)	(Tubing Capacity (gal/ft.)	x Tubing Length (ft)	) + Pump Volume (gal)	+ Cell Volume (gal)	= 1 Eqpt. Volume (gal)	
BBS-CCR-2	2	10	16.84	21.84	6.58	15.26	0.16	2.44	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	Eqpt. Table
1A	11:29	520	1.24	1.24	6.69	6.80	26.12	1443	0.13	2.68	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	11:31	500	0.26	1.50	6.69	6.75	26.11	1443	0.13	2.05	Temp°C+/- 0.2	STABLE	Pump:	PP
11:20	11:33	510	0.27	1.77	6.68	6.73	26.13	1441	0.14	2.49	Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:											DO % Sat.< 20	STABLE	Dedicated	☑ Yes
11:33											Turb. NTU < 20	STABLE	Tubing?	☐ No

Purge Complete At 11:21	Gallons to Purge 0.12	Stablility Values =	6.73	26.13	1441	0.14	2.49

Comments:

Total Time Total Miles

Site: **Big Bend** Date: File Name: Weather: Sampler(s) / Initials /TECO Initials RMB

LIMS #	Loction Code	Time	FE²	pH (SU)	Temp °C	Cond(uMHOS)	DO Mg/L	Turbidity(NTU)	Redox (mv)	Sulfite (mg/L)	Color	Odor	NGVD	
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	$COLOR-W	$ODOR-W	Time	LEVEL
L19I017-03A	BBS-CCR3	12:24		6.33	27.30	1802	0.20	9.29	-160.0		DK. YELLOW	MODERATE		

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
L19I017-03A	☐		1		☐	☑ 2	☑ 2	☐	☐	☐	☐	☐	☐	10
	☐		1		☐	☑ 2	☑ 2	☐	☐	☐	☐	☐	☐	

(1) 1L plastic (PP)	(2) 500ml plastic (PP)	(3) 250ml plastic (PP)	(4) 100ml coliform bottle	(5) 1L amber glass (AG)	(6) 40ml VOA vial (CG)	Samples On Ice	Sample Reciept
ESS 0114801E	ESS 0200401E	ESS 0300401E	ESS	ESS	ESS	☑ Yes ☐ No	Time 14:00
							Temp 4.8 C

Preservation	Pres ID	Preservation	Pres ID	Preservation	Pres ID
1L bottles (rads): 5 ml HNO3 to pH <2	L 023922N ☑	250ml bottles (nuts): 1 ml H2SO4 to pH <2	L ☐	500 ml bottles(Sulfide) 2ml NAOH/Zinc Acet. to pH >12	L ☐
500 ml bottles (metals): 2 ml HNO3 to pH <2	L ☐	40 ml Vial (TOC): 0.5 ml H2SO4 to pH <2	L ☐	250 ml bottles (Cyan) 1g NAOH to pH >12	L ☐
250 ml bottles (metal): 1 ml HNO3 to pH <2	L 023922N ☑	1L bottles (diss. rads): filtered with 0.45um, 5 ml HNO3 to pH <2	L ☐	A checked box indicates that the sample 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 027553K	7	7	7:34			7.04	14:09	Meter ID:	7:17	22.00	234.0	234.9
FDEP FT 1100	L 026262D	10	10	7:34	QC: (pH +/- 0.2) (Cond +/- 5%) (DO +/- 0.3mg/L) (Redox +/- 10mv)				RM01	14:04	22.10	232.0	234.9
Units: SU	L 027378A	4	4	7:34	A checked box indicates ICV / CCV passed				Zobell Sol ID:				
Conductivity Meter Calib.	**Standard ID**	**Std Value**	**Cal**	**Time**	**ICV**	**Time**	**CCV**	**Time**	L 39				
Meter ID: MPM08	L 026445E	1000	1000	7:38					**DO Meter Cal**	**Time**	**Temp °C**	**Reading mg/l**	**Theo Value mg/l**
FDEP FT 1200, Units: uMHOS	L 026125A	10000			10070	7:40	10066	14:02	Meter ID:	7:19	22.8	8.61	8.611
Turbidity Meter Calibration	**Standard ID**	**Std Value**	**Acceptability Range**		**ICV**	**Time**	**CCV**	**Time**	MPM08	15:04	22.3	8.87	8.710
Meter ID: TM07	L 026862	4.53	4.08	4.98	4.52	7:20			Barom. Pres				
FDEP FT 1600, Units: NTU	L 26863	47.50	44.41	50.59			47.70	14:05	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	Iodate/Iodide ID	Therm ID	pH	Conduct.(%)	DO (mg/l)	Redox (mv)
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 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)	x Well Capacity (gal)	= 1 Well Volume (gal)	(Tubing Capacity (gal/ft.)	x Tubing Length (ft)	) + Pump Volume (gal)	+ Cell Volume (gal)	= 1 Eqpt. Volume (gal)	
BBS-CCR3	2	10	18.23	23.23	6.22	17.01	0.16	2.72	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	12:08	320	0.76	0.76	6.52	6.33	27.28	1839	0.51	11.50	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	12:10	310	0.16	0.92	6.51	6.32	27.28	1818	0.27	9.87	Temp°C+/- 0.2	STABLE	Pump:	PP
11:59	12:12	320	0.17	1.09	6.53	6.33	27.30	1802	0.20	9.29	Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:											DO % Sat.< 20	STABLE	Dedicated ☑	Yes
12:12											Turb. NTU < 20	STABLE	Tubing? ☐	No
Purge Complete At	**12:00**	**Gallons to Purge**	**0.12**	Stablility Values =		6.33	27.30	1802	0.20	9.29				

Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Well Depth (ft)	- Depth to Water (ft)	= Water Column (ft)	x Well Capacity (gal)	= 1 Well Volume (gal)	(Tubing Capacity (gal/ft.)	x Tubing Length (ft)	) + Pump Volume (gal)	+ Cell Volume (gal	= 1 Eqpt. Volume (gal)	
0	2	10	14	18		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
											ph:+/- 0.2		Level Meter:	WLM08
Purge Start:											Temp°C+/- 0.2		Pump:	PP
											Cond % +/- 5		Tubing:	PE/S
Purge End:											DO % Sat.< 20		Dedicated ☐	Yes
											Turb. NTU < 20		Tubing? ☐	No
Purge Complete At		**Gallons to Purge**	**0.32**	Stablity Values =										

Comments:

Total Time Total Miles

Site: **Big Bend** Date: File Name: Weather: Sampler(s) / Initials /TECO 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	NGVD	
			mg/l	PH	TEMP-C	COND-F	DO	TURB-N-F	REDOX	SO3-TR	$COLOR-W	$ODOR-W	Time	LEVEL
L19I017-04 A	BBS-CCR-BW-1	10:23		6.52	27.86	4172	0.08	3.67	-19.0		CLEAR	NONE		
L19I017-05 A	BBS-CCR-BW-2	9:46		6.60	27.36	1938	0.16	5.54	-26.0		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
L19I017-04 A	☐		1		☐	☑ 2	☑ 2	☐	☐	☐	☐	☐	☐	10
L19I017-05 A	☐		1		☐	☑ 2	☑ 2	☐	☐	☐	☐	☐	☐	

(1) 1L plastic (PP)	(2) 500ml plastic (PP)	(3) 250ml plastic (PP)	(4) 100ml coliform bottle	(5) 1L amber glass (AG)	(6) 40ml VOA vial (CG)	Samples On Ice	Sample Reciept
ESS 0114801E	ESS 0200401E	ESS 0300401E	ESS	ESS	ESS	☑ Yes ☐ No	Time 14:00
							Temp 4.8 C

Preservation	Pres ID	Preservation	Pres ID	Preservation	Pres ID
1L bottles (rads): 5 ml HNO3 to pH <2	L 023922N ☑	250ml bottles (nuts): 1 ml H2SO4 to pH <2	L ☐	500 ml bottles(Sulfide) 2ml NAOH/Zinc Acet. to pH >12	L ☐
500 ml bottles (metals): 2 ml HNO3 to pH <2	L ☐	40 ml Vial (TOC): 0.5 ml H2SO4 to pH <2	L ☐	250 ml bottles (Cyan) 1g NAOH to pH >12	L ☐
250 ml bottles (metal): 1 ml HNO3 to pH <2	L 023922N ☑	1L bottles (diss. rads): filtered with 0.45um, 5 ml HNO3 to pH <2	L ☐	A checked box indicates that the sample 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 027553K	7	7	7:34			7.04	14:09	Meter ID:	7:17	22.00	234.0	234.9
FDEP FT 1100	L 026262D	10	10	7:34	QC: (pH +/- 0.2) (Cond +/- 5%) (DO +/- 0.3mg/L) (Redox +/- 10mv)				RM01	14:04	22.10	232.0	234.9
Units: SU	L 027378A	4	4	7:34	A checked box indicates ICV / CCV passed				Zobell Sol ID:				

Conductivity Meter Calib.	Standard ID	Std Value	Cal	Time	ICV	Time	CCV	Time	L 026839				
Meter ID: MPM08	L 026445E	1000	1000	7:38					DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg/l
FDEP FT 1200, Units: uMHOS	L 026125A	10000			10070	7:40	10066	14:02	Meter ID:	7:19	22.8	8.61	8.611

Turbidity Meter Calibration	Standard ID	Std Value	Acceptability Range		ICV	Time	CCV	Time	MPM08	15:04	22.3	8.87	8.710
Meter ID: TM07	L 026862	4.53	4.08	4.98	4.52	7:20			Barom. Pres				
FDEP FT 1600, Units: NTU	L 26863	47.50	44.41	50.59			47.70	14:05	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	Iodate/Iodide ID	Therm ID	pH	Conduct.(%)	DO (mg/l)	Redox (mv)
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 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)	x Well Capacity (gal)	= 1 Well Volume (gal)	(Tubing Capacity (gal/ft.)	x Tubing Length (ft)	) + Pump Volume (gal)	+ Cell Volume (gal)	= 1 Eqpt. Volume (gal)	
BBS-CCR-BW-1	2	10	39.3	44.3	28.34	15.96	0.16	2.55	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
1A	10:16	2800	11.83	11.83	29.70	6.52	27.85	4133	0.08	10.30	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	10:18	2800	1.48	13.31	29.72	6.52	27.86	4144	0.08	5.09	Temp°C+/- 0.2	STABLE	Pump:	ESP
10:00	10:20	2800	1.48	14.79	29.71	6.52	27.86	4172	0.08	3.67	Cond % +/- 5	STABLE	Tubing:	PE
Purge End:											DO % Sat.< 20	STABLE	Dedicated ☐	Yes
10:20											Turb. NTU < 20	STABLE	Tubing? ☑	No
Purge Complete At 10:00		Gallons to Purge 0.32		Stability Values =		6.52	27.86	4172	0.08	3.67				

Well #	Diam/ Comp	Screen Interval (ft)	Intake Depth (ft)	Well Depth (ft)	- Depth to Water (ft)	= Water Column (ft)	x Well Capacity (gal)	= 1 Well Volume (gal)	(Tubing Capacity (gal/ft.)	x Tubing Length (ft)	) + Pump Volume (gal)	+ Cell Volume (gal)	= 1 Eqpt. Volume (gal)	
BBS-CCR-BW-2	2	10	18.49	23.84	6.54	17.30	0.16	2.77	0.0026	24.64	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	9:35	700	1.66	1.66	6.84	6.60	27.35	1948	0.14	8.09	ph:+/- 0.2	STABLE	Level Meter:	WLM08
Purge Start:	9:37	720	0.38	2.04	6.86	6.60	27.35	1942	0.14	6.06	Temp°C+/- 0.2	STABLE	Pump:	PP
9:26	9:39	700	0.37	2.41	6.85	6.60	27.36	1938	0.16	5.54	Cond % +/- 5	STABLE	Tubing:	PE/S
Purge End:											DO % Sat.< 20	STABLE	Dedicated ☑	Yes
9:39											Turb. NTU < 20	STABLE	Tubing? ☐	No
Purge Complete At 9:27		Gallons to Purge 0.12		Stability Values =		6.60	27.36	1938	0.16	5.54				

Comments:

Total Time Total Miles

GROUNDWATER WELL SAMPLING EQUIPMENT CALIBRATION

Date: Sampler(s): Initials

pH Meter Calibration		Buffer ID	Buffer Value	Cal	Time				CCV	Time	Pass/Fail
Meter ID: MPM08	L	027553K ☒	7.01	7.01	7:34				7.04	14:09	Pass
FDEP FT 1100	L	026262D ☒	10.04	10.04	7:34				QC (pH +/- 0.2) (Cond +/- 5%) (DO +/- 0.3mg/L) (Redox +/- 10mv)		
Units: SU	L	027378A ☒	4.00	3.99	7:34	ICV	Time	Pass/Fail	A checked box indicates ICV / CCV passed		
ICV Check	L	026487L ☒	7.01			7.03	735	Pass			
Conductivity Meter Calib		Standard ID	Std Value	Cal	Time	ICV	Time	Pass/Fail	CCV	Time	Pass/Fail
Meter ID: MPM08	L	026445E ☒	1000	1000	7:38						
FDEP FT 1200, Units: uMHOS	L	026125A ☒	10000			10070	7:40	Pass	10066	14:02	Pass
Turbidity Meter Calibration		Standard ID	Std Value	Acceptability Range		CCV	Time	Pass/Fail	CCV	Time	Pass/Fail
Meter ID: TM07	L	026862 ☒	4.53	4.08	4.98	4.52	7:20	Pass			
FDEP FT 1600, Units: NTU	L	26863 ☐	47.50	44.41	50.59				47.70	14:05	Pass

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)/500ml DI=10mg/L				L	L	L	L

Redox Cal	Time	Temp °C	Reading mv	Theo Value mv	Pass / Fail
Meter ID:	7:17	22.0	234.0	234.9	Pass
RM01	14:04	22.1	232.0	234.9	Pass
Zobell Sol ID:					
L 026839 ☑					

DO Meter Cal	Time	Temp °C	Reading mg/l	Theo Value mg/l	Pass / Fail
FDEP FT 1500					
Meter ID:	7:19	22.82	8.61	8.611	Pass
MPM08	15:04	22.26	8.87	8.710	Pass
Barom. Pres					
760					

Therm ID	pH	Conduct. %	DO mg/l	Redox mv	CL2
MPM08	0.2	5	0.3	10	0.2

Calibration Criterion

Ferrous Iron
Comparator ID: Reagent ID: L- ☐

ClO_2 DPD Check must read +/- 10% of the Calculated Std. Concentration, multiplied by 2.4.

Glycene check should read < 0.10 mg/l ClO_2.

Chlorine Dioxide (mg/l)	Std. Conc. (mg/l)	Std. Spike Volume (ml)	Cal Sample Volume (ml)	Calc. Std. Conc. (mg/l)	Initial Calibration Verification ICV: DPD Check (mg/l)	Glycene Check	Time	Pass/Fail	Continuous Calibration Verification CCV: DPD Check (mg/l)	Time	Pass/Fail
Meter ID:		1.0	100								

☐ DPD ID: L ☐ Glycene ID: L ☐ A checked box indicates reagent expiration date has been verified.

Method 10126*

*Equivalent to Standard Methods, 4500 ClO_2 D.

COMMENTS: CL2 Std. ID: L

DEP-SOP-001/01

FS 2200 Groundwater Sampling

Form FD 9000-24

GROUNDWATER SAMPLING LOG

FACILITY NAME:	Big Bend	SITE LOCATION:	Apollo Beach, FL.
WELL NO:	BBS-CCR-1	SAMPLE ID:	L19I017-01 A
DATE:			

PURGING DATA

WELL DIAMETER (inches)	TUBING DIAMETER (inches)	1/4	WELL SCREEN INTERVAL (NGVD) DEPTH	12.32	feet to	22.32 (feet)	STATIC DEPTH TO WATER (feet)	6.97	PURGE PUMP TYPE OR BAILER:	PP

WELL VOLUME PURGE: (only fillout if applicable)
1 WELL VOLUME = (TOTAL WELL DEPTH - STATIC DEPTH TO WATER) X WELL CAPACITY

= (feet - feet) x gallons/foot = gallons

EQUIPMENT VOLUME PURGE: (only fillout if applicable)
1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME

=(0 gallons + (0.0026 gallons/foot X 23.3 feet) + 0.06 gallons = 0.12 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet):	17.32	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	17.32	PURGING INITIATED AT:	10:52	PURGING ENDED AT:	11:07	TOTAL VOLUME PURGED (gallons):	1.80

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 or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
11:03	1.31	1.31	0.12	7.12	6.82	26.09	4270	0.16	2.22	CLEAR	NONE
11:05	0.24	1.55	0.12	7.11	6.82	26.07	4260	0.15	2.02	CLEAR	NONE
11:07	0.25	1.80	0.13	7.13	6.82	26.05	4266	0.15	2.73	CLEAR	NONE

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.0; 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; 1/2" = 0.010; 5/8" = 0.016

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	TECO	SAMPLER (S) SIGNATURES:		SAMPLING INITIATED AT:	11:07	SAMPLING ENDED AT:	11:15
PUMP OR TUBING DEPTH IN WELL (feet):	17.3	SAMPLE PUMP FLOW RATE (mL per minute):	457	TUBING MATERIAL CODE:	PE/S		
FIELD DECONTAMINATION:	Y ☐ N ☑	FIELD-FILTERED: Filtration Equipment Type	Y ☐ N ☑	FILTER SIZE:	µm	DUPLICATE:	Y ☐ N ☑

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL. ADDED IN FIELD (ml) (1)	FINAL pH		
@Ino-500	1	PE	500ml	NONE	NONE	N/A	Inorganics	PP
@Met-250	2	PE	250ml	HNO3	1ml	<2	Metals	PP
@Rad-1L	2	PE	1L	HNO3	5ml	<2	Radiologicals	PP

REMARKS:
(1) Sample bottles pre-preserved at laboratory prior to sample collection.

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O= Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submirsable Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

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)

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)

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

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

Laboratory Job ID: 660-97425-1
Client Project/Site: L19I017

For:
Tampa Electric Company
5012 Causeway Boulevard
Tampa, Florida 33619

Attn: Ms. Peggy Penner

Authorized for release by:
10/3/2019 3:31:30 PM

Jess Hornsby, Project Manager II
(813)280-8340
jess.hornsby@testamericainc.com

Table of Contents

Sample Summary

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
660-97425-1	L19I017-01	Water	09/17/19 11:15	09/20/19 13:37	
660-97425-2	L19I017-02	Water	09/17/19 11:44	09/20/19 13:37	
660-97425-3	L19I017-03	Water	09/17/19 12:24	09/20/19 13:37	
660-97425-4	L19I017-04	Water	09/17/19 10:23	09/20/19 13:37	
660-97425-5	L19I017-05	Water	09/17/19 09:46	09/20/19 13:37	

Detection Summary

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Client Sample ID: L19I017-01 — Lab Sample ID: 660-97425-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.018	I	0.050	0.011	mg/L	1		200.7 Rev 4.4	Total/NA

Client Sample ID: L19I017-02 — Lab Sample ID: 660-97425-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.014	I	0.050	0.011	mg/L	1		200.7 Rev 4.4	Total/NA

Client Sample ID: L19I017-03 — Lab Sample ID: 660-97425-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.013	I	0.050	0.011	mg/L	1		200.7 Rev 4.4	Total/NA

Client Sample ID: L19I017-04 — Lab Sample ID: 660-97425-4

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.023	I	0.050	0.011	mg/L	1		200.7 Rev 4.4	Total/NA

Client Sample ID: L19I017-05 — Lab Sample ID: 660-97425-5

No Detections.

This Detection Summary does not include radiochemical test results.

Case Narrative

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Job ID: 660-97425-1

Laboratory: Eurofins TestAmerica, Tampa

Narrative

Receipt
The samples were received on 9/20/2019 1:37 PM; the samples arrived in good condition, properly preserved and, where required, on ice.

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

Definitions/Glossary

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Qualifiers

Metals

Qualifier	Qualifier Description
I	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
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
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)
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)

Client Sample Results

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Client Sample ID: L19I017-01
Date Collected: 09/17/19 11:15
Date Received: 09/20/19 13:37

Lab Sample ID: 660-97425-1
Matrix: Water

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.018	I	0.050	0.011	mg/L		09/30/19 18:51	10/01/19 19:32	1

Client Sample Results

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Client Sample ID: L19I017-02
Date Collected: 09/17/19 11:44
Date Received: 09/20/19 13:37

Lab Sample ID: 660-97425-2
Matrix: Water

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.014	I	0.050	0.011	mg/L		09/30/19 18:51	10/01/19 19:36	1

Client Sample Results

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Client Sample ID: L19I017-03
Date Collected: 09/17/19 12:24
Date Received: 09/20/19 13:37

Lab Sample ID: 660-97425-3
Matrix: Water

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.013	I	0.050	0.011	mg/L		09/30/19 18:51	10/01/19 19:51	1

Client Sample Results

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Client Sample ID: L19I017-04
Date Collected: 09/17/19 10:23
Date Received: 09/20/19 13:37

Lab Sample ID: 660-97425-4
Matrix: Water

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.023	I	0.050	0.011	mg/L		09/30/19 18:51	10/01/19 19:40	1

Client Sample Results

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Client Sample ID: L19I017-05

Date Collected: 09/17/19 09:46
Date Received: 09/20/19 13:37

Lab Sample ID: 660-97425-5

Matrix: Water

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.011	U	0.050	0.011	mg/L		09/30/19 18:51	10/01/19 19:44	1

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 400-459401/1-A
Matrix: Water
Analysis Batch: 459652

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 459401

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.011	U	0.050	0.011	mg/L		09/30/19 18:51	10/01/19 17:57	1

Lab Sample ID: LCS 400-459401/2-A
Matrix: Water
Analysis Batch: 459652

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 459401

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lithium			1.00	1.01		mg/L		101	85 - 115		

Lab Sample ID: 400-176711-A-3-C MS
Matrix: Water
Analysis Batch: 459652

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 459401

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lithium	0.074		1.00	1.20		mg/L		112	70 - 130		

Lab Sample ID: 400-176711-A-3-D MSD
Matrix: Water
Analysis Batch: 459652

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 459401

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	0.074		1.00	1.10		mg/L		103	70 - 130	8	20

QC Association Summary

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Metals

Prep Batch: 459401

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-97425-1	L19I017-01	Total/NA	Water	200.7	
660-97425-2	L19I017-02	Total/NA	Water	200.7	
660-97425-3	L19I017-03	Total/NA	Water	200.7	
660-97425-4	L19I017-04	Total/NA	Water	200.7	
660-97425-5	L19I017-05	Total/NA	Water	200.7	
MB 400-459401/1-A	Method Blank	Total/NA	Water	200.7	
LCS 400-459401/2-A	Lab Control Sample	Total/NA	Water	200.7	
400-176711-A-3-C MS	Matrix Spike	Total/NA	Water	200.7	
400-176711-A-3-D MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	

Analysis Batch: 459652

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-97425-1	L19I017-01	Total/NA	Water	200.7 Rev 4.4	459401
660-97425-2	L19I017-02	Total/NA	Water	200.7 Rev 4.4	459401
660-97425-3	L19I017-03	Total/NA	Water	200.7 Rev 4.4	459401
660-97425-4	L19I017-04	Total/NA	Water	200.7 Rev 4.4	459401
660-97425-5	L19I017-05	Total/NA	Water	200.7 Rev 4.4	459401
MB 400-459401/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	459401
LCS 400-459401/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	459401
400-176711-A-3-C MS	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	459401
400-176711-A-3-D MSD	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	459401

Lab Chronicle

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Client Sample ID: L19I017-01
Date Collected: 09/17/19 11:15
Date Received: 09/20/19 13:37

Lab Sample ID: 660-97425-1
Matrix: Water

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	459401	09/30/19 18:51	NET	TAL PEN
Total/NA	Analysis	200.7 Rev 4.4		1			459652	10/01/19 19:32	GESP	TAL PEN

Client Sample ID: L19I017-02
Date Collected: 09/17/19 11:44
Date Received: 09/20/19 13:37

Lab Sample ID: 660-97425-2
Matrix: Water

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	459401	09/30/19 18:51	NET	TAL PEN
Total/NA	Analysis	200.7 Rev 4.4		1			459652	10/01/19 19:36	GESP	TAL PEN

Client Sample ID: L19I017-03
Date Collected: 09/17/19 12:24
Date Received: 09/20/19 13:37

Lab Sample ID: 660-97425-3
Matrix: Water

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	459401	09/30/19 18:51	NET	TAL PEN
Total/NA	Analysis	200.7 Rev 4.4		1			459652	10/01/19 19:51	GESP	TAL PEN

Client Sample ID: L19I017-04
Date Collected: 09/17/19 10:23
Date Received: 09/20/19 13:37

Lab Sample ID: 660-97425-4
Matrix: Water

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	459401	09/30/19 18:51	NET	TAL PEN
Total/NA	Analysis	200.7 Rev 4.4		1			459652	10/01/19 19:40	GESP	TAL PEN

Client Sample ID: L19I017-05
Date Collected: 09/17/19 09:46
Date Received: 09/20/19 13:37

Lab Sample ID: 660-97425-5
Matrix: Water

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	459401	09/30/19 18:51	NET	TAL PEN
Total/NA	Analysis	200.7 Rev 4.4		1			459652	10/01/19 19:44	GESP	TAL PEN

Laboratory References:

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

Method Summary

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Method	Method Description	Protocol	Laboratory
200.7 Rev 4.4	Metals (ICP)	EPA	TAL PEN
200.7	Preparation, Total Metals	EPA	TAL PEN

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

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

Accreditation/Certification Summary

Client: Tampa Electric Company
Project/Site: L19I017

Job ID: 660-97425-1

Laboratory: Eurofins TestAmerica, Tampa

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

Authority	Program	Identification Number	Expiration Date
California	State	3052	06-30-20
Florida	NELAP	E84282	06-30-20
Georgia (DW)	State	905	06-30-20
USDA	US Federal Programs	P525-170731-001	09-25-20

Laboratory: Eurofins TestAmerica, Pensacola

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

Authority	Program	Identification Number	Expiration Date
Alabama	State	40150	07-01-20
ANAB	ISO/IEC 17025	L2471	02-22-20
Arizona	State	AZ0710	01-12-20
Arkansas DEQ	State	88-0689	09-01-20
California	State	2510	07-01-20
Florida	NELAP	E81010	06-30-20
Georgia	State	E81010(FL)	06-30-20
Illinois	NELAP	004586	10-09-19
Iowa	State Program	367	08-01-20
Kansas	NELAP	E-10253	08-16-20
Kentucky (UST)	State Program	53	06-30-20
Kentucky (WW)	State	93030	12-30-19
Louisiana	NELAP	30976	06-30-20
Louisiana (DW)	NELAP	LA017	12-31-19
Maryland	State	233	09-30-20
Massachusetts	State	M-FL094	06-30-20
Michigan	State	9912	05-06-20
Minnesota	NELAP	012-999-481	12-31-19
New Jersey	NELAP	FL006	07-30-20
North Carolina (WW/SW)	State Program	314	12-31-19
Oklahoma	State	9810-186	08-31-20
Pennsylvania	NELAP	68-00467	01-31-20
Rhode Island	State Program	LAO00307	12-30-19
South Carolina	State Program	96026	06-30-20
Tennessee	State	TN02907	06-30-20
Texas	NELAP	T104704286	09-30-20
US Fish & Wildlife	Federal	LE058448-0	07-31-20
USDA	Federal	P330-18-00148	05-17-21
Virginia	NELAP	460166	06-14-20
Washington	State	C915	05-15-20
West Virginia DEP	State	136	06-30-20

SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Services

L19I017

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:

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

Due Date: 10/01/19 16:00

Analysis		Expires		Laboratory ID	Comments
Sample ID: L19I017-01	**BBS-CCR-1**		**Water**		
Sampled: 09/17/19 11:15					
Lithium, Total EPA 6010		03/15/20 11:15			
Containers Supplied:					
Poly HNO3 - 250mL (A)					
Sample ID: L19I017-02	**BBS-CCR-2**		**Water**		
Sampled: 09/17/19 11:44					
Lithium, Total EPA 6010		03/15/20 11:44			
Containers Supplied:					
Poly HNO3 - 250mL (A)					
Sample ID: L19I017-03	**BBS-CCR-3**		**Water**		
Sampled: 09/17/19 12:24					
Lithium, Total EPA 6010		03/15/20 12:24			
Containers Supplied:					
Poly HNO3 - 250mL (A)					
Sample ID: L19I017-04	**BBS-CCR-BW1**		**Water**		
Sampled: 09/17/19 10:23					
Lithium, Total EPA 6010		03/15/20 10:23			
Containers Supplied:					
Poly HNO3 - 250mL (A)					
Sample ID: L19I017-05	**BBS-CCR-BW2**		**Water**		
Sampled: 09/17/19 09:46					
Lithium, Total EPA 6010		03/15/20 09:46			
Containers Supplied:					
Poly HNO3 - 250mL (A)					

Loc: 660
97425

660-97425 Chain of Custody

Released By	Date & Time	Received By	Date & Time
[signature]	9-20-19 9-17-19 1512	[signature]	09/20/19 1337
Released By	Date & Time	Received By	Date & Time

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Hornsby, Jess	Carrier Tracking No(s):	COC No: 660-116619.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jess.hornsby@testamericainc.com	State of Origin: Florida	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): NELAP - Florida; NELAP - Texas		Job #: 660-97425-1
Address: 3355 McLemore Drive,	Due Date Requested: 9/27/2019			
City: Pensacola	TAT Requested (days):			
State, Zip: FL, 32514				
Phone: 850-474-1001(Tel) 850-478-2671(Fax)	PO #:			
Email:	WO #:			
Project Name: L19I017	Project #: 66004821			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	200.7/200.7_P_TOT Lithium	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
L19I017-01 (660-97425-1)	9/17/19	11:15 Eastern		Water			X	1	
L19I017-02 (660-97425-2)	9/17/19	11:44 Eastern		Water			X	1	
L19I017-03 (660-97425-3)	9/17/19	12:24 Eastern		Water			X	1	
L19I017-04 (660-97425-4)	9/17/19	10:23 Eastern		Water			X	1	
L19I017-05 (660-97425-5)	9/17/19	09:46 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by: Erika Edwards	9/20/19 1625	TAL Tampa	M Meadaway	9/21/19 830	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 4.8C ID8

Ver: 01/16/2019


Do Not Lift Using This Tag
ORIGIN ID:TPFA (813) 885-7427
ERRICKA EDWARDS
TEST AMERICA
6712 BENJAMIN RD STE 100
TAMPA, FL 33634
UNITED STATES US
SHIP DATE: 20SEP19
ACTWGT: 23.25 LB
CAD: 112292650/INET4160
DIMS: 24x18x20 IN
BILL RECIPIENT
TO SAMPLE RECEIVING
TEST AMERICA PENSACOLA
3355 MCLEMMORE DRIVE
PENSACOLA FL 32514
(850) 474-1001
INV:
PO:
REF:
DEPT:
4.9 °C
DLB
FedEx Express
TRK# 0201 7763 0032 9959
SATURDAY 12:00P
PRIORITY OVERNIGHT
X0 PNSA
32514
FL-US BFM
eurofins
Environment Testing
TestAmerica
1123420
RT 686 1
FZ
12:00 A
9959
09.21
159469-434 RIT EXP 07/20

Login Sample Receipt Checklist

Client: Tampa Electric Company

Job Number: 660-97425-1

Login Number: 97425
List Number: 1
Creator: Hornsby, Terry

List Source: Eurofins TestAmerica, Tampa

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
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.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tampa Electric Company

Job Number: 660-97425-1

Login Number: 97425
List Number: 2
Creator: Conrady, Hank W

List Source: Eurofins TestAmerica, Pensacola
List Creation: 09/21/19 02:13 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	4.8°C IR-8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

KNL ENVIRONMENTAL TESTING

FL DOH Certification #E84025

Report Date: October 1, 2019

TECO
5012 Causeway Blvd.
Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client
Client/Field ID: L19I017-01
BBS-CCR-1
Sample Collection: 09-17-19/1115
Lab ID No: 19.11800
Lab Custody Date: 09-20-19/1300
Sample description: Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Results	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	30.4 ± 2.2	Calc	Calc	0.6
Radium-226	pCi/l	28.3 ± 2.2	9-27-19/1435	EPA 903.0	0.6
Radium-228	pCi/l	2.1 ± 0.5	10-1-19/0945	EPA Ra-05	0.6

* 104% carrier recovery

Thomas J. Weeks
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: Thomas Weeks (813) 229-2879.

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

KNL ENVIRONMENTAL TESTING

FL DOH Certification #E84025

Report Date: October 1, 2019

TECO
5012 Causeway Blvd.
Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client
Client/Field ID: L19I017-02
BBS-CCR-2
Sample Collection: 09-17-19/1144
Lab ID No: 19.11801
Lab Custody Date: 09-20-19/1300
Sample description: Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Results	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	16.2 ± 1.7	Calc	Calc	0.6
Radium-226	pCi/l	16.0 ± 1.7	9-27-19/01435	EPA 903.0	0.5
Radium-228	pCi/l	0.2 ± 0.4	10-1-19/0945	EPA Ra-05	0.6

* 109% carrier recovery

Thomas J. Weeks
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: Thomas Weeks (813) 229-2879.

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

KNL ENVIRONMENTAL TESTING

FL DOH Certification #E84025

Report Date: October 1, 2019

TECO
5012 Causeway Blvd.
Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client
Client/Field ID: L19I017-03
BBS-CCR-3
Sample Collection: 09-17-19/1224
Lab ID No: 19.11802
Lab Custody Date: 09-20-19/1300
Sample description: Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Results	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	17.7 ± 1.3	Calc	Calc	0.6
Radium-226	pCi/l	15.6 ± 1.3	9-30-19/1344	EPA 903.0	0.4
Radium-228	pCi/l	2.1 ± 0.5	10-1-19/0945	EPA Ra-05	0.6

* 113% carrier recovery

Thomas J. Weeks
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: Thomas Weeks (813) 229-2879.

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

KNL ENVIRONMENTAL TESTING

FL DOH Certification #E84025

Report Date: October 1, 2019

TECO
5012 Causeway Blvd.
Tampa, FL 33619

Attn: Peggy Penner

Field Custody: Client
Client/Field ID: L19I017-04
BBS-CCR-BW1
Sample Collection: 09-17-19/1023
Lab ID No: 19.11803
Lab Custody Date: 09-20-19/1300
Sample description: Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Results	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	29.9 ± 1.7	Calc	Calc	0.6
Radium-226	pCi/l	26.9 ± 1.7	9-30-19/1344	EPA 903.0	0.3
Radium-228	pCi/l	3.0 ± 0.6	10-1-19/0945	EPA Ra-05	0.6

* 107% carrier recovery

Thomas J. Weeks
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: Thomas Weeks (813) 229-2879.

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

KNL ENVIRONMENTAL TESTING

FL DOH Certification #E84025

Report Date: October 1, 2019

TECO
5012 Causeway Blvd.
Tampa, FL 33619

Attn: Peggy Penner

Field Custody:	Client
Client/Field ID:	L19I017-05 BBS-CCR-BW2
Sample Collection:	09-17-19/0946
Lab ID No:	19.11804
Lab Custody Date:	09-20-19/1300
Sample description:	Water

CERTIFICATE OF ANALYSIS

Parameter	Units	Results	Analysis Date	Method	Detection Limit
Combined Radium (Radium-226 + Radium 228)	pCi/l	4.7 ± 0.7	Calc	Calc	0.8
Radium-226	pCi/l	3.8 ± 0.7	9-30-19/1344	EPA 903.0	0.4
Radium-228	pCi/l	0.9 ± 0.6	9-30-19/1218	EPA Ra-05	0.8

* 100% carrier recovery

Thomas J. Weeks
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: Thomas Weeks (813) 229-2879.

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

SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Services

L19I017 03

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: 10/01/19 16:00

Analysis	Expires	Laboratory ID	Comments
Sample ID: L19I017-01 BBS-CCR-1		**Water** 19.11E00	
Sampled: 09/17/19 11:15			
Radium 226 EPA 903.0	03/15/20 11:15	Level 2 Data requred	
Radium 226+228, Total	03/15/20 11:15	Level 2 Data requred	
Radium 228 Ra-05	03/15/20 11:15	Level 2 Data requred	
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000mL (D)		
Sample ID: L19I017-02 BBS-CCR-2		**Water** 19.11E01	
Sampled: 09/17/19 11:44			
Radium 226 EPA 903.0	03/15/20 11:44	Level 2 Data requred	
Radium 226+228, Total	03/15/20 11:44	Level 2 Data requred	
Radium 228 Ra-05	03/15/20 11:44	Level 2 Data requred	
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000mL (D)		
Sample ID: L19I017-03 BBS-CCR-3		**Water** 19.11E02	
Sampled: 09/17/19 12:24			
Radium 226+228, Total	03/15/20 12:24	Level 2 Data requred	
Radium 228 Ra-05	03/15/20 12:24	Level 2 Data requred	
Radium 226 EPA 903.0	03/15/20 12:24	Level 2 Data requred	
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000mL (D)		
Sample ID: L19I017-04 BBS-CCR-BW1		**Water** 19.11E03	
Sampled: 09/17/19 10:23			
Radium 226 EPA 903.0	03/15/20 10:23	Level 2 Data requred	
Radium 226+228, Total	03/15/20 10:23	Level 2 Data requred	
Radium 228 Ra-05	03/15/20 10:23	Level 2 Data requred	
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000mL (D)		

Released By	Date & Time	Received By	Date & Time
[signature]	9-2019 1300	KNL [signature]	9-20-19 1300
Released By	Date & Time	Received By	Date & Time

SUBCONTRACT ORDER

Tampa Electric Company, Laboratory Services

L19I017

05

Analysis	Expires	Laboratory ID	Comments
Sample ID: L19I017-05 BBS-CCR-BW2	**Water**	1911E04	
Sampled: 09/17/19 09:46			
Radium 228 Ra-05	03/15/20 09:46	Level 2 Data requred	
Radium 226 EPA 903.0	03/15/20 09:46	Level 2 Data requred	
Radium 226+228, Total	03/15/20 09:46	Level 2 Data requred	
Containers Supplied:			
RAD Poly HNO3 - 1000mL (C)	RAD Poly HNO3 - 1000mL (D)		

Released By	Date & Time	Received By	Date & Time
[signature]	9-20-19 1300	KNL [signature]	9.20.19 1300
Released By	Date & Time	Received By	Date & Time

APPENDIX D

Statistical Analyses Summary Memoranda – Fourth and Fifth Detection Monitoring Events and Geosyntec Data Validation Reports

Geosyntec consultants

12802 Tampa Oaks Blvd., Suite 151
Tampa, FL 33637
PH 813-558-0990
FAX 813-558-9726
www.geosyntec.com

12 July 2019

Mr. Randy Melton
Administrator
Planning and Environmental Health & Safety
702 North Franklin Street
Tampa, FL 33602

Subject: Summary of Results – Fourth Detection Monitoring Event (March 2019)
Economizer Ash and Pyrite Pond System
Big Bend Station – Tampa Electric Company

Dear Mr. Melton,

Geosyntec Consultants, Inc. (Geosyntec) has prepared the enclosed technical memorandum to summarize the findings from the Fourth Detection Monitoring Event performed on 14 March 2019 at the Economizer Ash and Pyrite Pond System (EAPPS) located at Big Bend Station. The detection monitoring event for Appendix III parameters was conducted in accordance with 40 CFR 257.94 of the federal Coal Combustion Residual Rule.

The Appendix III results were compared against background concentrations derived previously using statistical methods that comply with the allowable methods specified in 40 CFR 257.93. As with the previous three detection monitoring events, groundwater pH was the only Appendix III parameter detected above background levels. However, the Alternate Source Demonstration (April 2018) prepared in accordance with 40 CFR 257.94(3)(e) documented that groundwater pH is not a statistically significant increase (SSI) attributable to a release from the EAPPS. As a result, detection monitoring will continue at the EAPPS in the absence of an Appendix III SSI.

Please contact us at 813-558-0990 if you have further questions.

Sincerely,
GEOSYNTEC CONSULTANTS, INC.

Todd K. Kafka (FL PG 2338)
Principal

Michael N. Lodato (FL PG 1351)
Senior Principal

Geosyntec consultants

12802 Tampa Oaks Blvd., Suite 151
Tampa, Florida 33637
PH 813.558.0990
FAX 813.558.9726
www.geosyntec.com

Memorandum

Date:	20 June 2019
To:	Randy Melton
Copies to:	Terry Eastley Zel Jones
From:	Cathy Crea, Ph.D.
Reviewed by:	Michael Lodato, PG Todd Kafka, PG
Subject:	Summary of Results for the Third Detection Monitoring Event 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 14 October 2015 and 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. TEC installed a groundwater monitoring system (GMS) at the EAPPs that complies with 40 CFR 257.91 and performed baseline groundwater sampling events in accordance with 40 CFR 257.93.

Geosyntec Consultants, Inc. (Geosyntec) has prepared this technical memorandum to summarize the results of the fourth detection monitoring event as required by 40 CRF 257.94. The fourth detection

monitoring event was performed by TEC staff on 14 March 2019. Geosyntec's statistical analyses were performed in accordance with the *Statistical Analysis Plan* dated 15 October 2017.

BACKGROUND

The GMS was installed at the EAPPS in May 2016 and consists of 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." 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. A 95% upper prediction limit (UPL) was established for each constituent from the baseline sampling events conducted between June 2016 and August 2017 and the first detection monitoring event in October 2017. In accordance with the *Statistical Analysis Plan*, the same methodology used for the first three detection monitoring events (October 2017, April 2018, and September 20109) was used for the fourth detection monitoring event (March 2019) and is not repeated herein. Details of the derivation of the background concentrations and the results of the first detection monitoring event are summarized in the summary memorandum *Summary of Statistical Analyses of Baseline Groundwater Samples Economizer Ash and Pyrite Pond System* dated January 2018.

DETECTION MONITORING RESULTS

The fourth detection monitoring event included the collection of five groundwater samples from the GMS in March 2019. Geosyntec reviewed and performed a Stage 2A data validation, consistent with the data collected previously. The data were qualified and deemed usable for meeting project objectives. The data validation summary memorandum is provided in **Attachment A**.

A comparison of the fourth detection monitoring results to the background values for the Appendix III constituents is shown in **Table 1** and indicates pH concentrations above background in BBS-CCR-1, which is one of the three downgradient monitoring wells. The established Upper Prediction Limit (UPL)

for pH is 6.70 standard units (SU), and the pH at BBS-CCR-1 was 6.81. Similar pH values were reported in this well during the first three detection monitoring events (October 2017, April 2018, and September 2018). The pH concentrations at BBS-CCR-2 and BBS-CCR-3 remain within background concentrations.

CONCLUSIONS

As specified in 40 CFR 257.94(3)(e), Geosyntec prepared an alternate source demonstration (ASD) documenting that the elevated pH value is not an SSI and is not attributable to a release from the EAPPS. The elevated pH values are attributable to natural variability (e.g., local background and changes in groundwater flow directions) and within the margin of error for the field pH instrument (*Alternate Source Demonstration – Economizer Ash and Pyrite Pond System* dated April 2018). In the absence of SSIs for other Appendix III constituents, TEC will continue with detection monitoring as applicable for the EAPPS.

* * * * *

TABLE 1

Detection Monitoring Results – March 2019

TABLE 1 - DETECTION MONITORING RESULTS - March 2019
Tampa Electric Company, Big Bend Station, Economizer Ash and Pyrite Pond System, Apollo Beach, FL

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
Background Concentration Value		**59.1**	**781**	**1140**	**0.559**	**(6.38, 6.70)**	**1550**	**5050**
Well ID	**Sample Collection Date**	**March 2019 Detection Monitoring Results**						
BBS-CCR-1	3/14/2019	18.4	518	664	0.415 U	**6.81**	1,160	3,000
BBS-CCR-2	3/14/2019	0.279	208	77.2	0.394 U	6.74	445	1,060
BBS-CCR-3	3/14/2019	0.259	207	161	0.513 J+	6.43	534	1,350

Notes:

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

J+ : Data validation qualifer - 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 positivetive bias of associated QC or calibration data or attributable to matrix interference.

mg/L - milligrams per litre

STD - standard units

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

ATTACHMENT A

Data Validation Memorandum

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date: 16 May 2019

To: Todd Kafka

From: Kristoffer Henderson

CC: J. Caprio

Subject: Stage 2A Data Validation – Level II Data Deliverable – Tampa Electric Laboratory Service Work Order L19C024, TestAmerica Job ID 660-93234-1 and KNL Environmental Testing Order L19C024

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 March 14, 2019 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
- Anions (Chloride, Fluoride and Sulfate) by EPA Method 300.0
- Total Dissolved Solids (TDS) by Standard Method 2540C

EXECUTIVE SUMMARY

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below and the information provided, 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
L19C024-01	BBS-CCR-1
L19C024-02	BBS-CCR-2
L19C024-03	BBS-CCR-3

Laboratory ID	Client ID
L19C024-04	BBS-CCR-BW1
L19C024-05	BBS-CCR-BW2

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

Times were not listed for the relinquished by and received by signatures for the first transfer and the relinquished by signature for the second transfer on the chain of custody (COC) for the sample transfer from TELS to KNL.

The laboratory report was revised on May 15, 2019 to add calcium LCS/MS/MSD results and to include the radiochemistry QC. The revised report was identified as L19C024 Revised.

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 (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) 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 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 Holding Times

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 Method Blank

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 433799, method 200.8 batch 19C0102 and method 6010B batch 19C0106). Metals were not detected in the method blanks above the method detection limits (MDLs).

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). Two sample set specific MS/MSD pairs were reported, one for the method 200.8 data using sample BBS-CCR-BW1; and one for the method 6010B data using sample BBS-CCR-1. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria, with the following exceptions.

The MS recoveries of boron and calcium were low and outside the laboratory specified acceptance criteria in the MS/MSD pair using sample BBS-CCR-1. Since the sample concentrations of boron and calcium were greater than four times the spiked concentration, no qualifications were applied to the data.

Batch MS/MSD pairs were also reported for the method 200.8 and method 200.7 Rev 4.4 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. The recovery results were within the laboratory specified acceptance criteria.

1.6 Serial Dilution

Serial dilutions were not reported.

1.7 Field Duplicate

Field duplicates were not reported with the sample sets.

1.8 Sensitivity

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 Electronic Data Deliverable (EDD) Review

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 (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) 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 Overall Assessment

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 Holding Times

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 Method Blank

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 19C0109). Mercury was not detected in the method blank above the MDL.

2.4 Matrix Spike/Matrix Spike Duplicate

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-BW2, was reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

One batch MS/MSD pair 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 Laboratory Control Sample

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 Sensitivity

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 Electronic Data Deliverable Review

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 (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) 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 Holding Times

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 Method Blank

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 (two for the radium-226 data and one for the radium-228 data). The method blanks were within the validation criteria.

3.4 Matrix Spike

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 Laboratory Control Sample

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

3.6 Laboratory Duplicate

Three 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 Sensitivity

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 Electronic Data Deliverable Review

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 anions (chloride, fluoride and sulfate) by EPA Method 300.0 and TDS by SM 2540C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) 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 Deliverable Review

4.1 Overall Assessment

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 Holding Times

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

4.3 Method Blanks

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 (TDS batch 19C0118 and the anions batch 19C0184). 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 19C0184. Therefore, the estimated concentrations of fluoride in the associated samples were U qualified as not detected at the RL and the fluoride concentrations in samples BBS-CCR-3 and BBS-CCR-BW1 were J+ qualified as estimated with high biases, based on professional and technical judgment.

Sample	Analyte	Laboratory Result (mg/L)	Laboratory Flag	Validation Result (mg/L)	Validation Qualifier*	Reason Code**
BBS-CCR-1	Fluoride	0.415	I	0.500	U	3
BBS-CCR-2	Fluoride	0.394	I	0.500	U	3
BBS-CCR-3	Fluoride	0.513	NA	0.513	J+	3
BBS-CCR-BW1	Fluoride	0.537	NA	0.537	J+	3
BBS-CCR-BW2	Fluoride	0.495	I	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
NA-not applicable
* 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

4.4 Matrix Spike/Matrix Spike Duplicate

MS/MSDs were analyzed at the proper frequency for the number and types of samples analyzed (one pair per batch of 20 samples). One sample set specific MS/MSD pair, using sample BBS-CCR-1, was reported for the anions. The recovery and RPD results were within the laboratory specified acceptance criteria.

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

4.5 Laboratory Control Sample

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

Two sample set specific laboratory duplicates were reported for TDS using samples BBS-CCR-1 and BBS-CCR-2. The RPD results were within the laboratory specified acceptance criteria.

4.7 Field Duplicate

Field duplicates were not reported with the sample sets.

4.8 Sensitivity

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 Electronic Data Deliverable Review

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

Geosyntec consultants

12802 Tampa Oaks Blvd., Suite 151
Tampa, Florida 33637
PH 813.558.0990
FAX 813.558.9726
www.geosyntec.com

Memorandum

Date:	17 December 2019
To:	Randy Melton
Copies to:	Terry Eastley Zel Jones
From:	Cathy Crea, Ph.D.
Reviewed by:	Michael Lodato, PG Todd Kafka, PG
Subject:	Summary of Results for the Fifth Detection Monitoring Event 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 14 October 2015 and 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. TEC installed a groundwater monitoring system (GMS) at the EAPPs that complies with 40 CFR 257.91 and performed baseline groundwater sampling events in accordance with 40 CFR 257.93.

Geosyntec Consultants, Inc. (Geosyntec) has prepared this technical memorandum to summarize the results of the fifth detection monitoring event as required by 40 CRF 257.94. The fifth detection

monitoring event was performed by TEC staff on 17 September 2019. Geosyntec's statistical analyses were performed in accordance with the *Statistical Analysis Plan* dated 15 October 2017.

BACKGROUND

The GMS was installed at the EAPPS in May 2016 and consists of 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." 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. A 95% upper prediction limit (UPL) was established for each constituent from the baseline sampling events conducted between June 2016 and August 2017 and the first detection monitoring event in October 2017. In accordance with the *Statistical Analysis Plan*, the same methodology used for the first four detection monitoring events (October 2017, April 2018, September 2018, and March 2019) was used for the fifth detection monitoring event (September 2019) and is not repeated herein. Details of the derivation of the background concentrations and the results of the first detection monitoring event are summarized in the summary memorandum *Summary of Statistical Analyses of Baseline Groundwater Samples Economizer Ash and Pyrite Pond System* dated January 2018.

DETECTION MONITORING RESULTS

The fifth detection monitoring event included the collection of five groundwater samples from the GMS in March 2019. Geosyntec reviewed and performed a Stage 2A data validation, consistent with the data collected previously. The data were qualified and deemed usable for meeting project objectives. The data validation summary memorandum is provided in **Attachment A**.

A comparison of the fifth detection monitoring results to the background values for the Appendix III constituents is shown in **Table 1** and indicates pH concentrations above/below background in all three downgradient monitoring wells, BBS-CCR-1 through BBS-CCR-3. The established lower and upper

prediction limits (LPL and UPL) for pH are 6.38 and 6.70 standard units (SU), respectively. The pH at BBS-CCR-1 (6.81 SU) and BBS-CCR-2 (6.73 SU) were above the UPL, while the pH at BBS-CR-3 (6.33 SU) was below the LPL. Similar pH values were reported in CCR-1 and CCR-2 during the first four detection monitoring events (October 2017, April 2018, September 2018, and March 2019). This is the only monitoring event where the pH at BBS-CCR-3 was not within the range of background.

CONCLUSIONS

As specified in 40 CFR 257.94(3)(e), Geosyntec prepared an alternate source demonstration (ASD) documenting that the elevated pH values are not an SSI and are not attributable to a release from the EAPPS. The elevated pH values are attributable to natural variability (e.g., local background and changes in groundwater flow directions) and are within the margin of error for the field pH instrument (*Alternate Source Demonstration – Economizer Ash and Pyrite Pond System* dated April 2018). In the absence of SSIs for other Appendix III constituents, TEC will continue with detection monitoring as applicable for the EAPPS.

* * * * *

TABLE 1

Detection Monitoring Results – September 2019

TABLE 1 - DETECTION MONITORING RESULTS - SEPTEMBER 2019

Tampa Electric Company, Big Bend Station, Economizer Ash and Pyrite Pond System, Apollo Beach, FL

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
Background Concentration Value		59.1	781	1140	0.559	(6.38, 6.70)	1550	5050
Well ID	Sample Collection Date	September 2019 Detection Monitoring Results						
BBS-CCR-1	9/17/2019	21	575	766	0.195	**6.82**	1140	3250
BBS-CCR-2	9/17/2019	0.199	212	79.5	0.183	**6.73**	419	1040
BBS-CCR-3	9/17/2019	0.541	211	129	0.39	**6.33**	540	1300

Notes:

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

mg/L - milligrams per litre

STD - standard units

ATTACHMENT A

Data Validation Memorandum

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date: 8 November 2019

To: Todd Kafka

From: Kristoffer Henderson

CC: J. Caprio

Subject: Stage 2A Data Validation – Level II Data Deliverable – Tampa Electric Laboratory Service Work Order L19I017

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 17, 2019 as part of the Big Bend Power Station coal combustion residuals (CCR) groundwater monitoring program plan.

Tampa Electric Laboratory Services, Tampa, Florida (TELS). The samples were analyzed for the following tests:

- Metals by EPA Methods 200.8 and 6010B
- Mercury by EPA Method 7470A
- Anions (Chloride, Fluoride and Sulfate) by EPA Method 300.0
- Reduction and Oxidation Potential by SM 2580B
- Total Dissolved Solids (TDS) by Standard Method 2540C

Eurofins TestAmerica Pensacola, Florida (ETA) analyzed the samples for the following test:

- Lithium by EPA Method 200.7 Rev. 4.4

KNL Environmental Testing, Tampa, Florida (KNL) analyzed the samples for the following tests:

- Radium-226 by EPA Method 903.0
- Radium-228 by EPA Method Ra-05

EXECUTIVE SUMMARY

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below and the information provided, the data are usable for supporting project objectives.

The data were reviewed based on the pertinent methods referenced by the data package and professional and technical judgment and the following documents:

- 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) and
- American Nuclear Society Verification and Validation of Radiological Data for use in Waste Management and Environmental Remediation.

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

Laboratory ID	Client ID
L19I1017-01	BBS-CCR-1
L19I1017-02	BBS-CCR-2
L19I1017-03	BBS-CCR-3

Laboratory ID	Client ID
L19I1017-04	BBS-CCR-BW1
L19I1017-05	BBS-CCR-BW2

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

Field parameters specific conductance, dissolved oxygen, pH and turbidity were reported in the laboratory report but were not validated.

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 (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) 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

1.1 Overall Assessment

The metals data reported in this package are considered usable for supporting 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 Holding Times

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 Method Blank

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 459401, method 200.8 batch 19I0128 and method 6010B batch 19I0130). Metals were not detected in the method blanks above the method detection limits (MDLs), with the following exception.

Calcium was detected at an estimated concentration greater than the MDL and less than the reporting limit (RL) in the method blank in batch 19I0130. Since calcium was detected above the RL in the associated sample, no qualifications were applied to the data.

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). Two sample set specific MS/MSD pairs were reported, one for the method 200.8 data using sample BBS-CCR-1; and one for the method 6010B data using sample BBS-CCR-BW2. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria.

Since the calcium concentration in sample BBS-CCR-BW2 was greater than four times the spiked concentration, no qualifications were applied to the calcium data based on the MS/MSD pair results.

One batch MS/MSD pair was also reported for method 200.7 Rev 4.4 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. The recovery results were within the laboratory specified acceptance criteria.

1.6 Field Duplicate

Field duplicates were not submitted with the sample sets.

1.7 Sensitivity

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.

1.8 Electronic Data Deliverable (EDD) Review

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. Also, the samples were reported to the MDLs in the laboratory report; however, only the RLs were listed 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 (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) 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 Overall Assessment

The mercury data reported in this package are considered usable for supporting 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 Holding Times

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 Method Blank

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 19I0129). Mercury was not detected in the method blank above the MDL.

2.4 Matrix Spike/Matrix Spike Duplicate

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-BW2, was reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

2.5 Laboratory Control Sample

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 submitted with the sample sets.

2.7 Sensitivity

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 Electronic Data Deliverable Review

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. The samples were reported to the MDLs in the laboratory report; however, only the RLs were listed in the EDD. No other 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 (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) 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
- ✓ Field 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 supporting 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 Holding Times

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 Method Blank

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

3.4 Matrix Spike

MSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Four 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 Laboratory Control Sample

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

3.6 Laboratory Duplicate

Four 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 Field Duplicate

Field duplicates were not submitted with the sample sets.

3.8 Sensitivity

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.

3.9 Electronic Data Deliverable Review

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 anions (chloride, fluoride and sulfate) by EPA Method 300.0 and TDS by SM 2540C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) 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 Deliverable Review

4.1 Overall Assessment

The wet chemistry data reported in this package are considered usable for supporting 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 Holding Times

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

4.3 Method Blanks

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 (TDS batch 19I0139 and the anions batches 19I0161 and 19I0174). The wet chemistry parameters were not detected in the method blanks above the MDLs.

4.4 Matrix Spike/Matrix Spike Duplicate

MS/MSDs were analyzed at the proper frequency for the number and types of samples analyzed (one pair per batch of 20 samples). Three batch MS/MSD pairs were reported for the anions, 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 Laboratory Control Sample

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

Two sample set specific laboratory duplicates were reported for TDS using samples BBS-CCR-1 and BBS-CCR-2. The RPD results were within the laboratory specified acceptance criteria.

Two batch laboratory duplicates were also reported for TDS, 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 Field Duplicate

Field duplicates were not reported with the sample sets.

4.8 Sensitivity

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 Electronic Data Deliverable Review

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. Also, the samples were reported to the MDLs in the laboratory report; however, only the RLs were listed 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. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

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