# APPENDIX F – BACKGROUND SOIL INVESTIGATION

## **APPENDIX F.1**

BACKGROUND SOIL INVESTIGATION SAMPLING AND ANALYSIS REPORT



#### John Sevier Fossil Plant Background Soil Investigation Sampling and Analysis Report

TDEC Commissioner's Order Environmental Investigation Plan John Sevier Fossil Plant Rogersville, Tennessee

February 1, 2021

Prepared for:

Tennessee Valley Authority Chattanooga, Tennessee



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### **Revision Record**

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### Sign-off Sheet

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### Abbreviations

ASTM	American Society for Testing and Materials
BGS	Background Soil
CCR	Coal Combustion Residuals
CCR Parameters	Constituents listed in Appendix III and IV of 40 CFR 257 and five inorganic constituents included in Appendix I of Tennessee Rule 0400- 11-01-04
CEC	Civil & Environmental Engineering Consultants, Inc.
CFR	Code of Federal Regulations
COC	Chain-of-Custody
DPT	Direct Push Technology
EAR	Environmental Assessment Report
EIP	Environmental Investigation Plan
ENV	Environmental
EnvStds	Environmental Standards, Inc.
FSP	Field Sampling Personnel
ft bgs	feet below ground surface
GPS	Global Positioning System
HSA	Hollow Stem Auger
ID	Identification
IDW	Investigation derived waste
JSF Plant	John Sevier Fossil Plant
PG	Professional Geologist
PLM	Polarized Light Microscopy
QAPP	Quality Assurance Project Plan
QC	Quality Control
RJ Lee	RJ Lee Group, Inc.
SAP	Sampling and Analysis Plan
SAR	Sampling and Analysis Report
SOP	Standard Operating Procedure
Stantec	Stantec Consulting Services Inc.
TDEC	Tennessee Department of Environment and Conservation
TDEC Order	Commissioner's Order No. OGC15-0177
TestAmerica	TestAmerica Laboratories, Inc.

TI	Technical Instruction
TVA	Tennessee Valley Authority

Introduction February 1, 2021

### **1.0 INTRODUCTION**

Stantec Consulting Services Inc. (Stantec) has prepared this sampling and analysis report (SAR) on behalf of the Tennessee Valley Authority (TVA) to document activities related to a Background Soil (BGS) investigation at TVA's John Sevier Fossil (JSF) Plant located in Rogersville, Tennessee as shown on Exhibit A.1 (Appendix A).

The purpose of the BGS investigation was to collect soil samples to evaluate the background soil conditions at the JSF Plant in support of fulfilling the requirements for the Tennessee Department of Environment and Conservation (TDEC) issued Commissioner's Order No. OGC15-0177 (TDEC Order) to TVA (TDEC 2015). The TDEC Order sets forth a "process for the investigation, assessment, and remediation of unacceptable risks" at TVA's coal ash disposal sites in Tennessee.

The purpose of this SAR is to document the work completed during the BGS investigation and to present the information and data collected during the execution of the Background Soil Sampling and Analysis Plan (SAP) (Stantec 2018a). This SAR is not intended to provide conclusions or evaluations of results. The scope of the BGS investigation represented herein was conducted pursuant to the SAP and is part of a larger environmental investigation at the JSF Plant. The evaluation of the results will consider other aspects of the environmental investigation, as well as data collected under other State and/or coal combustion residual (CCR) programs and will be presented in the Environmental Assessment Report (EAR).

The BGS investigation activities were performed in general accordance with the following documents developed by TVA to support fulfilling the requirements of the TDEC Order at the JSF Plant:

- Background Soil SAP (Stantec 2018a)
- Environmental Investigation Plan (EIP) (Stantec 2018b)
- Hydrogeological Investigation SAP (Stantec 2018c)
- Quality Assurance Project Plan (QAPP) (Environmental Standards, Inc. 2018).

The BGS and Hydrogeological investigations were implemented in accordance with TVA- and TDECapproved Programmatic- and Project-specific changes. Minor variations in scope and procedures from those outlined in the Background Soil SAP and the Hydrogeological Investigation SAP occurred during field activities due to field conditions and programmatic updates, and are referenced in Section 3.7.

The BGS sampling activities were completed in two field mobilization phases. Phase I field sampling activities were performed from January 23, 2019 to February 5, 2019, and Phase II field sampling activities were performed on October 7 and 8, 2019. Additional BGS sampling activities were performed from January 23 through 29, 2019 as part of the hydrogeological investigation during background groundwater monitoring well installation as described in the Hydrogeological Investigation SAP. A rock outcrop survey was also conducted on January 13 and 14, 2020.

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Laboratory analysis of constituents was performed by TestAmerica Laboratories, Inc (TestAmerica) in Pittsburgh, Pennsylvania, and St. Louis, Missouri (radium samples only) and by RJ Lee Group, Inc. (RJ Lee) in Monroeville, Pennsylvania (percent ash). Additional quality assurance oversight on data acquisition protocols, sampling practices, and data validation or verification was performed by Environmental Standards, Inc. (EnvStds) under direct contract to TVA.

Objective and Scope February 1, 2021

### 2.0 OBJECTIVE AND SCOPE

The primary objective of the BGS investigation conducted pursuant to the Background Soil SAP is to collect soil samples for characterization of the background soils within the vicinity of the JSF Plant in response to the TDEC Order. The approach for the investigation was to:

- Identify locations where naturally occurring, in-situ, native soils unaffected by CCR material are present
- Mobilize a track mounted direct push technology (DPT) rig to staked boring locations approved by TDEC and considered suitable for the DPT rig to safely drill into the native underlying soils
- Advance the DPT rig and collect background soil samples for analyses
- Collect background soil samples from the well screen intervals of background monitoring wells using a hollow stem auger (HSA) drilling rig, as part of the hydrogeological investigation scope of work.

The scope of work for the BGS investigation consisted of the following tasks:

- Verifying and documenting proposed sampling locations using global positioning system (GPS) survey
- Collecting field measurements of soil pH
- Collecting soil samples for laboratory analysis of CCR-related constituents as described in the SAPs.

These activities were carried out concurrently with advancement of the soil borings. Drilling and background well installation and development activities were performed in accordance with the Hydrogeological Investigation SAP and reported in the JSF Plant Hydrogeological Investigation SAR.

In addition to the collection of soil samples, a rock outcrop survey was conducted. The scope of work for the survey consisted of the following tasks:

- Visually inspecting accessible rock and residuum outcrops in the vicinity of the JSF Plant to determine if naturally occurring sources of metallic ore minerals are present in the area
- Collecting rock samples with hand tools for further visual assessment where potential naturally occurring sources of metallic ore minerals were identified
- Recording sample collection locations using field GPS equipment.

Field Activities February 1, 2021

### 3.0 FIELD ACTIVITIES

BGS investigation field activities were conducted between January 23, 2019 and October 8, 2019. Additionally, under the hydrogeological investigation scope of work, two background monitoring well borings were drilled between January 23 and 29, 2019, and a rock outcrop survey was conducted on January 13 and 14, 2020. Soil samples were collected from the 15 background soil borings and two background monitoring well borings and are included with the BGS investigation. Prior to initiating field activities, TVA conducted environmental reviews, obtained permits, and performed utility clearances as necessary to complete the field work.

Stantec performed soil sample collection and rock outcrop survey activities based on guidance and specifications listed in TVA's Environmental (ENV) Technical Instructions (TIs), the SAPs, and the QAPP, except as noted in the Variations section of this report. As part of TVA's commitment to generate representative and reliable data, data validation or verification of laboratory analytical results was performed by EnvStds under direct contract with TVA. EnvStds also conducted audits of field activities and provided quality reviews of field documentation. TDEC was onsite on January 14, 2020 to observe rock outcrop inspections and sampling. In addition, on behalf of TDEC, Civil and Environmental Consultants, Inc. (CEC) collected split soil samples at two boring locations (JSF-BG07 and JSF-110). Additional details of the CEC sample collection are provided in Section 3.3.1.

During the BGS investigation, Stantec conducted the following field activities:

- Verified boring locations proposed in the SAP using the GPS
- Collected GPS measurements at the boring locations
- Collected soil samples from 15 BGS boring locations and two background monitoring well locations (hydrogeological investigation scope of work)
- Recorded field measurements of soil pH at the 17 sampled boring/well locations
- Collected quality control (QC) samples, including four matrix spike/matrix spike duplicates, four field duplicates, 14 field blanks, six equipment blanks, and one liner blank
- Conveyed collected samples via Federal Express shipment to TestAmerica and to RJ Lee for analysis
- Visually inspected seven rock outcrop areas
- Collected seven rock outcrop samples for further visual assessment.

Details on each activity are presented in the sections below.



Field Activities February 1, 2021

### 3.1 WORK LOCATIONS

The BGS investigation field activities were conducted at 15 boring locations and seven rock outcrop areas near the JSF Plant under the BGS investigation scope of work and two background monitoring well locations near the JSF Plant under the hydrogeological investigation scope of work. The BGS investigation boring locations and rock outcrop survey areas are shown on Exhibit A.2 and Exhibit A.3 (Appendix A), respectively. A list of the BGS investigation borings and associated soil samples is included in Table B.1, and sample results provided in Tables B.2 through B.4 (Appendix B).

#### 3.1.1 Soil Horizons

Surficial soil samples were collected at depths ranging from 0.0 to 0.5 feet below ground surface (ft bgs) using a hand auger. Along with surficial samples, the Field Sampling Personnel (FSP) collected approximately two feet of soil from each five-foot soil run (one foot in both directions from the midpoint of the five-foot interval) for the total depth of the boring. In cases where recovery was less than five feet, the FSP collected the two-foot sample interval generally from either the mid-point of the recovered interval or from the entire recovered interval, if recovery was about 2.5 feet or less. Samples were collected from multiple soil depths to provide data for vertical characterization of background soils.

#### 3.1.2 Rock Outcrops

The rock outcrops were visually inspected for the presence of naturally occurring ore-related minerals. Visual inspections included removing weathered surficial rock or residuum, (if necessary, to identify any ore-related minerals that might be present) and photographing the outcrops. Representative samples were generally collected directly from the outcrops using hand tools and retained for further visual assessment to prepare a written description of the sample, as necessary. In areas where the outcrop consisted primarily of residuum and/or where outcrops had been anticipated to exist but were not found during the outcrop survey field work, grab samples were collected from float (i.e., pieces of rock that have been separated from nearby bedrock outcrops) present in those areas for further description. Outcrop strike and dip measurements were taken using a Brunton<sup>®</sup> Pocket Transit. The rock sample locations were recorded using field GPS equipment (Trimble<sup>®</sup> R1 unit).

### 3.2 DOCUMENTATION

Stantec planned the BGS investigation activities per ENV-TI-05.08.01, *Planning Sampling Events* and maintained field documentation in general accordance with ENV-TI-05.80.03, *Field Record Keeping* and the QAPP. Field activities and data were primarily recorded on program-specific field forms. Health and safety forms were completed in accordance with TVA and Stantec health and safety requirements. Additional information regarding field documentation is provided below.

Field Activities February 1, 2021

#### 3.2.1 Field Forms

Stantec used program-specific field forms to record field observations and data for specific activities. Field forms used during the BGS investigation included:

- Daily Field Activity Log
- Subsurface Log
- Soil pH Calibration and Inspection Log
- Soil pH Data Form
- Chain-of-Custody (COC).

#### 3.2.1.1 Daily Field Activity Log

Stantec FSP recorded daily field activities, observations and data on a *Daily Field Activity Log* to chronologically document the field program. Deviations from the SAPs or QAPP were also documented on the *Daily Field Activity Log*.

#### 3.2.1.2 Subsurface Log

A Professional Geologist (PG) licensed in the State of Tennessee prepared a *Subsurface Log* for each boring. The log documented date boring location, drilling personnel, tooling/equipment used, depth to water, sample number, sample recovery, Standard Penetration Test blow counts (not recorded when DPT rig was used), subsurface lithology and other relevant observations. Soil color was logged per the appropriate Munsell soil color chart (Munsell Color 2009). The *Subsurface Logs* are provided in Appendix C.

#### 3.2.1.3 Soil pH Calibration and Inspection Log

Stantec FSP recorded daily soil pH meter calibrations and inspections on a *Soil pH Calibration and Inspection Log* for each day that soil pH measurements were taken. The log documented temperature, temperature verification, temperature-adjusted calibration values, post calibration pH values, and calibration solution details. Additional information on equipment calibration is provided in Section 3.2.2.

#### 3.2.1.4 Soil pH Data Form

Stantec FSP prepared a *Soil pH Data Form* for each day that soil pH measurements were taken. The form documented the sample identification (ID), boring ID, the depth range, pH measurement date and time, and the field pH value.



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#### 3.2.1.5 Chain-of-Custody

Stantec FSP completed *COC* documentation for each soil and outcrop sample collected for potential laboratory analysis and additional visual inspection during the BGS investigation. The sample ID, sample location, sample depth (if applicable), type of sample, sampling date, analyses requested (if determined warranted), and sample custody record were recorded on the *COCs*. The Field Team Leader reviewed the *COCs* for completeness, and the FSP conducted a QC check of samples in each cooler/container compared to sample IDs on the corresponding *COC* prior to submittal to the laboratory. *COCs* were completed in general accordance with *ENV-TI-05.80.02: Sample Labeling and Custody*.

#### 3.2.2 Equipment Calibration

Field instruments used to collect, generate, or measure environmental data were calibrated each day prior to sampling as specified by the SAPs, QAPP, and Stantec Standard Operating Procedure (SOP) - REV 1 for measurement of soil pH for the ExTech ExStik 110 meter (Stantec 2018d). Temperature was recorded using a calibrated National Institute of Standards and Technology traceable thermometer. Additional details regarding equipment calibration were recorded on the *Soil pH Calibration and Inspection Logs*.

#### 3.2.3 Photographs

Photographs of the soil cores from boring activities and the rock outcrop survey areas were taken during the BGS investigation. Photographic logs of subsurface soil cores from the BGS borings, the screened interval of the background well borings, and rock outcrop survey areas are provided in Attachments D.1, D.2, and D.3, respectively, in Appendix D.

### 3.3 SOIL BORINGS AND SAMPLING

#### 3.3.1 Soil Borings

The BGS investigation borings were advanced by S&ME, Inc. and Hawkston Drilling, LLC. during the first and second mobilization, respectively, under Stantec oversight, using a DPT rig equipped with a dual tube tooling system. The background monitoring wells, completed under the hydrogeological investigation, were advanced by Stantec using a HSA drilling rig with a 2-inch spilt-spoon attached per American Society for Testing and Materials (ASTM) *D6151-08: Standard Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling*.

A list of BGS investigation borings and associated soil samples is included in Table B.1 (Appendix B) and the locations of the BGS investigation borings are shown on Exhibit A.2 (Appendix A). BGS investigation borings were advanced in the following chronological sequence:

• <u>JSF-BG12</u> – On January 23, 2019, the DPT rig mobilized to location JSF-BG12. The DPT rig advanced one soil boring at this location. Refusal was encountered at 15.9 ft bgs. The boring was logged and sampled as JSF-BG12.

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- <u>JSF-106</u>– On January 23, 2019, the HSA rig mobilized to location JSF-106. The HSA rig advanced one soil boring at this location. Refusal was encountered at 15.0 ft bgs. The boring was logged on and sampled as JSF-106 and background monitoring well JSF-106 was installed at this boring location. Monitoring well installation activities are summarized in the Hydrogeological Investigation SAR.
- <u>JSF-BG10</u> On January 24, 2019, the DPT rig mobilized to location JSF-BG10. The DPT rig advanced one soil boring at this location. Refusal was encountered at 12.9 ft bgs. The boring was logged and sampled as JSF-BG10.
- <u>JSF-BG11</u> On January 24, 2019, the DPT rig mobilized to location JSF-BG11. The DPT rig advanced one soil boring at this location. Refusal was encountered at 14.6 ft bgs. The boring was logged and sampled as JSF-BG11.
- <u>JSF-BG09</u> On January 25, 2019, the DPT rig mobilized to location JSF-BG09. The DPT rig advanced one soil boring at this location. Refusal was encountered at 19.1 ft bgs. The boring was logged and sampled as JSF-BG09.
- <u>JSF-BG08</u> On January 28, 2019, the DPT rig mobilized to location JSF-BG08. The DPT rig advanced one soil boring at this location. Refusal was encountered at 19.3 ft bgs. The boring was logged and sampled as JSF-BG08.
- <u>JSF-110</u>- On January 28, 2019, the HSA rig mobilized to location JSF-110. The HSA rig advanced one soil boring at this location. Refusal was encountered at 18.0 ft bgs. The boring was logged on and sampled as JSF-110 and background monitoring well JSF-110 was installed at this boring location. Monitoring well installation activities are summarized in the Hydrogeological Investigation SAR.

CEC collected split samples from 9.9 to 12.0 ft bgs at JSF-110.

 <u>JSF-BG07</u> – On January 29, 2019, the DPT rig mobilized to location JSF-BG07. The DPT rig advanced one soil boring at this location. Refusal was encountered at 14.2 ft bgs. The boring was logged and sampled as JSF-BG07.

CEC collected split samples from 1.4 to 4.1 ft bgs and 11.0 to 14.0 ft bgs at JSF-BG07.

- <u>JSF-BG03</u> The original location of JSF-BG03 was moved after receiving TDEC approval because of private property access restrictions. On January 29, 2019, the DPT rig mobilized to alternate location JSF-BG03Alt. The DPT rig advanced one soil boring at this location. Refusal was encountered at 14.4 ft bgs. The boring was logged and sampled as JSF-BG03.
- <u>JSF-BG04Alt</u> The original location of JSF-BG04 was moved after receiving TDEC approval because of private property access restrictions. On January 30, 2019, the DPT rig mobilized to alternate location JSF-BG04Alt. The DPT rig advanced one soil boring at this location. Refusal was encountered at 18.9 ft bgs. The boring was logged and sampled as JSF-BG04Alt.

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- <u>JSF-BG05Alt</u> The original location of JSF-BG05 was moved after receiving TDEC approval because of private property access restrictions. On January 31, 2019, the DPT rig mobilized to alternate location JSF-BG05Alt. The DPT rig advanced two soil borings at this location. The initial boring was drilled to 5.0 ft bgs and had poor recovery (first boring). Refusal was encountered at 11.8 ft bgs (second boring). The deepest boring, drilled to 11.8 ft bgs, was logged and sampled as JSF-BG05Alt.
- <u>JSF-BG06Alt</u> The original location of JSF-BG06 was moved after receiving TDEC approval because of private property access restrictions. On February 1, 2019, the DPT rig mobilized to alternate location JSF-BG06Alt. The DPT rig advanced one soil boring at this location. Refusal was encountered at 14.5 ft bgs. The boring was logged and sampled as JSF-BG06Alt.
- <u>JSF-BG02Alt</u> The original location of JSF-BG02 was moved after receiving TDEC approval because of private property access restrictions. On February 4, 2019, the DPT rig mobilized to alternate location JSF-BG02Alt. The DPT rig advanced one soil boring. Refusal was encountered at 19.5 ft bgs. The boring was logged and sampled as JSF-BG02Alt.
- JSF-BG01Alt The original location of JSF-BG03 was moved after receiving TDEC approval because of private property access restrictions. On February 5, 2019, the DPT rig mobilized to alternate location JSF-BG01Alt. The DPT rig advanced one soil boring. Refusal was encountered at 12.4 ft bgs. The boring was logged and sampled as JSF-BG01Alt.
- <u>JSF-BG13</u> On October 7, 2019, the DPT rig mobilized to location JSF-BG13. The DPT rig advanced one soil boring at this location. Refusal was encountered at 29.0 ft bgs. The boring was logged and sampled as JSF-BG13.
- <u>JSF-BG14</u> On October 8, 2019, the DPT rig mobilized to location JSF-BG14. The DPT rig advanced one soil boring at this location. Refusal was encountered at 25.0 ft bgs. The boring was logged and sampled as JSF-BG14.
- <u>JSF-BG15</u> On October 8, 2019, the DPT rig mobilized to location JSF-BG15. The DPT rig advanced one soil boring at this location. Refusal was encountered at 24.5 ft bgs. The boring was logged and sampled as JSF-BG15.

Following sample collection, as described in Section 3.3.2, the BGS investigation borings were backfilled using a 30 percent solids bentonite grout placed by the tremie method to within approximately six inches of the surface. The top six inches were restored to match the surrounding existing conditions.

#### 3.3.2 Soil Sampling

During advancement of each boring, a Tennessee-licensed PG prepared field subsurface logs using the *Subsurface Log* form. Each form includes a description of subsurface lithology, sample recovery, color using the Munsell Soil Color Charts and other relevant parameters as required by the SAPs and TIs. As part of the logging process, soil cores were photographed by FSP with interval data presented on a white

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board. Analytical and duplicate samples were collected from the BGS investigation borings and documented on the *Daily Field Activity Log* and *COC* as shown on Table B.1 (Appendix B).

The sampling team typically collected approximately two-foot grab samples from the mid-point of each five-foot soil run based on recovery. The collected soil was placed in clean, resealable plastic bags and homogenized using gloved hands and when necessary clean, unused, disposable, or decontaminated sampling tools. Decontamination of sampling equipment was conducted in accordance with ENV-TI-05.80.05, *Field Sampling Equipment Cleaning and Decontamination*. Once the sample was sufficiently homogenized, an aliquot of the homogenized sample and deionized water was used to create a soil paste for measurement of the soil pH with the ExTech ExStik 110 pH meter according to Stantec SOP – REV 1 (Stantec, 2018d). The measurements were recorded on the *Soil pH Data Form* within 15 minutes after creating the soil paste.

Afterwards, the soil sample was placed in an appropriate laboratory-supplied sample container. Soil samples were collected in accordance with ENV-TI-05.80.50, *Soil and Sediment Sampling* and ENV-TI-05.80.04, *Field Sampling Quality Control*. Sample containers were labeled and handled in accordance with ENV-TI-05.80.02, *Sample Labeling and Custody*. FSP secured caps on each bottle and attached a custody seal across the cap before placing the sample container in a cooler with ice (within 15 minutes of sample collection) for shipment to the laboratory.

The samples were analyzed for CCR-related constituents listed in Appendices III and IV of Title 40 of the Code of Federal Regulations (CFR) Part 257 (40 CFR 257). In addition, five inorganic constituents listed in Appendix I of Tennessee Rule 0400-11-01-.04 and not included in the 40 CFR 257 Appendices III and IV were analyzed to maintain continuity with the TDEC environmental programs. These additional TDEC Appendix I constituents included copper, nickel, silver, vanadium, and zinc. The combined federal CCR Appendices III and IV constituents and TDEC Appendix I inorganic constituents are hereafter referred to as "CCR Parameters." In addition, surficial soil samples from each BGS investigation boring location were analyzed for the presence of ash (percent ash) by polarized light microscopy (PLM). For borings JSF-BG13, JSF-BG14, and JSF-BG15, samples collected from the entire boring were also submitted for PLM analysis.

### 3.4 ROCK OUTCROP SURVEY

The rock outcrop survey was conducted on January 13 and 14, 2020. The survey areas are shown on Exhibit A.3 (Appendix A). As part of the survey process, rock outcrops were photographed by the FSP with area name, and strike and dip documented on a white board. A photographic log for the rock outcrop survey is provided in Attachment D.3 (Appendix D).

The survey was completed in the following chronological sequence:

<u>Area 01</u> – On January 13, 2020, the survey team mobilized to location Area 01. One rock sample was collected from the outcrops (JSF-ROC-AREA01-01).



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- <u>Area 05</u> On January 13, 2020, the survey team mobilized to location Area 05. One rock sample was collected from the outcrops (JSF-ROC-AREA05-01).
- <u>Area 02</u> On January 14, 2020, the survey team mobilized to location Area 02. Two rock samples were collected from the outcrops (JSF-ROC-AREA02-01 and JSF-ROC-AREA02-02).
- <u>Area 03</u> On January 14, 2020, the survey team mobilized to location Area 03. No rock samples were collected due to the absence of outcrops.
- <u>Area 04</u> On January 14, 2020, the survey team mobilized to location Area 04. No rock samples were collected due to the absence of outcrops.
- <u>Area 06</u> On January 14, 2020, the survey team mobilized to location Area 06. One rock sample was collected from the outcrops (JSF-ROC-AREA06-01). The rock outcrop located in Area 06 extends along the western bank of Polly's Branch and due to high water levels, only one portion of the outcrop near the southern tip of Area 06 could be surveyed in January 2020. The outcrop was found to be submerged in subsequent site visits; therefore, the survey of the northern portion of Area 06 could not be completed. Photographs taken along the outcrop of Polly's Branch on January 14, 2020 are included in the photographic log in Attachment D.3 (Appendix D).
- <u>Area 07</u> On January 14, 2020, the survey team mobilized to location Area 07. Two rock samples were collected from the outcrops (JSF-ROC-AREA07-01 and JSF-ROC-AREA07-02).

### 3.5 INVESTIGATION DERIVED WASTE

Investigation derived waste (IDW) generated during the BGS Investigation included:

- Used calibration solutions
- Soil cuttings
- Personal protective equipment
- Decontamination fluids
- General trash.

Soil cuttings and decontamination water produced during the BGS investigation were dispersed to the ground surface as authorized by TVA JSF Plant personnel and in accordance with ENV-TI-05.80.05, *Field Sampling Equipment Cleaning and Decontamination* and the Background Soil SAP.

IDW was handled in accordance with JSF Plant-specific waste management plan, and local, state, and federal regulations. Transportation and disposal of IDW was coordinated with TVA JSF Plant personnel.

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### 3.6 SAMPLE SHIPMENT

Soil samples were packed and transported or shipped under *COC* procedures as required by ENV-TI-05.80.06, *Handling and Shipping of Samples* and ENV-TI-05.80.02, *Sample Labeling and Custody*. The soil samples were shipped to TestAmerica in St. Louis, Missouri (radium analysis only) and to TestAmerica in Pittsburgh, Pennsylvania (all other analyses). The samples to be analyzed by PLM (percent ash) were shipped separately to RJ Lee located in Monroeville, Pennsylvania. TestAmerica submitted sample receipt forms to EnvStds to document the condition in which the samples were received. Rock outcrop samples were transported by Stantec field personnel to the Lexington, Kentucky, Stantec office for additional visual inspection and photo documentation.

### 3.7 VARIATIONS

The proposed scope and procedures for the BGS investigation were outlined in the SAPs, QAPP, applicable TVA TIs and ASTM standards, as detailed in the sections above. Variations in scope or procedures discussed with TDEC and/or TVA, changes based on field conditions, or additional field sampling performed to complete the scope of work in the SAR are described in the following sections. As discussed below, these variations do not impact the usability and representativeness of the data provided in this SAR for the BGS investigation at the JSF Plant.

### 3.7.1 Variations in Scope

Variations in scope are provided below.

- Alternate background soil boring locations for JSF-BG01 through JSF-BG06 were used because of private property access restrictions as approved by TDEC.
- Three background soil boring locations (JSF-BG13, JSF-BG14, and JSF-BG15) were approved by TDEC and added to the investigation to supplement the background data and meet the objectives of the SAP.

#### 3.7.2 Variations in Procedures

Variations in procedures occurring in the field are provided below.

The field pH measurement for the JSF-106 sample from 9.0 to 12.0 ft bgs was measured 33
minutes after the sample was placed in the laboratory containers. However, the field pH was
measured within 15 minutes of creating the paste; therefore, the measurement is considered
usable. The soil sample collected from this boring interval was also submitted to the laboratory
for pH testing.

Summary February 1, 2021

### 4.0 SUMMARY

The data presented in this report are from the BGS investigation at the JSF Plant. The BGS investigation included collecting soil analytical samples to assess CCR Parameters and percent ash. A total of 78 samples, including four duplicate samples, were collected from the 15 BGS borings (JSF-BG01Alt through JSF-BG15) and two background well borings (JSF-106 and JSF-110) and analyzed for CCR Parameters. Surficial soil samples from each BGS investigation boring location were analyzed for the presence of ash (percent ash) by PLM; additionally, soil samples from the entire JSF-BG13, JSF-BG14, and JSF-BG15 borings were also analyzed for PLM. Soil samples were also tested for pH in the field.

A list of samples collected, along with duplicates, is presented in Table B.1. The soil analytical data are presented in Tables B.2 and B.3, and the field soil pH data are summarized in Table B.4. Analytical data were reported by TestAmerica and RJ Lee and validated by EnvStds.

Additionally, a rock outcrop survey was conducted near the JSF Plant to determine if naturally occurring sources of metallic ore minerals are present in the area. Seven JSF rock outcrop areas were visited and documented, but only five areas were sampled. No samples were collected from Areas 03 and 04 due to the absence of outcrops.

Stantec has completed a BGS investigation at the JSF Plant in Rogersville, Tennessee, in accordance with the Background Soil and Hydrogeological Investigation SAPs as documented herein. The data collected during the BGS investigation are usable for reporting and evaluation in the EAR and meet the objectives of the TDEC Order EIP. The complete dataset from this investigation will be evaluated along with data collected under other TDEC Order SAPs, as well as data collected under other State and CCR Programs. This evaluation will be provided in the EAR.

References February 1, 2021

### 5.0 REFERENCES

- American Society for Testing and Materials D6151-08: Standard Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling.
- Environmental Standards, Inc. 2018. *Quality Assurance Project Plan for the Tennessee Valley Authority John Sevier Fossil Plant Environment Investigation*. Prepared for Tennessee Valley Authority. Revision 2. October 2018.
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- TVA. ENV-TI-05.80.02, Sample Labeling and Custody.
- TVA. ENV-TI-05.80.03, Field Record Keeping.
- TVA. ENV-TI-05.80.04, Field Sampling Quality Control.
- TVA. ENV-TI-05.80.05, Field Sampling Equipment Cleaning and Decontamination.
- TVA. ENV-TI-05.80.06, Handling and Shipping of Samples.
- TVA. ENV-TI-05.80.50, Soil and Sediment Sampling.

# **APPENDIX A - EXHIBITS**



Client/Pro Tenn	oject ossoo Vallo				
loho		y Autho	rity		
JOHH	Sevier Foss	il (JSF) PI	ant TDEC	Order	
Project Lo Rogersv	ocation ille, Tennessee		Tec	Prepared b hnical Review	1755682 y DMB on 2020-10 by RN on 2020-10
	0	500	1,000	1,500	2,000
	1:6,	000 (At orig	inal docume	ent size of 22>	(34)
Leg	end				
	TVA Property	Boundary			
	CCR Unit Are	a (Annroxir	nate)		
			nate)		
$\times$	Consolidated	d & Capped	d CCR Area (	(Approximat	e)

 Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
 Topographic mapping corresponds to the Burem and McCloud Quadrangles (Edition 2019, Scale 1:24,000)





Exhibit No.

A.2

Title

# Background Soil Boring Location Map

Client/Project

Tennessee Valley Authority John Sevier Fossil (JSF) Plant TDEC Order

Project L	ocation				175568225	•
Rogersv	ville, Tennessee		Tec	Prepared by hnical Review	y DMB on 2020-10-15 by RN on 2020-10-15	
	0	500	1,000	1,500	2,000	
Leg	end	6,000 (At orig	ginal docume	ent size of 22x	(34)	
۲	Background	d Soil Boring				
<del>\$</del>	Background	d Monitoring	Well			



2018 Imagery Boundary

CCR Unit Area (Approximate)

Consolidated & Capped CCR Area (Approximate)

### Notes

1. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet 2. Imagery Provided by Tuck Mapping (2017-03-08) and TVA (2018-09-11) Scott Kentucky Washingtor Virginia Sullivar Tennessee Hancock John Sevier Fossil Plan Washington Greene



North

Carolina



Exhibit No. A.3

### Title Rock Outcrop Survey Area

### Client/Project

Tennessee Valley Authority John Sevier Fossil (JSF) Plant TDEC Order

Project Loca	tion				175568225
Rogersville, Tennessee			Та	Prepared by	DMB on 2020-10-15
			lec	chnical Review i	Dy RH ON 2020-10-15
	0	450	900	1,350	1,800
					Feel
	1:5,40	) (At original	document	size of $22x34$ )	
l adar	hd				
Leyei	IU				
• Re	ock Samol	2			
R	ock Outerc	op Survey Are	ea		

TVA Property Boundary
2018 Imagery Boundary
CCR Unit Area (Approximate)
Consolidated & Capped CCR Area (Approximate)

### Notes



Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
 Imagery Provided by Tuck Mapping (2017-03-08) and TVA (2018-09-11)

## **APPENDIX B - TABLES**

							Analysis Type		
Location ID	Sample ID	Sample Type	% Ash	Total Metals	Total Mercury	Anions	pH (laboratory)	pH (field)	Radium-226, Radium-228, Radium-226+228
JSF-106	JSF-BS-JSF106-9.0/12.0-20190124	Normal Environmental Sample		Х	Х	х	Х	Х	Х
JSF-110	JSF_BS_JSF110_9.9/12.0_20190129	Normal Environmental Sample		Х	Х	х	Х	Х	Х
	JSF-BS-BG01ALT-0.0/0.5-20190205	Normal Environmental Sample	х	Х	Х	х	Х	х	Х
JSF-BG01ALT	JSF-BS-BG01ALT-0.5/2.5-20190205	Normal Environmental Sample		Х	Х	х	Х	Х	Х
	JSF-BS-BG01ALT-6.8/8.8-20190205	Normal Environmental Sample		Х	Х	х	Х	х	Х
	JSF-BS-BG01ALT-10.0/12.4-20190205	Normal Environmental Sample		Х	Х	х	Х	Х	Х
	JSF-BS-BG02ALT-0.0/0.5-20190204	Normal Environmental Sample	х	Х	Х	х	Х	х	Х
	JSF-BS-FD03-20190204	Field Duplicate Sample		Х	Х	х	Х		X
	JSF-BS-BG02ALT-0.9/2.9-20190204	Normal Environmental Sample		Х	Х	х	Х	х	Х
JSF-BGUZALT	JSF-BS-BG02ALT-5.9/7.9-20190204	Normal Environmental Sample		Х	Х	х	Х	х	X
	JSF-BS-BG02ALT-11.5/13.5-20190204	Normal Environmental Sample		Х	Х	х	Х	Х	Х
	JSF-BS-BG02ALT-16.5/18.5-20190204	Normal Environmental Sample		Х	Х	х	Х	х	X
	JSF-BS-BG03-0.0/0.5-20190129	Normal Environmental Sample	Х	Х	Х	х	Х	Х	Х
	JSF-BS-BG03-1.5/3.5-20190129	Normal Environmental Sample		Х	Х	х	Х	х	X
JSF-BG03	JSF-BS-BG03-5.0/6.6-20190129	Normal Environmental Sample		Х	Х	х	Х	Х	Х
	JSF-BS-BG03-7.2/9.2-20190129	Normal Environmental Sample		Х	Х	х	Х	х	X
	JSF-BS-BG03-11.5/13.5-20190129	Normal Environmental Sample		Х	Х	х	Х	Х	Х
	JSF-BS-BG04ALT-0.0/0.5-20190130	Normal Environmental Sample	х	Х	Х	х	Х	Х	Х
	JSF-BS-BG04ALT-0.9/2.9-20190130	Normal Environmental Sample		Х	Х	х	Х	Х	Х
JSF-BG04ALT	JSF-BS-BG04ALT-7.2/9.2-20190130	Normal Environmental Sample		Х	Х	х	Х	Х	Х
	JSF-BS-BG04ALT-15.5/18.5-20190130	Normal Environmental Sample		Х	Х	х	Х	Х	Х
	JSF-BS-FD02-20190130	Field Duplicate Sample		Х	Х	х	Х		Х
	JSF-BS-BG05ALT-0.0/0.5-20190131	Normal Environmental Sample	х	Х	Х	х	Х	Х	Х
JSF-BG05ALT	JSF-BS-BG05ALT-1.3/3.3-20190131	Normal Environmental Sample		Х	Х	х	Х	Х	Х
	JSF-BS-BG05ALT-6.0/8.0-20190131	Normal Environmental Sample		Х	Х	х	Х	х	X
	JSF-BS-BG06ALT-0.0/0.5-20190201	Normal Environmental Sample	Х	Х	Х	х	Х	Х	Х
	JSF-BS-BG06ALT-1.5/3.5-20190201	Normal Environmental Sample		Х	Х	х	Х	х	X
JSF-BGUUALT	JSF-BS-BG06ALT-6.5/8.5-20190201	Normal Environmental Sample		Х	Х	х	Х	х	Х
	JSF-BS-BG06ALT-11.2/13.2-20190201	Normal Environmental Sample		Х	Х	х	Х	Х	X
	JSF-BS-BG07-0.0/0.5-20190129	Normal Environmental Sample	х	Х	Х	х	Х	х	Х
	JSF-BS-BG07-1.4/4.1-20190129	Normal Environmental Sample		Х	Х	х	Х	х	X
J3F-DG07	JSF-BS-BG07-6.2/8.2-20190129	Normal Environmental Sample		Х	Х	х	Х	Х	Х
	JSF-BS-BG07-11.0/14.0-20190129	Normal Environmental Sample		Х	Х	х	Х	Х	Х
	JSF-BS-BG08-0.0/0.5-20190128	Normal Environmental Sample	Х	Х	Х	х	Х	Х	Х
	JSF-BS-BG08-2.0/4.0-20190128	Normal Environmental Sample		Х	Х	х	х	x	X
JSF-BG08	JSF-BS-BG08-6.5/8.5-20190128	Normal Environmental Sample		Х	Х	Х	Х	Х	Х
	JSF-BS-BG08-11.5/13.5-20190128	Normal Environmental Sample		Х	Х	Х	Х	Х	Х
	JSF-BS-BG08-16.5/18.5-20190128	Normal Environmental Sample		х	Х	х	х	х	Х

See notes on last page.

							Analysis Type		
Location ID	Sample ID	Sample Type	% Ash	Total Metals	Total Mercury	Anions	pH (laboratory)	pH (field)	Radium-226, Radium-228, Radium-226+228
	JSF-BS-BG09-0.0/0.5-20190125	Normal Environmental Sample	Х	х	X	х	Х	Х	Х
	JSF-BS-BG09-1.0/4.0-20190125	Normal Environmental Sample		х	Х	х	Х	Х	Х
	JSF-BS-BG09-6.1/8.1-20190125	Normal Environmental Sample		х	X	х	Х	Х	Х
J2L-DG03	JSF-BS-BG09-10.0/11.7-20190125	Normal Environmental Sample		х	X	х	Х	Х	Х
	JSF-BS-BG09-12.7/14.7-20190125	Normal Environmental Sample		х	X	х	Х	Х	Х
	JSF-BS-BG09-16.1/18.1-20190125	Normal Environmental Sample		х	х	х	Х	Х	x
	JSF-BS-BG10-0.0/0.5-20190124	Normal Environmental Sample	Х	х	х	х	Х	Х	x
	JSF-BS-BG10-1.4/3.4-20190124	Normal Environmental Sample		х	Х	х	Х	Х	х
J2L-PG10	JSF-BS-BG10-6.5/8.5-20190124	Normal Environmental Sample		х	х	х	Х	Х	x
	JSF-BS-BG10-10.5/12.5-20190124	Normal Environmental Sample		х	х	х	Х	Х	Х
	JSF-BS-BG11-0.0/0.5-20190124	Normal Environmental Sample	Х	х	х	х	Х	Х	Х
	JSF-BS-BG11-1.1/3.1-20190124	Normal Environmental Sample		х	Х	х	Х	х	х
JSF-BG11	JSF-BS-BG11-5.5/8.5-20190124	Normal Environmental Sample		х	х	х	Х	Х	Х
	JSF-BS-FD01-20190124	Field Duplicate Sample		х	Х	х	Х		х
	JSF-BS-BG11-11.3/13.3-20190124	Normal Environmental Sample		х	Х	х	Х	Х	х
	JSF-BS-BG12-0.0/0.5-20190123	Normal Environmental Sample	Х	х	Х	х	Х	х	х
	JSF-BS-BG12-0.8/2.8-20190123	Normal Environmental Sample		х	х	х	Х	Х	Х
JSF-BG12	JSF-BS-BG12-5.0/10.0-20190123	Normal Environmental Sample		х	х	х	Х	х	х
	JSF-BS-BG12-10.75/12.75-20190123	Normal Environmental Sample		Х	Х	Х	Х	Х	Х
	JSF-BS-BG12-13.5/15.0-20190123	Normal Environmental Sample		Х	х	х	Х	Х	x
	JSF-BS-BG13-0.0/0.5-20191008	Normal Environmental Sample	Х	Х	Х	Х	Х	Х	Х
	JSF-BS-BG13-1.5/3.5-20191007	Normal Environmental Sample	x	Х	х	х	Х	Х	x
	JSF-BS-BG13-6.5/8.5-20191007	Normal Environmental Sample	Х	Х	Х	Х	Х	Х	Х
JSF-BG13	JSF-BS-BG13-11.5/13.5-20191007	Normal Environmental Sample	Х	х	х	х	Х	х	Х
	JSF-BS-BG13-16.5/18.5-20191007	Normal Environmental Sample	Х	Х	Х	Х	Х	Х	Х
	JSF-BS-BG13-21.5/23.5-20191007	Normal Environmental Sample	x	х	х	х	х	х	х
	JSF-BS-BG13-26.5/28.5-20191007	Normal Environmental Sample	Х	Х	Х	Х	Х	Х	Х
	JSF-BS-BG14-0.0/0.5-20191008	Normal Environmental Sample	x	х	х	х	х	х	x
	JSF-BS-BG14-3.0/5.0-20191008	Normal Environmental Sample	x	х	Х	х	Х	Х	Х
	JSF-BS-BG14-6.5/8.5-20191008	Normal Environmental Sample	x	х	х	х	х	х	х
JUL-DO14	JSF-BS-BG14-11.5/13.5-20191008	Normal Environmental Sample	Х	Х	Х	х	Х	х	Х
	JSF-BS-BG14-16.5/18.5-20191008	Normal Environmental Sample	Х	х	Х	х	Х	Х	Х
	JSF-BS-BG14-21.5/23.5-20191008	Normal Environmental Sample	Х	Х	X	Х	Х	Х	X

See notes on last page.

#### Analysis Type

							Analysis Type		
Location ID	Sample ID	Sample Type	% Ash	Total Metals	Total Mercury	Anions	pH (laboratory)	pH (field)	Radium-226, Radium-228, Radium-226+228
	JSF-BS-BG15-0.0/0.5-20191008	Normal Environmental Sample	Х	х	Х	х	х	Х	X
	JSF-BS-BG15-1.5/3.5-20191008	Normal Environmental Sample	Х	Х	Х	х	Х	Х	X
	JSF-BS-BG15-6.5/8.5-20191008	Normal Environmental Sample	Х	х	Х	х	х	Х	X
JSF-BG15	JSF-BS-BG15-11.0/14.0-20191008	Normal Environmental Sample	Х	Х	Х	х	Х	Х	X
	JSF-BS-DUP01-20191008	Field Duplicate Sample		х	х	х	х		Х
	JSF-BS-BG15-16.5/18.5-20191008	Normal Environmental Sample	Х	Х	Х	х	Х	Х	X
	JSF-BS-BG15-21.5/23.5-20191008	Normal Environmental Sample	Х	x	Х	х	Х	Х	X

#### Notes:

% Ash	PLM
Total Metals	SW-846 6020A
Total Mercury	SW-846 7471B
Anions	SW-846 9056A
pH (laboratory)	SW-846 9045D
Radium-226, Radium-228, Radium-226+228	EPA 901.1
ID	identification

1. Field and laboratory quality control sample results except for field duplicates are not included in report tables but were used for data validation.

2. Boring JSF-106 and JSF-110 under hydrogeological investigation scope of work; sample collected within well screen interval.

3. CEC collected split samples from JSF-BG07 and JSF-110

Sample Location		JSF-106	JSF-110		JSF-B	JSF-BG02ALT			
Sample Date Sample ID Sample Depth Sample Type Level of Review	Unito	24-Jan-19 JSF-BS-JSF106-9.0/12.0-20190124 9 - 12 ft Normal Environmental Sample Final-Verified	29-Jan-19 JSF_BS_JSF110_9.9/12.0_20190129 9.9 - 12 ft Normal Environmental Sample Final-Verified	5-Feb-19 JSF-BS-BG01ALT-0.0/0.5-20190205 0 - 0.5 ft Normal Environmental Sample Final-Verified	5-Feb-19 JSF-BS-BG01ALT-0.5/2.5-20190205 0.5 - 2.5 ft Normal Environmental Sample Final-Verified	5-Feb-19 JSF-BS-BG01ALT-6.8/8.8-20190205 6.8 - 8.8 ft Normal Environmental Sample Final-Verified	5-Feb-19 JSF-BS-BG01ALT-10.0/12.4-20190205 10 - 12.4 ft Normal Environmental Sample Final-Verified	4-Feb-19 JSF-BS-BG02ALT-0.0/0.5-20190204 0 - 0.5 ft Normal Environmental Sample Final-Verified	4-Feb-19 JSF-BS-FD03-20190204 0 - 0.5 ft Field Duplicate Sample Final-Verified
DLM	Units								
	0/			-4				0	
% ASH	%	-	-	٤:	-	-	-	2	-
I otal Metals									
Antimony	mg/kg	0.0794 UJ	0.0753 UJ	0.0663 UJ	0.0729 UJ	0.0686 UJ	0.0762 UJ	0.109 J	0.161 J
Arsenic	mg/kg	2.90 J	3.86 J	0.915	1.74	0.993	5.86	3.29	3.20
Barium	mg/kg	103 J	21.4	3.57	27.4	72.1	207	24.1	20.5
Beryllium	mg/kg	1.09 J	0.466	0.0674 J	0.168	0.205	1.94	0.313	0.276
Boron	mg/kg	2.54 J	1.81 J	1.78 J	<1.59	<1.49	2.39 J	<1.82	<1.70
Cadmium	mg/kg	0.107 U*	<0.0206	<0.0182	<0.0200	<0.0188	0.0619 J	0.0319 J	0.0214 J
Calcium	mg/kg	1,920	36.1 J	299,000	2,490	1,250	3,690	268	155
Chromium	mg/kg	16.6 J	6.50	1.43	5.53	5.35	24.6	9.97	8.43
Cobalt	mg/kg	13.8 J	2.53	0.419	2.44	1.97	17.2	1.81	1.49
Copper	mg/kg	12.1 J	7.28	2.57 J	2.66 J	1.68 J	22.3 J	5.26 J	4.16 J
Lead	mg/kg	14.7	10.1	2.25	7.46	5.13	13.2	16.1 J	29.2 J
Lithium	mg/kg	23.0 J	5.65 J	0.727	4.74	6.30	40.3	5.55	4.87
Mercury	mg/kg	0.0251 J	<0.0165	<0.0148	0.0234 J	0.0257 J	<0.0194	0.0802	0.0650
Molybaenum	mg/kg	0.318 0*	0.433 J	0.194 J	0.419 J	<0.180	<0.200	0.485 J	0.633
NICKEI	mg/кg	25.4 J	6.08	1.48	2.06	3.38	33.8	4.//	3.73
Selenium	mg/кg	0.578 J	0.600 J	<0.131	0.466 J	0.215 J	1.05	0.686	0.702
Sliver	mg/kg	0.0179 UR	<0.0170	<0.0289	<0.0317	<0.0299	<0.0332	<0.0305	<0.0339
Vanadium	mg/kg	0.134 0	0.0077 J	0.0342 J	0.116 J	0.0011 J	0.07 To J	0.133 J	0.132
Zino	mg/kg	15.1 J 60 7 J	11.3	2.42	12.0 9.07 I	0.00	19.1	19.0	12.8
Anione	iiiy/ky	00.7 5	17:0	5:42 5	8.07 J	0.47 5	90.0 5	17.45	12.8 5
Anions									
Chloride	mg/kg	<4.83	8.46 J	<4.01	<4.46	12.7	<4.88	<5.15	<5.06
Fluoride	mg/kg	0.846 UJ	<0.815	0.702 UJ	2.19 J	0.873 J	1.15 J	0.902 UJ	0.888 J
Sultate	mg/kg	75.3	<8.14	<7.01	67.7	97.5	15.7	14.2	25.3
General Chemistry	/								
pH (lab)	SU	6.8	4.8	8.9	6.0	7.0	7.4	4.6	4.8
		See notes on last page.							



Sample Location	1		JSF-BG0	2ALT		JSF-BG03					
Sample Date Sample ID		4-Feb-19 JSF-BS-BG02ALT-0.9/2.9-20190204	4-Feb-19 JSF-BS-BG02ALT-5.9/7.9-20190204	4-Feb-19 JSF-BS-BG02ALT-11.5/13.5-20190204	4-Feb-19 JSF-BS-BG02ALT-16.5/18.5-20190204	29-Jan-19 JSF-BS-BG03-0.0/0.5-20190129	29-Jan-19 JSF-BS-BG03-1.5/3.5-20190129	29-Jan-19 JSF-BS-BG03-5.0/6.6-20190129	29-Jan-19 JSF-BS-BG03-7.2/9.2-20190129	29-Jan-19 JSF-BS-BG03-11.5/13.5-20190129	
Sample Depth		0.9 - 2.9 ft	5.9 - 7.9 ft	11.5 - 13.5 ft	16.5 - 18.5 ft	0 - 0.5 ft	1.5 - 3.5 ft	5 - 6.6 ft	7.2 - 9.2 ft	11.5 - 13.5 ft	
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	
Level of Review		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	
	Units										
PLM											
% ASH	%	-	-	-	-	<1	-	-	-	-	
Total Metals											
Antimony	mg/kg	0.0746 J	0.0697 UJ	0.0878 UJ	0.0995 J	0.148 J	0.116 J	0.0680 UJ	0.0852 UJ	0.0893 UJ	
Arsenic	mg/kg	1.24	0.409	7.94	8.07	4.57 J	2.22 J	1.88 J	2.75 J	5.69 J	
Barium	mg/kg	19.5	32.1	46.7	30.3	28.8	33.1	18.1	25.3	52.0	
Beryllium	mg/kg	0.0872 J	0.195	1.81	1.97	0.486	0.322	0.348	1.84	2.43	
Boron	mg/kg	<1.58	<1.52	4.27 J	4.97 J	2.30 J	1.77 J	1.13 J	2.50 J	3.32 J	
Cadmium	mg/kg	<0.0198	<0.0191	0.0849 J	0.0499 J	0.0216 J	<0.0218	<0.0186	<0.0234	0.0506 J	
Calcium	mg/kg	178	71.6	1,640	11,500	465	405	55.5	116	444	
Chromium	mg/kg	4.83	6.42	23.8	20.4	11.3	13.8	6.09	13.7	19.1	
Cobalt	mg/kg	0.552	0.624	24.1	20.8	2.16	1.39	1.15	3.72	18.5	
Copper	mg/kg	1.43 J	4.30 J	31.9 J	25.0 J	10.7	6.07	5.40	14.7	19.9	
Lead	mg/kg	5.65	5.97	8.38	14.6	14.5	12.4	6.29	14.4	7.45	
Lithium	mg/kg	4.01	4.52	36.5	43.6	7.11 J	5.91 J	3.81 J	9.51 J	43.8 J	
Mercury	mg/kg	0.0241 J	0.0164 UJ	<0.0197	<0.0170	0.0415	0.218	<0.0140	<0.0182	<0.0162	
Molybdenum	mg/kg	0.399 J	0.265 J	0.285 J	0.385 J	0.811	0.510 J	0.223 J	0.179 J	0.191 J	
Nickel	mg/kg	1.10	2.04	36.3	36.3	6.49	3.89	3.01	9.12	32.3	
Selenium	mg/kg	0.472 J	0.317 J	2.15	1.23	0.787	0.893	0.646	1.18	2.40	
Silver	mg/kg	<0.0315	<0.0303	<0.0382	<0.0341	<0.0171	<0.0179	<0.0153	<0.0192	<0.0202	
Thallium	mg/kg	0.121	0.108 J	0.136 J	0.0867 J	0.189	0.223	0.0877 J	0.124 J	0.0882 J	
Vanadium	mg/kg	12.0	8.38	22.6	17.4	28.1	26.7	7.16	13.7	18.2	
Zinc	mg/kg	5.07 J	7.95	84.6 J	89.6 J	20.4	17.9	10.5	29.8	82.6	
Anions											
Chloride	mg/kg	<4.48	<4.19	<5.42	<4.75	<4.60	20.8	6.62 J	9.07 J	9.32 J	
Fluoride	mg/kg	0.785 UJ	0.735 UJ	0.950 UJ	0.832 UJ	<0.806	<0.865	<0.773	<0.883	<0.923	
Sulfate	mg/kg	21.4	42.5	49.7	28.4	70.0	82.2	9.93 J	19.7	9.83 J	
General Chemist	y										
pH (lab)	SU	5.3	4.4	5.9	8.2	5.2	4.5	4.4	4.4	4.8	
		See notes on last page.									

Sample Location	1			ISE-BG04ALT		JSF-BG05ALT				
Sample Date		20. Jan 10	20. Jan 10	20 Jan 40	20 Jan 10	20. Jan 10	21 Jan 10	21 Jan 19 21 Jan 19		
Sample Date		30-Jaii-19	30-Jail-19	30-Jali-19	30-Jdil-19	30-Jali-19	31-Jdli-19	31-Jail-19		
Sample ID		JSF-BS-BG04AL1-0.0/0.3-20190130	JSF-BS-BG04AL1-0.9/2.9-20190130	JSF-BS-BG04AL1-7.2/9.2-20190130	JSF-DS-DG04AL1-15.5/16.5-20190130	JSF-BS-FD02-20190130	JSF-BS-BG05AL1-0.0/0.5-20190131	JSF-BS-BG05AL1-1.3/3.3-20190131	JSF-BS-BG05AL1-6.0/6.0-20190131	
Sample Depth		Normal Environmental Sample	V.3 - 2.3 It Normal Environmental Sample	1.2 - 3.2 IL Normal Environmental Sample	Normal Environmental Sample	Field Duplicate Sample	0 - 0.5 It Normal Environmental Sample	Normal Environmental Sample	0-0 It Normal Environmental Sample	
Lovel of Poview		Final Varified	Final Varified	Final Varified	Final Varified	Field Duplicate Sample	Final Varified	Final Verified	Final Varified	
Level of Review	Units	Fillal-Vermeu	Final-Vermeu	Fillal-Vermeu	Fillai-Vermeu	Final-Vermeu	Fillal-Verified	Final-vermeu	Fillal-Vermeu	
PLM										
% ASH	%	3	-	-	-	-	2	-	-	
Total Metals										
Antimony	mg/kg	0.0964 J	0.208 J	0.112 J	0.185 J	0.114 J	0.0808 UJ	0.0907 J	0.0708 UJ	
Arsenic	mg/kg	2.86	6.03	5.85	9.24	7.51	2.38 J	2.91 J	0.799 J	
Barium	mg/kg	49.9	26.9	248	51.9	41.5	31.9	33.1	56.8	
Beryllium	mg/kg	0.393	0.314	0.325	2.16	1.84	0.294	0.256	1.87	
Boron	mg/kg	3.76 J	1.52 J	1.35 J	3.30 J	2.54 J	1.20 J	1.47 J	1.15 J	
Cadmium	mg/kg	3.09 J	0.0215 UJ	0.0361 J	0.0608 J	0.0451 J	0.0924 J	<0.0193	<0.0194	
Calcium	mg/kg	52,300	450	48.6 J	371	286	1,330	658	1,090	
Chromium	mg/kg	6.35	20.8	17.4	15.5	13.1	6.48	10.6	8.71	
Cobalt	mg/kg	1.92	2.45	8.36	31.0	37.0	2.00	2.13	8.89	
Copper	mg/kg	7.70	9.95	7.92	27.3	25.4	3.27	3.43	6.52	
Lead	mg/kg	12.2	8.83	9.45	15.2	14.8	10.2	8.53	11.0	
Lithium	mg/kg	2.76	9.86	3.23	38.6	38.0	5.56 J	10.0 J	13.0 J	
Mercury	mg/kg	0.0434 J	0.0435	<0.0143	0.0163 J	< 0.0167	0.0190 J	0.0286 J	0.0199 J	
Molybdenum	mg/kg	0.624 J	1.26	0.853	0.322 J	0.261 J	0.404 J	0.493 J	0.200 J	
Nickel	mg/kg	3.53	5.91	6.69	33.8	30.2	2.48	4.10	11.8	
Selenium	mg/kg	0.828 J	0.807 J	0.375 J	0.927 J	0.639 J	0.448 J	0.493 J	1.43 J	
Silver	mg/kg	<0.0199	<0.0177	<0.0159	<0.0186	<0.0188	<0.0183	<0.0159	<0.0160	
Thallium	mg/kg	0.111 J	0.201	0.303	0.114 J	0.0938 J	0.0918 J	0.130	0.0705 J	
Vanadium	mg/kg	9.05 J	38.9 J	11.1 J	17.1 J	16.5 J	12.1	19.3	10.2	
Zinc	mg/kg	704	20.4	15.8	96.3	86.4	22.3	13.6	32.4	
Anions										
Chloride	mg/kg	<5.15	<4.80	<4.38	26.4	26.8	<5.15	<4.61	<4.45	
Fluoride	mg/kg	1.42 J	0.841 UJ	0.768 UJ	0.886 UJ	0.883 UJ	3.97 J	0.808 UJ	4.45 J	
Sulfate	mg/kg	11.1 J	105	8.90 J	<8.85	<8.81	14.6 J	51.7 J	32.6 J	
General Chemistry										
pH (lab)	SU	7.4	6.4	4.8	4.5	4.5	7.0	4.7	6.7	
		See notes on last page.								



Samula Lagation						ISE DC07					
Sample Location		4 5-6 40									
Sample Date		1-F6D-19	1-FCD-19 ISE DS DC06ALT 1 5/2 5 20100201	1-F6D-19	1-FED-19 ISE DS DC06ALT 11 2/12 2 20100201	29-Jan-19	29-Jan-19	29-Jan-19	29-Jan-19		
Sample ID		0 - 0 5 ft	15-35ft	65-85ft	11 2 - 13 2 ft	0 - 0 5 ft	1 A _ A 1 ft	62-82 ft	11 - 14 ft		
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample		
Level of Review		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified		
	Units										
PLM		•									
% ASH	%	2	-	-	-	<1	-	-	-		
Total Metals											
Antimony	mg/kg	0.173 J	0.107 J	0.110 J	0.115 J	0.133 J	0.176 J	0.117 J	0.0896 J		
Arsenic	mg/kg	5.76 J	4.34 J	5.13 J	3.73 J	2.26 J	4.33 J	3.86 J	4.13 J		
Barium	mg/kg	171	57.8	66.5	36.6	20.0	30.1	44.3	81.8		
Beryllium	mg/kg	1.92	1.11	1.26	1.69	0.210	0.346	0.596	1.98		
Boron	mg/kg	3.49 J	1.96 J	2.15 J	2.00 J	5.01 J	1.85 J	1.71 J	2.88 J		
Cadmium	mg/kg	0.156	0.0423 J	0.0548 J	0.0618 J	0.233	0.0491 J	0.0224 J	0.0489 J		
Calcium	mg/kg	687	72.2	89.5	203	165,000	2,240	234	487		
Chromium	mg/kg	21.3	12.3	11.1	17.2	4.53	15.1	15.3	17.5		
Cobalt	mg/kg	16.7	13.9	27.1	15.1	1.65	2.02	2.50	31.9		
Copper	mg/kg	13.5	21.7	21.9	21.5	5.75	4.43	8.93	24.2		
Lead	mg/kg	23.4	12.9	13.2	14.1	17.1	11.0	16.1	13.6		
Lithium	mg/kg	5.18 J	23.3 J	24.3 J	36.3 J	3.72 J	9.09 J	10.9 J	38.9 J		
Mercury	mg/kg	0.0430	<0.0205	<0.0179	<0.0186	0.0238 J	0.0791	0.0342 J	<0.0211		
Molybdenum	mg/kg	0.699	<0.215	<0.220	<0.218	0.582 J	0.880	0.425 J	0.562 J		
Nickel	mg/kg	17.0	19.0	19.8	32.3	3.20	4.60	8.27	29.1		
Selenium	mg/kg	1.94 J	1.68 J	1.23 J	1.18 J	0.392 J	0.772	1.12	1.12		
Silver	mg/kg	<0.0327	<0.0356	<0.0364	<0.0361	<0.0165	<0.0178	<0.0175	<0.0193		
Thallium	mg/kg	0.294	0.119 J	0.111 J	0.0709 J	0.0875 J	0.228	0.229	0.0816 J		
Vanadium	mg/kg	31.2	18.2	18.8	19.8	7.35	31.4	24.5	17.8		
Zinc	mg/kg	31.1	61.2	58.3	102	55.6	17.6	23.1	84.5		
Anions											
Chloride	mg/kg	<4.84	56.4	63.1	82.3	<4.42	<4.65	<4.83	<5.08		
Fluoride	mg/kg	<0.849	<0.877	<0.876	<0.878	1.21	<0.816	<0.846	<0.890		
Sulfate	mg/kg	33.3	<8.75	<8.75	<8.77	14.1	256	98.9	<8.89		
General Chemistry	у										
pH (lab)	SU	6.4	4.2	4.5	4.5	8.1	7.3	4.4	5.1		
		See notes on last page.									

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Sample Location		JSF-BG08					JSF-BG09					
Sample Date		28-Jan-19	28-Jan-19	28-Jan-19	28-Jan-19	28-Jan-19	25-Jan-19	25-Jan-19	25-Jan-19	25-Jan-19		
Sample ID		JSF-BS-BG08-0.0/0.5-20190128	JSF-BS-BG08-2.0/4.0-20190128	JSF-BS-BG08-6.5/8.5-20190128	JSF-BS-BG08-11.5/13.5-20190128	JSF-BS-BG08-16.5/18.5-20190128	JSF-BS-BG09-0.0/0.5-20190125	JSF-BS-BG09-1.0/4.0-20190125	JSF-BS-BG09-6.1/8.1-20190125	JSF-BS-BG09-10.0/11.7-20190125		
Sample Depth		0 - 0.5 ft	2 - 4 ft	6.5 - 8.5 ft	11.5 - 13.5 ft	16.5 - 18.5 ft	0 - 0.5 ft	1 - 4 ft	6.1 - 8.1 ft	10 - 11.7 ft		
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample		
Level of Review		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified		
	Units											
PLM												
% ASH	%	<1	-	-	-	-	2	-	-	-		
Total Metals												
Antimony	mg/kg	0.129 J	<0.0754	0.104 J	<0.0775	<0.0711	0.134 J	0.115 J	0.150 J	0.123 J		
Arsenic	mg/kg	3.30	1.64	8.47	5.67	2.33	3.11 J	6.60 J	2.49 J	3.29 J		
Barium	mg/kg	32.5	11.4	65.2	168	88.2	27.5	32.6	31.3	89.0		
Beryllium	mg/kg	0.447	0.0999 J	1.10	4.96	0.717	0.363	0.478	0.479	0.466		
Boron	mg/kg	3.75 J	1.09 J	<0.957	1.24 J	1.63 J	3.83 J	2.24 J	2.16 J	1.89 J		
Cadmium	mg/kg	0.0601 J	<0.0207	<0.0213	0.206	0.0458 J	0.0294 J	0.0349 J	<0.0203	0.0317 J		
Calcium	mg/kg	19,200	376	2,490	2,080	1,470	59,900	67,600	378	101		
Chromium	mg/kg	8.03	4.38	15.3	11.7	9.29	6.85	11.1	9.80	15.9		
Cobalt	mg/kg	4.15	0.599	7.45	14.1	6.48	3.12	3.61	2.77	17.6		
Copper	mg/kg	8.36	1.79	9.86	13.6	9.74	5.49	7.65	8.56	9.11		
Lead	mg/kg	12.4	5.09	19.5	12.7	7.13	11.6	11.5	12.6	22.0		
Lithium	mg/kg	8.81	3.47	6.15	9.91	9.60	7.85 J	9.16 J	6.65 J	5.05 J		
Mercury	mg/kg	0.0329 J	0.0453	<0.0184	0.0270 J	0.0182 J	0.0420 J	0.0819	0.0393	0.0292 J		
Molybdenum	mg/kg	0.484 J	0.377 J	0.475 J	0.754	0.335 J	0.520 J	0.640 J	0.634	1.29		
Nickel	mg/kg	6.73	0.808	8.01	27.0	10.9	5.51	5.90	6.43	7.74		
Selenium	mg/kg	0.803	0.325 J	1.15	4.27	1.03	0.476 J	0.739	0.504 J	0.384 J		
Silver	mg/kg	<0.0177	<0.0170	<0.0176	<0.0175	<0.0161	<0.0180	<0.0196	<0.0167	<0.0175		
Thallium	mg/kg	0.107 J	0.0773 J	0.150	0.169	0.0831 J	0.0932 J	0.157	0.139	0.173		
Vanadium	mg/kg	13.2	11.2	20.1	21.9	12.0	11.5	19.0	21.3	12.9		
Zinc	mg/kg	27.1	3.59	29.0	56.8	36.5	22.0	19.9	19.0	16.4		
Anions												
Chloride	mg/kg	<4.80	<4.42	<4.67	<4.69	<4.51	<4.80	<5.22	6.24 J	<4.84		
Fluoride	mg/kg	1.35	<0.774	<0.818	<0.822	<0.790	2.62 J	1.21 J	0.809 UJ	0.848 UJ		
Sulfate	mg/kg	<8.40	83.8	43.9	11.0 J	12.7	8.47 J	80.0	114	65.4		
<b>General Chemistry</b>												
pH (lab)	SU	8.1	5.5	6.0	7.5	7.7	8.1	7.7	5.4	4.7		
		See notes on last page.										


Sample Location		JSF-B	G09			JSF-BG10			JSF-E	3G11
Sample Date		25-Jan-19	25-Jan-19	24-Jan-19	24-Jan-19	24-Jan-19	24-Jan-19	24-Jan-19	24-Jan-19	24-Jan-19
Sample ID		JSF-BS-BG09-12.7/14.7-20190125	JSF-BS-BG09-16.1/18.1-20190125	JSF-BS-BG10-0.0/0.5-20190124	JSF-BS-BG10-0.0/0.5-20190124	JSF-BS-BG10-1.4/3.4-20190124	JSF-BS-BG10-6.5/8.5-20190124	JSF-BS-BG10-10.5/12.5-20190124	JSF-BS-BG11-0.0/0.5-20190124	JSF-BS-BG11-0.0/0.5-20190124
Sample Depth		12.7 - 14.7 ft	16.1 - 18.1 ft	0 - 0.5 ft	0 - 0.5 ft	1.4 - 3.4 ft	6.5 - 8.5 ft	10.5 - 12.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample
Level of Review		Final-Verified	Final-Verified	Final-Verified	Validated	Validated	Validated	Validated	Final-Verified	Validated
	Units									
PLM										
% ASH	%	-	-	2	-	-	-	-	2	-
Total Metals										
Antimony	mg/kg	0.203 J	0.0823 J	-	0.179 J	0.258 J	0.135 J	0.0976 J	-	0.183 J
Arsenic	mg/kg	8.59 J	6.33 J	-	4.11	6.06	4.57	3.52	-	10.8
Barium	mg/kg	94.8	214	-	32.5	31.3	36.6	48.4	-	64.7
Beryllium	mg/kg	2.00	3.63	-	0.521	0.856	1.39	1.80	-	0.778
Boron	mg/kg	4.67 J	3.06 J	-	5.89 J	2.42 J	2.36 J	2.44 J	-	2.51 J
Cadmium	mg/kg	0.0661 J	0.399	-	0.0860 J	<0.0227	0.0442 J	0.0635 J	-	0.0907 J
Calcium	mg/kg	484	1,400	-	48,400	1,000	33.8 J	271	-	3,550
Chromium	mg/kg	11.9	11.9	-	9.59	15.5	18.2	22.8	-	13.9
Cobalt	mg/kg	16.8	32.6	-	4.00	4.47	12.4	14.2	-	6.60
Copper	mg/kg	27.3	26.7	-	7.45	20.2	26.6	25.4	-	11.2
Lead	mg/kg	19.7	24.8	-	16.5	25.3	20.9	14.8	-	15.7
Lithium	mg/kg	38.2 J	54.3 J	-	11.7	16.1	25.8	37.4	-	15.2
Mercury	mg/kg	0.0214 J	<0.0165	-	0.107	0.0342 J	<0.0223	<0.0193	-	0.0568
Molybdenum	mg/kg	0.284 J	0.293 J	-	0.634 J	0.543 J	0.223 J	0.197 J	-	0.633 J
Nickel	mg/kg	24.3	36.5	-	6.75	14.1	27.0	30.8	-	11.1
Selenium	mg/kg	1.74	2.55	-	0.618 J	0.718	0.999	1.26	-	0.876
Silver	mg/kg	<0.0199	<0.0184	-	0.108 U*	<0.0187	<0.0189	<0.0196	-	<0.0198
Thallium	mg/kg	0.141 J	0.269	-	0.119 J	0.126 J	0.0908 J	0.0995 J	-	0.186
Vanadium	mg/kg	18.5	15.4	-	14.8	21.8	18.7	18.3	-	17.9
Zinc	mg/kg	64.2	110	-	22.0	36.0	66.9	91.4	-	39.0
Anions										
Chloride	mg/kg	<5.33	<5.30	-	<5.12	<5.02	<5.14	<5.27	-	<5.26
Fluoride	mg/kg	0.934 UJ	0.929 UJ	-	0.898 UJ	0.880 UJ	0.901 UJ	0.924 UJ	-	1.43 J
Sulfate	mg/kg	12.5 J	<9.28	-	<8.97	29.6	<9.00	<9.23	-	13.1 J
<b>General Chemistry</b>										
pH (lab)	SU	5.8	5.5	-	7.9	6.4	5.3	5.4	-	8.0
		See notes on last page.								

Sample Location			JSF-B0	611				JSF-BG12		
Sample Date		24-Jan-19	24-Jan-19	24-Jan-19	24-Jan-19	23-Jan-19	23-Jan-19	23-Jan-19	23-Jan-19	23-Jan-19
Sample ID		JSF-BS-BG11-1.1/3.1-20190124	JSF-BS-BG11-5.5/8.5-20190124	JSF-BS-FD01-20190124	JSF-BS-BG11-11.3/13.3-20190124	JSF-BS-BG12-0.0/0.5-20190123	JSF-BS-BG12-0.0/0.5-20190123	JSF-BS-BG12-0.8/2.8-20190123	JSF-BS-BG12-5.0/10.0-20190123	JSF-BS-BG12-10.75/12.75-20190123
Sample Depth		1.1 - 3.1 ft	5.5 - 8.5 ft	5.5 - 8.5 ft	11.3 - 13.3 ft	0 - 0.5 ft	0 - 0.5 ft	0.8 - 2.8 ft	5 - 10 ft	10.75 - 12.75 ft
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Field Duplicate Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample
Level of Review		Validated	Validated	Validated	Validated	Final-Verified	Validated	Validated	Validated	Validated
	Units									
PLM										
% ASH	%	-	-	-	-	2	-	-	-	-
Total Metals										
Antimony	mg/kg	0.154 J	<0.0786	<0.0813	0.0920 J	-	0.541	0.0876 J	0.0802 J	0.0899 J
Arsenic	mg/kg	6.19	3.71	4.80	2.55	-	4.90	4.21	1.21	1.75
Barium	mg/kg	86.0	33.1	43.8	119	-	41.3	100	83.7	92.0
Beryllium	mg/kg	0.910	0.430	0.619	1.09	-	0.759	1.42	0.739	1.13
Boron	mg/kg	1.92 J	0.989 J	<1.00	1.23 J	-	17.8	1.53 J	1.41 J	2.23 J
Cadmium	mg/kg	0.0688 J	<0.0215	0.0226 J	0.0673 J	-	0.122 J	<0.0203	0.0212 J	0.0925 J
Calcium	mg/kg	6,540	640	723	1,550	-	77,300	2,990	1,350	1,690
Chromium	mg/kg	11.8	9.99	11.7	13.2	-	8.01	11.9	10.5	12.8
Cobalt	mg/kg	10.1	4.40 J	8.20 J	11.5	-	4.56	11.1	3.73	7.30
Copper	mg/kg	8.29	6.26	6.17	9.87	-	13.3	5.28	5.98	10.5
Lead	mg/kg	15.4	9.91	12.7	10.3	-	16.6	10.3	8.62	9.57
Lithium	mg/kg	12.3	10.5	9.46	10.3	-	12.1	8.29	9.47	11.5
Mercury	mg/kg	0.0411	<0.0152	0.0235 J	<0.0184	-	0.0369 J	<0.0168	0.0472	0.0320 J
Molybdenum	mg/kg	0.480 U*	0.312 U*	0.383 U*	0.383 J	-	0.444 U*	0.585 U*	0.266 U*	0.580 U*
Nickel	mg/kg	10.3	7.25	7.37	12.9	-	9.76	9.28	7.04	11.6
Selenium	mg/kg	0.988	0.545 J	0.923	1.15	-	1.42	1.45	0.869	1.14
Silver	mg/kg	<0.0176	<0.0177	<0.0184	<0.0172	-	0.0224 U*	<0.0167	<0.0163	0.0209 U*
Thallium	mg/kg	0.0991 J	0.0878 J	0.0943 J	0.129	-	0.114 J	0.139	0.132	0.151
Vanadium	mg/kg	16.5	13.0	14.0	20.1	-	10.4	21.7	16.9	20.4
Zinc	mg/kg	36.6	22.5	23.0	39.1	-	35.9	25.0	26.2	42.1
Anions										
Chloride	mg/kg	<4.63	<4.64	<4.76	<4.48	-	<5.41	<4.57	<4.47	6.51 J
Fluoride	mg/kg	2.18 J	0.814 UJ	0.833 UJ	1.55 J	-	0.948 UJ	0.801 UJ	1.36 J	2.63 J
Sulfate	mg/kg	629	370	361	149	-	27.6	795	231	77.7
<b>General Chemistry</b>										
pH (lab)	SU	7.3	5.4	5.5	7.9	-	7.7	6.7	7.3	8.0
		See notes on last page.								



Sample Location		JSF-BG12				JSF-BG13			
Sample Date		23-Jan-19	8-Oct-19	7-Oct-19	7-Oct-19	7-Oct-19	7-Oct-19	7-Oct-19	7-Oct-19
Sample ID		JSF-BS-BG12-13.5/15.0-20190123	JSF-BS-BG13-0.0/0.5-20191008	JSF-BS-BG13-6.5/8.5-20191007	JSF-BS-BG13-1.5/3.5-20191007	JSF-BS-BG13-11.5/13.5-20191007	JSF-BS-BG13-16.5/18.5-20191007	JSF-BS-BG13-21.5/23.5-20191007	JSF-BS-BG13-26.5/28.5-20191007
Sample Depth		13.5 - 15 ft	0 - 0.5 ft	6.5 - 8.5 ft	1.5 - 3.5 ft	11.5 - 13.5 ft	16.5 - 18.5 ft	21.5 - 23.5 ft	26.5 - 28.5 ft
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample
Level of Review		Validated	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
	Units								
PLM									
% ASH	%	-	1	<1	<1	1	2	2	3
Total Metals									
Antimony	mg/kg	<0.0781	0.214 J	0.157 J	0.115 J	0.147 J	0.156 J	0.110 J	0.0791 UJ
Arsenic	mg/kg	1.16	3.45	5.17	3.46	3.28	3.95	3.08	1.34
Barium	mg/kg	41.4	74.9	160	74.6	161	193	140	59.1
Beryllium	mg/kg	0.478	1.03	1.56	1.01	1.50	1.65	1.34	0.785
Boron	mg/kg	1.17 J	5.51 J	3.09 J	3.15 J	3.72 J	3.85 J	3.85 J	3.64 J
Cadmium	mg/kg	0.0695 J	0.121 J	0.321	0.0961 J	0.308	0.284	0.285	0.0296 J
Calcium	mg/kg	623	7,850	1,850	1,100	3,390	2,820	2,060	1,410
Chromium	mg/kg	7.24	12.0	16.6	12.1	16.0	17.2	13.5	10.0
Cobalt	mg/kg	3.57	11.4	13.0	5.09	11.4	12.0	9.66	4.37
Copper	mg/kg	4.05	12.8	13.3	10.6	23.8	14.3	11.4	6.52
Lead	mg/kg	4.02	20.1	16.1	11.2	16.4	15.1	11.6	6.54
Lithium	mg/kg	4.86	16.9	24.7	17.0	22.1	28.2	22.6	12.2
Mercury	mg/kg	<0.0176	0.0371 J	0.0562	0.0385	0.0461	0.0350 J	0.0299 J	<0.0165
Molybdenum	mg/kg	0.209 U*	0.727	1.09	0.833	0.661	0.718	0.577 J	<0.208
Nickel	mg/kg	4.65	11.6	16.6	9.88	13.2	17.1	13.7	6.94
Selenium	mg/kg	0.576 J	0.258 J	0.152 J	0.203 J	0.367 J	<0.148	<0.145	0.283 J
Silver	mg/kg	<0.0176	<0.0351	<0.0325	< 0.0335	0.0422 J	0.0346 J	<0.0321	<0.0344
Thallium	mg/kg	0.0630 J	0.181	0.289	0.448	0.221	0.223	0.182	0.0859 J
Vanadium	mg/kg	8.96	25.4	27.3	25.8	22.7	24.1	18.6	10.3
Zinc	mg/kg	16.4	46.6	60.2	36.9	58.6	62.3	48.4	25.8
Anions									
Chloride	mg/kg	<4.77	<5.09	<4.56	<4.46	<4.74	<4.71	<4.78	<5.11
Fluoride	mg/kg	1.50 J	1.87	<0.800	<0.781	1.27	1.43	1.16 J	0.950 J
Sulfate	mg/kg	45.6	14.9	49.0	67.2	30.2	29.2	40.5	24.6
General Chemistr	У								
pH (lab)	SU	7.6	7.7	6.4	6.9	6.9	7.4	6.8	7.1
······		See notes on last page.							

						1				
Sample Location				JSF-B	G14				JSF-BG15	
Sample Date		8-Oct-19	8-Oct-19	8-Oct-19	8-Oct-19	8-Oct-19	8-Oct-19	8-Oct-19	8-Oct-19	8-Oct-19
Sample ID		JSF-BS-BG14-0.0/0.5-20191008	JSF-BS-BG14-3.0/5.0-20191008	JSF-BS-BG14-6.5/8.5-20191008	JSF-BS-BG14-11.5/13.5-20191008	JSF-BS-BG14-16.5/18.5-20191008	JSF-BS-BG14-21.5/23.5-20191008	JSF-BS-BG15-0.0/0.5-20191008	JSF-BS-BG15-1.5/3.5-20191008	JSF-BS-BG15-6.5/8.5-20191008
Sample Depth		0 - 0.5 ft	3-5ft	6.5 - 8.5 ft	11.5 - 13.5 ft	16.5 - 18.5 ft	21.5 - 23.5 ft	0 - 0.5 ft	1.5 - 3.5 ft	6.5 - 8.5 ft
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample
Level of Review	Units	Final-verified	Final-verified	Final-Verified	Final-verified	Final-verified	Final-verified	Final-verified	Final-verified	Final-Verified
PLM					•					
% ASH	%	1	2	1	<1	2	<1	3	3	2
Total Metals										
Antimony	mg/kg	0.210 J	0.172 J	0.210 J	0.170 J	0.112 J	0.0679 UJ	0.221 J	0.203 J	0.153 J
Arsenic	mg/kg	3.88	3.98	4.03	4.64	3.73	4.29	4.58	4.01	3.53
Barium	mg/kg	77.8	178	172	90.4	66.2	55.8	150	182	139
Beryllium	mg/kg	1.12	1.64	1.57	1.08	0.886	0.551	1.46	1.62	1.20
Boron	mg/kg	8.05 J	4.72 J	4.54 J	4.07 J	3.87 J	3.76 J	7.66 J	7.13 J	3.78 J
Cadmium	mg/kg	0.251	0.236	0.200	0.194	0.156	0.0315 J	0.282	0.260	0.182
Calcium	mg/kg	43,300	2,320	2,500	1,230	1,010	23,700	21,100	14,500	1,540
Chromium	mg/kg	11.4	16.0	17.4	13.2	10.5	10.1	17.2	17.1	12.0
Cobalt	mg/kg	7.88	12.2	13.5	10.1	7.33	9.35	11.1	12.7	8.84
Copper	mg/kg	11.5	11.0	14.7	10.7	8.35	7.79	13.5	16.3	8.87
Lead	mg/kg	35.7	15.0	15.9	12.7	9.18	7.76	27.1	16.1	10.2
Lithium	mg/kg	16.9	24.3	26.2	19.7	12.8	13.6	25.0	23.9	18.5
Mercury	mg/kg	0.0257 J	0.0564	0.0373 J	0.0495	0.0258 J	<0.0152	0.0345 J	0.0566	0.0767
Molybdenum	mg/kg	0.706	0.771	0.751	0.854	0.644	0.389 J	0.839	0.717	0.603
Nickel	mg/kg	11.8	15.8	17.6	14.1	10.9	16.3	17.3	18.7	13.9
Selenium	mg/kg	0.462 J	0.412 J	0.177 J	0.267 J	<0.149	0.145 J	0.654	0.507 J	0.255 J
Silver	mg/kg	0.0362 J	0.0416 J	0.0342 J	<0.0334	<0.0330	<0.0296	0.0447 J	0.0368 J	<0.0307
Thallium	mg/kg	0.356	0.217	0.231	0.167	0.122	0.0655 J	0.231	0.234	0.165
Vanadium	mg/kg	26.2	25.1	26.0	21.8	16.8	8.54	25.1	25.5	19.8
Zinc	mg/kg	45.6	51.2	57.7	41.6	32.1	31.4	71.5	61.7	38.8
Anions										
Chloride	mg/kg	<4.31	<4.54	<4.56	<4.55	<4.46	<4.43	<4.70	<4.54	<4.40
Fluoride	mg/kg	1.11 J	2.11	<0.799	0.847 J	0.792 J	1.00 J	2.13 J	3.68 J	1.30 J
Sulfate	mg/kg	9.91 J	50.6	22.2	37.0	23.0	52.2	10.6 J	28.9	19.4
General Chemistr	/									
pH (lab)	SU	7.8	7.5	7.0	6.8	6.9	8.0	7.7	7.9	7.3
		See notes on last page.								

Sample Location			JSF-	-BG15	
Sample Date Sample ID Samplo Dopth		8-Oct-19 JSF-BS-BG15-11.0/14.0-20191008	8-Oct-19 JSF-BS-DUP01-20191008 11 - 14 ft	8-Oct-19 JSF-BS-BG15-16.5/18.5-20191008	8-Oct-19 JSF-BS-BG15-21.5/23.5-20191008 21 5 - 23 5 #
Sample Depth		Normal Environmental Sample	Field Dunlicate Sample	Normal Environmental Sample	Normal Environmental Sample
Level of Review		Final-Verified	Final-Verified	Final-Verified	Final-Verified
	Units		r mar vormou		i mai vormoa
PLM					
% ASH	%	1	-	2	2
Total Metals					
Antimony	mg/kg	0.106 J	0.150 J	0.145 J	0.112 J
Arsenic	mg/kg	4.33	4.25	4.46	4.91
Barium	mg/kg	121	114	103	29.9
Beryllium	mg/kg	1.29	1.27	1.18	0.572
Boron	mg/kg	4.94 J	3.70 J	4.08 J	3.28 J
Cadmium	mg/kg	0.187	0.198	0.209	0.0768 J
Calcium	mg/kg	1,360	1,160	1,160	593
Chromium	mg/kg	13.1	11.9	12.2	11.7
Cobalt	mg/kg	11.5	9.51	9.14	4.79
Copper	mg/kg	11.4	10.3	10.0	5.79
Lead	mg/kg	13.3	11.4	10.8	6.48
Lithium	mg/kg	24.0	20.4	19.5	7.50
Mercury	mg/kg	0.0625	0.0666	0.0628	<0.0152
Molybdenum	mg/kg	0.830	0.748	0.719	0.516 J
Nickel	mg/kg	15.2	16.8	15.6	11.2
Selenium	mg/kg	<0.152	<0.147	0.254 J	<0.145
Silver	mg/kg	<0.0337	<0.0325	<0.0345	<0.0321
Thallium	mg/kg	0.181	0.183	0.161	0.0813 J
Vanadium	mg/kg	22.3	20.5	20.7	10.7
Zinc	mg/kg	49.6	42.8	42.4	21.4
Anions					
Chloride	mg/kg	<4.89	<4.74	<4.71	<4.48
Fluoride	mg/kg	0.946 J	1.10 J	0.826 UJ	0.811 J
Sulfate	mg/kg	44.6	51.7	44.2	12.2
General Chemist	ry				
pH (lab)	SU	6.9	6.7	6.1	7.4

Notes:	
<0.03	analyte was not detected at a concentration greater than the Method Detection Limit
-	parameter not analyzed / not available
%	percent
ft	feet below ground surface
ID	identification
J	quantitation is approximate due to limitations identified during data validation
mg/kg	milligrams per kilogram
PLM	Polarized Light Microscope - analysis for % ash
SU	Standard Unit
U*	this result should be considered "not detected" because it was detected in an associated field or laboratory blank at a similar level
UJ	this compound was not detected, but the reporting or detection limit should be considered estimated due to a bias identified during data validation
UR	unreliable reporting or detection limit; compound may or may not be present in sample.

1. Level of review is defined in the Quality Assurance Project Plan.

2. Non-detect (ND) results reported by RJ Lee Group for percent (%) ash expressed as <1 in table.

3. The 0-0.5 foot sample was collected using a hand auger when accessible during the drilling operations at that boring location; it may or may not have been the first sample obtained and thus could have a different sample date.

4. Level of review for % ash samples is Final-Verified.

Sample Date 2 Sample ID JSF-BS-JSF10	I-Jan-19 29-Jan-19 16-9.0/12.0-20190124 JSF BS JSF110 9.9/12.0 20	5-Feb-19	5-Feb-19	5-Feb-19	5 Eab 19	4 Eab 10	
Sample ID JSF-BS-JSF10	6-9.0/12.0-20190124 JSF BS JSF110 9.9/12.0 20				3-160-13	4-rep-19	4-Feb-19
Comula Danth		1190129 JSF-BS-BG01AL1-0.0/0.5-20190205	JSF-BS-BG01ALT-0.5/2.5-20190205	JSF-BS-BG01ALT-6.8/8.8-20190205	JSF-BS-BG01ALT-10.0/12.4-20190205	JSF-BS-BG02ALT-0.0/0.5-20190204	JSF-BS-FD03-20190204
Sample Depth	9 - 12 ft 9.9 - 12 ft	0 - 0.5 ft	0.5 - 2.5 ft	6.8 - 8.8 ft	10 - 12.4 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Type Normal Envi	ronmental Sample Normal Environmental Sa	mple Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Field Duplicate Sample
Level of Review Fin	al-Verified Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
Units							
Radiological Parameters							
Radium-226 pCi/g 0.90	2 +/-(0.233) 0.440 +/-(0.120)	0.124 +/-(0.103)U	1.06 +/-(0.256)	0.828 +/-(0.196)	0.598 +/-(0.222)	0.993 +/-(0.262)	0.921 +/-(0.227)
Radium-228 pCi/g 1.67	+/-(0.370) 0.697 +/-(0.260)	-0.0110 +/-(0.176)U	0.536 +/-(0.204)	0.952 +/-(0.312)	1.54 +/-(0.327)	1.04 +/-(0.342)	0.916 +/-(0.290)
Radium-226+228 pCi/g 2.52	+/-(0.437) 1.14 +/-(0.286)	0.124 +/-(0.204)U	1.60 +/-(0.327)	1.78 +/-(0.368)	2.14 +/-(0.395)	2.03 +/-(0.431)	1.84 +/-(0.368)



Sample Location			JSF-BG0	ZALT				JSF-BG03		
Sample Date		4-Feb-19	4-Feb-19	4-Feb-19	4-Feb-19	29-Jan-19	29-Jan-19	29-Jan-19	29-Jan-19	29-Jan-19
Sample ID		JSF-BS-BG02ALT-0.9/2.9-20190204	JSF-BS-BG02ALT-5.9/7.9-20190204	JSF-BS-BG02ALT-11.5/13.5-20190204	JSF-BS-BG02ALT-16.5/18.5-20190204	JSF-BS-BG03-0.0/0.5-20190129	JSF-BS-BG03-1.5/3.5-20190129	JSF-BS-BG03-5.0/6.6-20190129	JSF-BS-BG03-7.2/9.2-20190129	JSF-BS-BG03-11.5/13.5-20190129
Sample Depth		0.9 - 2.9 ft	5.9 - 7.9 ft	11.5 - 13.5 ft	16.5 - 18.5 ft	0 - 0.5 ft	1.5 - 3.5 ft	5 - 6.6 ft	7.2 - 9.2 ft	11.5 - 13.5 ft
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample
Level of Review		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
	Units									
Radiological Parameter	ſS	•								
Radium-226	pCi/g	0.913 +/-(0.213)	0.486 +/-(0.156)	1.16 +/-(0.277)	1.06 +/-(0.252)	0.208 +/-(0.132)U	0.914 +/-(0.259)	0.574 +/-(0.200)	0.774 +/-(0.255)	0.893 +/-(0.267)
Radium-228	pCi/g	1.05 +/-(0.281)	0.636 +/-(0.335)	1.65 +/-(0.317)	1.58 +/-(0.362)	1.32 +/-(0.272)	1.52 +/-(0.326)	1.14 +/-(0.252)	2.05 +/-(0.369)	1.50 +/-(0.380)
Radium-226+228	pCi/g	1.96 +/-(0.353)	1.12 +/-(0.370)	2.81 +/-(0.421)	2.64 +/-(0.441)	1.53 +/-(0.302)J	2.43 +/-(0.416)	1.71 +/-(0.322)	2.82 +/-(0.449)	2.39 +/-(0.464)
		See notes on last name								



Sample Location				JSF-BG04ALT			JSF-BG05ALT				
Sample Date		30-Jan-19	30-Jan-19	30-Jan-19	30-Jan-19	30-Jan-19	31-Jan-19	31-Jan-19	31-Jan-19		
Sample ID		JSF-BS-BG04ALT-0.0/0.5-20190130	JSF-BS-BG04ALT-0.9/2.9-20190130	JSF-BS-BG04ALT-7.2/9.2-20190130	JSF-BS-BG04ALT-15.5/18.5-20190130	JSF-BS-FD02-20190130	JSF-BS-BG05ALT-0.0/0.5-20190131	JSF-BS-BG05ALT-1.3/3.3-20190131	JSF-BS-BG05ALT-6.0/8.0-20190131		
Sample Depth		0 - 0.5 ft	0.9 - 2.9 ft	7.2 - 9.2 ft	15.5 - 18.5 ft	15.5 - 18.5 ft	0 - 0.5 ft	1.3 - 3.3 ft	6 - 8 ft		
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Field Duplicate Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample		
Level of Review		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified		
	Units										
Radiological Paramete	ers	-									
Radium-226	pCi/g	0.747 +/-(0.185)	0.722 +/-(0.228)	0.375 +/-(0.155)	0.772 +/-(0.311)	0.817 +/-(0.220)	0.849 +/-(0.200)	0.837 +/-(0.298)	0.543 +/-(0.218)		
Radium-228	pCi/g	0.630 +/-(0.210)	1.30 +/-(0.335)	0.483 +/-(0.210)	1.54 +/-(0.455)	1.68 +/-(0.471)	0.990 +/-(0.412)	1.27 +/-(0.524)	0.965 +/-(0.246)		
Radium-226+228	pCi/g	1.38 +/-(0.280)	2.02 +/-(0.405)	0.858 +/-(0.261)	2.31 +/-(0.551)	2.50 +/-(0.520)	1.84 +/-(0.458)	2.11 +/-(0.603)	1.51 +/-(0.329)		
		See notes on last name									

last page.



Sample Logation	1	1		GOGAL T			ISE	BC07	
Sample Date		1-Feb-19	1-Feb-19	1-Feb-19	1-Feb-19	29-Jan-19	29-Jan-19	29-Jan-19	29-Jan-19
Sample ID		JSF-BS-BG06ALT-0.0/0.5-20190201	JSF-BS-BG06ALT-1.5/3.5-20190201	JSF-BS-BG06ALT-6.5/8.5-20190201	JSF-BS-BG06ALT-11.2/13.2-20190201	JSF-BS-BG07-0.0/0.5-20190129	JSF-BS-BG07-1.4/4.1-20190129	JSF-BS-BG07-6.2/8.2-20190129	JSF-BS-BG07-11.0/14.0-20190129
Sample Depth		0 - 0.5 ft	1.5 - 3.5 ft	6.5 - 8.5 ft	11.2 - 13.2 ft	0 - 0.5 ft	1.4 - 4.1 ft	6.2 - 8.2 ft	11 - 14 ft
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample
Level of Review		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
	Units								
Radiological Parameters	;								
Radium-226	pCi/g	0.790 +/-(0.209)	0.845 +/-(0.259)	0.743 +/-(0.247)	0.749 +/-(0.214)	0.289 +/-(0.131)	0.778 +/-(0.193)	0.786 +/-(0.196)	0.973 +/-(0.241)
Radium-228	pCi/g	1.24 +/-(0.346)	1.30 +/-(0.411)	1.71 +/-(0.408)	1.76 +/-(0.409)	0.303 +/-(0.150)	1.08 +/-(0.237)	1.42 +/-(0.306)	1.69 +/-(0.391)
Radium-226+228	pCi/g	2.03 +/-(0.404)	2.15 +/-(0.486)	2.45 +/-(0.477)	2.51 +/-(0.462)	0.592 +/-(0.199)	1.86 +/-(0.306)	2.21 +/-(0.363)	2.66 +/-(0.459)
		See notes on last name							



Sample Location	1	JSF-BG08					JSF-BG09				
Sample Date Sample ID Sample Depth Sample Type Level of Review	Units	28-Jan-19 JSF-BS-BG08-0.0/0.5-20190128 0 - 0.5 ft Normal Environmental Sample Final-Verified	28-Jan-19 JSF-BS-BG08-2.0/4.0-20190128 2 - 4 ft Normal Environmental Sample Final-Verified	28-Jan-19 JSF-BS-BG08-6.5/8.5-20190128 6.5 - 8.5 ft Normal Environmental Sample Final-Verified	28-Jan-19 JSF-BS-BG08-11.5/13.5-20190128 11.5 - 13.5 ft Normal Environmental Sample Final-Verified	28-Jan-19 JSF-BS-BG08-16.5/18.5-20190128 16.5 - 18.5 ft Normal Environmental Sample Final-Verified	25-Jan-19 JSF-BS-BG09-0.0/0.5-20190125 0 - 0.5 ft Normal Environmental Sample Final-Verified	25-Jan-19 JSF-BS-BG09-1.0/4.0-20190125 1 - 4 ft Normal Environmental Sample Final-Verified	25-Jan-19 JSF-BS-BG09-6.1/8.1-20190125 6.1 - 8.1 ft Normal Environmental Sample Final-Verified	25-Jan-19 JSF-BS-BG09-10.0/11.7-20190125 10 - 11.7 ft Normal Environmental Sample Final-Verified	
Radiological Parameter	S	-									
Radium-226 Radium-228 Radium-226+228	pCi/g pCi/g pCi/g	0.626 +/-(0.215) 0.989 +/-(0.336) 1.62 +/-(0.399)	0.947 +/-(0.219) 1.23 +/-(0.311) 2.18 +/-(0.380)	1.08 +/-(0.310) 1.48 +/-(0.345) 2.56 +/-(0.464)	0.565 +/-(0.187) 1.16 +/-(0.309) 1.73 +/-(0.361)	0.416 +/-(0.160) 0.754 +/-(0.203) 1.17 +/-(0.258)	0.175 +/-(0.329)U 0.768 +/-(0.258) 0.943 +/-(0.418)J	0.860 +/-(0.223) 1.03 +/-(0.296) 1.89 +/-(0.371)	0.512 +/-(0.177) 1.15 +/-(0.324) 1.66 +/-(0.369)	0.594 +/-(0.212) 1.08 +/-(0.292) 1.67 +/-(0.361)	
		See notes on last name									



Sample Location		JSF-B	G09		JSF	-BG10		JSF-BG11				
Sample Date		25-Jan-19	25-Jan-19	24-Jan-19	24-Jan-19	24-Jan-19	24-Jan-19	24-Jan-19	24-Jan-19	24-Jan-19		
Sample ID		JSF-BS-BG09-12.7/14.7-20190125	JSF-BS-BG09-16.1/18.1-20190125	JSF-BS-BG10-0.0/0.5-20190124	JSF-BS-BG10-1.4/3.4-20190124	JSF-BS-BG10-6.5/8.5-20190124	JSF-BS-BG10-10.5/12.5-20190124	JSF-BS-BG11-0.0/0.5-20190124	JSF-BS-BG11-1.1/3.1-20190124	JSF-BS-BG11-5.5/8.5-20190124		
Sample Depth		12.7 - 14.7 ft	16.1 - 18.1 ft	0 - 0.5 ft	1.4 - 3.4 ft	6.5 - 8.5 ft	10.5 - 12.5 ft	0 - 0.5 ft	1.1 - 3.1 ft	5.5 - 8.5 ft		
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample		
Level of Review		Final-Verified	Final-Verified	Validated	Validated	Validated	Validated	Validated	Validated	Validated		
	Units											
<b>Radiological Parameters</b>		•										
Radium-226	pCi/g	0.842 +/-(0.232)	1.53 +/-(0.354)	0.927 +/-(0.239)	0.647 +/-(0.205)	1.35 +/-(0.300)	0.780 +/-(0.256)	0.737 +/-(0.204)	0.829 +/-(0.226)	0.897 +/-(0.198)		
Radium-228	pCi/g	1.26 +/-(0.360)	2.28 +/-(0.526)	0.538 +/-(0.284)U	1.56 +/-(0.310)	2.37 +/-(0.503)	1.75 +/-(0.385)	1.30 +/-(0.436)	1.53 +/-(0.314)	1.43 +/-(0.283)		
Radium-226+228	pCi/g	2.10 +/-(0.428)	3.81 +/-(0.634)	1.47 +/-(0.371)J	2.21 +/-(0.372)	3.72 +/-(0.586)	2.53 +/-(0.462)	2.04 +/-(0.481)	2.36 +/-(0.387)	2.33 +/-(0.345)		
		Cas notes on last nore										



-	-		-
Page	6	ot	9

O-marks I	1		PC11	1									
Sample Location		J3F	-0011			J3F-D012			JSF-BG13				
Sample Date		24-Jan-19	24-Jan-19	23-Jan-19	23-Jan-19	23-Jan-19	23-Jan-19	23-Jan-19	8-Oct-19	7-Oct-19			
Sample ID		JSF-BS-FD01-20190124	JSF-BS-BG11-11.3/13.3-20190124	JSF-BS-BG12-0.0/0.5-20190123	JSF-BS-BG12-0.8/2.8-20190123	JSF-BS-BG12-5.0/10.0-20190123	JSF-BS-BG12-10.75/12.75-20190123	JSF-BS-BG12-13.5/15.0-20190123	JSF-BS-BG13-0.0/0.5-20191008	JSF-BS-BG13-1.5/3.5-20191007			
Sample Depth		5.5 - 8.5 ft	11.3 - 13.3 ft	0 - 0.5 ft	0.8 - 2.8 ft	5 - 10 ft	10.75 - 12.75 ft	13.5 - 15 ft	0 - 0.5 ft	1.5 - 3.5 ft			
Sample Type		Field Duplicate Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample			
Level of Review		Validated	Validated	Validated	Validated	Validated	Validated	Validated	Final-Verified	Final-Verified			
	Units												
<b>Radiological Parameters</b>													
Radium-226	pCi/g	0.872 +/-(0.234)	0.820 +/-(0.185)	0.254 +/-(0.149)U	1.08 +/-(0.304)	0.603 +/-(0.233)	0.779 +/-(0.213)	0.752 +/-(0.223)	0.920 +/-(0.207)	1.01 +/-(0.216)			
Radium-228	pCi/g	1.22 +/-(0.348)	1.37 +/-(0.278)	0.744 +/-(0.250)	1.60 +/-(0.418)	1.57 +/-(0.328)	1.26 +/-(0.265)	1.04 +/-(0.273)	1.09 +/-(0.277)	1.80 +/-(0.365)			
Radium-226+228	pCi/g	2.09 +/-(0.419)	2.19 +/-(0.334)	0.998 +/-(0.291)J	2.68 +/-(0.517)	2.17 +/-(0.402)	2.04 +/-(0.340)	1.79 +/-(0.353)	2.01 +/-(0.346)	2.81 +/-(0.424)			
		See notes on last page											



Sample Location				JSF-BG13		JSF-BG14					
Sample Date		7-Oct-19	7-Oct-19	7-Oct-19	7-Oct-19	7-Oct-19	8-Oct-19	8-Oct-19	8-Oct-19	8-Oct-19	
Sample ID		JSF-BS-BG13-6.5/8.5-20191007	JSF-BS-BG13-11.5/13.5-20191007	JSF-BS-BG13-16.5/18.5-20191007	JSF-BS-BG13-21.5/23.5-20191007	JSF-BS-BG13-26.5/28.5-20191007	JSF-BS-BG14-0.0/0.5-20191008	JSF-BS-BG14-3.0/5.0-20191008	JSF-BS-BG14-6.5/8.5-20191008	JSF-BS-BG14-11.5/13.5-20191008	
Sample Depth		6.5 - 8.5 ft	11.5 - 13.5 ft	16.5 - 18.5 ft	21.5 - 23.5 ft	26.5 - 28.5 ft	0 - 0.5 ft	3 - 5 ft	6.5 - 8.5 ft	11.5 - 13.5 ft	
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	
Level of Review		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	
	Units										
Radiological Parameter	s										
Radium-226	pCi/g	1.63 +/-(0.315)	1.03 +/-(0.213)	1.51 +/-(0.267)	0.880 +/-(0.190)	1.24 +/-(0.306)	0.569 +/-(0.206)	1.35 +/-(0.251)	1.13 +/-(0.224)	1.08 +/-(0.240)	
Radium-228	pCi/g	1.97 +/-(0.383)	1.90 +/-(0.338)	1.52 +/-(0.356)	1.34 +/-(0.257)	1.61 +/-(0.443)	0.842 +/-(0.286)	1.54 +/-(0.297)	1.40 +/-(0.251)	1.19 +/-(0.289)	
Radium-226+228	pCi/g	3.60 +/-(0.496)	2.93 +/-(0.400)	3.03 +/-(0.445)	2.22 +/-(0.320)	2.85 +/-(0.538)	1.41 +/-(0.352)	2.89 +/-(0.389)	2.53 +/-(0.336)	2.27 +/-(0.376)	



Sample Location Sample Date Sample ID Sample Depth Sample Type Level of Review	Units	JSF- 8-Oct-19 JSF-BS-BG14-16.5/18.5-20191008 16.5 - 18.5 ft Normal Environmental Sample Final-Verified	BG14 8-Oct-19 JSF-BS-BG14-21.5/23.5-20191008 21.5 - 23.5 ft Normal Environmental Sample Final-Verified	8-Oct-19 JSF-BS-BG15-0.0/0.5-20191008 0 - 0.5 ft Normal Environmental Sample Final-Verified	8-Oct-19 JSF-BS-BG15-1.5/3.5-20191008 1.5 - 3.5 ft Normal Environmental Sample Final-Verified	8-Oct-19 JSF-BS-BG15-6.5/8.5-20191008 6.5 - 8.5 ft Normal Environmental Sample Final-Verified	JSF-BG15 8-Oct-19 JSF-BS-BG15-11.0/14.0-20191008 11 - 14 ft Normal Environmental Sample Final-Verified	8-Oct-19 JSF-BS-DUP01-20191008 11 - 14 ft Field Duplicate Sample Final-Verified	8-Oct-19 JSF-BS-BG15-16.5/18.5-20191008 16.5 - 18.5 ft Normal Environmental Sample Final-Verified	8-Oct-19 JSF-BS-BG15-21.5/23.5-20191008 21.5 - 23.5 ft Normal Environmental Sample Final-Verified
Radiological Parameters		-								
Radium-226	pCi/g	0.996 +/-(0.225)	0.546 +/-(0.129)	0.993 +/-(0.249)	1.54 +/-(0.276)	1.34 +/-(0.235)	1.16 +/-(0.261)	1.13 +/-(0.234)	1.03 +/-(0.205)	0.727 +/-(0.177)
Radium-228	pCi/g	1.28 +/-(0.260)	0.733 +/-(0.240)	1.17 +/-(0.289)	1.40 +/-(0.266)	1.59 +/-(0.302)	1.52 +/-(0.368)	1.57 +/-(0.324)	1.66 +/-(0.331)	0.931 +/-(0.217)
Radium-226+228	pCi/g	2.28 +/-(0.344)	1.28 +/-(0.272)	2.16 +/-(0.381)	2.94 +/-(0.383)	2.93 +/-(0.383)	2.68 +/-(0.451)	2.70 +/-(0.400)	2.69 +/-(0.389)	1.66 +/-(0.280)

#### Notes:

ft	feet below ground surface
ID	identification
J	quantitation is approximate due to limitations identified during data validation
pCi/g	picoCurie per gram
U	not detected

1. Level of review is defined in the Quality Assurance Project Plan.

2. The 0-0.5 foot sample was collected using a hand auger when accessible during the drilling operations at that boring location; it may or may not have been the first sample obtained and thus could have a different sample date.

#### TABLE B.4 - Soil Field pH Results John Sevier Fossil Plant January - October 2019

Sample Location	Sample ID	Sample Date	Sample Depth	pH (field)
		-		SU
JSF-106	JSF-BS-JSF106-9.0/12.0-20190124	24-Jan-19	9 - 12 ft	6.67
JSF-110	JSF_BS_JSF110_9.9/12.0_20190129	29-Jan-19	9.9 - 12 ft	3.86
	JSF-BS-BG01ALT-0.0/0.5-20190205	5-Feb-19	0 - 0.5 ft	8.92
JSE-BG01ALT	JSF-BS-BG01ALT-0.5/2.5-20190205	5-Feb-19	0.5 - 2.5 ft	6.02
bol boomer	JSF-BS-BG01ALT-6.8/8.8-20190205	5-Feb-19	6.8 - 8.8 ft	6.15
	JSF-BS-BG01ALT-10.0/12.4-20190205	5-Feb-19	10 - 12.4 ft	6.02
	JSF-BS-BG02ALT-0.0/0.5-20190204	4-Feb-19	0 - 0.5 ft	5.10
	JSF-BS-BG02ALT-0.9/2.9-20190204	4-Feb-19	0.9 - 2.9 ft	5.30
JSF-BG02ALT	JSF-BS-BG02ALT-5.9/7.9-20190204	4-Feb-19	5.9 - 7.9 ft	4.55
	JSF-BS-BG02ALT-11.5/13.5-20190204	4-Feb-19	11.5 - 13.5 ft	5.63
	JSF-BS-BG02ALT-16.5/18.5-20190204	4-Feb-19	16.5 - 18.5 ft	6.98
	JSF-BS-BG03-0.0/0.5-20190129	29-Jan-19	0 - 0.5 ft	6.03
	JSF-BS-BG03-1.5/3.5-20190129	29-Jan-19	1.5 - 3.5 ft	4.86
JSF-BG03	JSF-BS-BG03-5.0/6.6-20190129	29-Jan-19	5 - 6.6 ft	4.74
	JSF-BS-BG03-7.2/9.2-20190129	29-Jan-19	7.2 - 9.2 ft	4.83
	JSF-BS-BG03-11.5/13.5-20190129	29-Jan-19	11.5 - 13.5 ft	5.01
	JSF-BS-BG04ALT-0.0/0.5-20190130	30-Jan-19	0 - 0.5 ft	8.41
	JSF-BS-BG04ALT-0.9/2.9-20190130	30-Jan-19	0.9 - 2.9 ft	6.43
JOF-BOU4ALT	JSF-BS-BG04ALT-7.2/9.2-20190130	30-Jan-19	7.2 - 9.2 ft	5.45
	JSF-BS-BG04ALT-15.5/18.5-20190130	30-Jan-19	15.5 - 18.5 ft	5.04
	JSF-BS-BG05ALT-0.0/0.5-20190131	31-Jan-19	0 - 0.5 ft	6.43
JSF-BG05ALT	JSF-BS-BG05ALT-1.3/3.3-20190131	31-Jan-19	1.3 - 3.3 ft	5.26
	JSF-BS-BG05ALT-6.0/8.0-20190131	31-Jan-19	6 - 8 ft	6.79
	JSF-BS-BG06ALT-0.0/0.5-20190201	1-Feb-19	0 - 0.5 ft	8.17
	JSF-BS-BG06ALT-1.5/3.5-20190201	1-Feb-19	1.5 - 3.5 ft	4.64
JSF-BG00ALT	JSF-BS-BG06ALT-6.5/8.5-20190201	1-Feb-19	6.5 - 8.5 ft	4.78
	JSF-BS-BG06ALT-11.2/13.2-20190201	1-Feb-19	11.2 - 13.2 ft	5.00
	JSF-BS-BG07-0.0/0.5-20190129	29-Jan-19	0 - 0.5 ft	7.54
	JSF-BS-BG07-1.4/4.1-20190129	29-Jan-19	1.4 - 4.1 ft	6.81
JSF-BG0/	JSF-BS-BG07-6.2/8.2-20190129	29-Jan-19	6.2 - 8.2 ft	4.72
	JSF-BS-BG07-11.0/14.0-20190129	29-Jan-19	11 - 14 ft	5.41
	JSF-BS-BG08-0.0/0.5-20190128	28-Jan-19	0 - 0.5 ft	7.25
	JSF-BS-BG08-2.0/4.0-20190128	28-Jan-19	2 - 4 ft	6.86
JSF-BG08	JSF-BS-BG08-6.5/8.5-20190128	28-Jan-19	6.5 - 8.5 ft	5.68
	JSF-BS-BG08-11.5/13.5-20190128	28-Jan-19	11.5 - 13.5 ft	6.62
	JSF-BS-BG08-16.5/18.5-20190128	28-Jan-19	16.5 - 18.5 ft	6.24
	JSF-BS-BG09-0.0/0.5-20190125	25-Jan-19	0 - 0.5 ft	8.80
	JSF-BS-BG09-1.0/4.0-20190125	25-Jan-19	1 - 4 ft	8.15
105 0.000	JSF-BS-BG09-6.1/8.1-20190125	25-Jan-19	6.1 - 8.1 ft	5.99
JSF-BG09	JSF-BS-BG09-10.0/11.7-20190125	25-Jan-19	10 - 11.7 ft	4.85
	JSF-BS-BG09-12.7/14.7-20190125	25-Jan-19	12.7 - 14.7 ft	5.50
	JSF-BS-BG09-16.1/18.1-20190125	25-Jan-19	16.1 - 18.1 ft	5.76
	JSF-BS-BG10-0.0/0.5-20190124	24-Jan-19	0 - 0.5 ft	6.89
	JSF-BS-BG10-1.4/3.4-20190124	24-Jan-19	1.4 - 3.4 ft	6.30
JSF-BG10	JSF-BS-BG10-6.5/8.5-20190124	24-Jan-19	6.5 - 8.5 ft	5.24
	JSF-BS-BG10-10.5/12.5-20190124	24-Jan-19	10.5 - 12.5 ft	5.31
	JSF-BS-BG11-0.0/0.5-20190124	24-Jan-19	0 - 0.5 ft	7.28
	JSF-BS-BG11-1.1/3.1-20190124	24-Jan-19	1.1 - 3.1 ft	6.58
JSF-BG11	JSF-BS-BG11-5.5/8.5-20190124	24-Jan-19	5.5 - 8.5 ft	6.28
	JSF-BS-BG11-11 3/13 3-20190124	24-Jan-19	11.3 - 13.3 ft	6.54
	001 00-0011-11.0/10.0-20130124	2-7-0dil-13	11.0 - 10.0 IL	0.04

#### TABLE B.4 - Soil Field pH Results John Sevier Fossil Plant January - October 2019

Sample Location	Sample ID	Sample Date	Sample Depth	pH (field)
				SU
	JSF-BS-BG12-0.0/0.5-20190123	23-Jan-19	0 - 0.5 ft	7.84
	JSF-BS-BG12-0.8/2.8-20190123	23-Jan-19	0.8 - 2.8 ft	7.04
JSF-BG12	JSF-BS-BG12-5.0/10.0-20190123	23-Jan-19	5 - 10 ft	6.73
	JSF-BS-BG12-10.75/12.75-20190123	23-Jan-19	10.75 - 12.75 ft	6.80
	JSF-BS-BG12-13.5/15.0-20190123	23-Jan-19	13.5 - 15 ft	7.07
	JSF-BS-BG13-0.0/0.5-20191008	8-Oct-19	0 - 0.5 ft	6.87
	JSF-BS-BG13-1.5/3.5-20191007	7-Oct-19	1.5 - 3.5 ft	7.22
	JSF-BS-BG13-6.5/8.5-20191007	7-Oct-19	6.5 - 8.5 ft	6.30
JSF-BG13	JSF-BS-BG13-11.5/13.5-20191007	7-Oct-19	11.5 - 13.5 ft	6.58
	JSF-BS-BG13-16.5/18.5-20191007	7-Oct-19	16.5 - 18.5 ft	6.85
	JSF-BS-BG13-21.5/23.5-20191007	7-Oct-19	21.5 - 23.5 ft	7.06
	JSF-BS-BG13-26.5/28.5-20191007	7-Oct-19	26.5 - 28.5 ft	7.15
	JSF-BS-BG14-0.0/0.5-20191008	8-Oct-19	0 - 0.5 ft	8.56
	JSF-BS-BG14-3.0/5.0-20191008	8-Oct-19	3 - 5 ft	6.88
	JSF-BS-BG14-6.5/8.5-20191008	8-Oct-19	6.5 - 8.5 ft	6.65
J3F-DG14	JSF-BS-BG14-11.5/13.5-20191008	8-Oct-19	11.5 - 13.5 ft	6.87
	JSF-BS-BG14-16.5/18.5-20191008	8-Oct-19	16.5 - 18.5 ft	6.55
	JSF-BS-BG14-21.5/23.5-20191008	8-Oct-19	21.5 - 23.5 ft	9.67
	JSF-BS-BG15-0.0/0.5-20191008	8-Oct-19	0 - 0.5 ft	5.11
	JSF-BS-BG15-1.5/3.5-20191008	8-Oct-19	1.5 - 3.5 ft	9.14
	JSF-BS-BG15-6.5/8.5-20191008	8-Oct-19	6.5 - 8.5 ft	5.54
JOF-DO 10	JSF-BS-BG15-11.0/14.0-20191008	8-Oct-19	11 - 14 ft	4.99
	JSF-BS-BG15-16.5/18.5-20191008	8-Oct-19	16.5 - 18.5 ft	4.98
	JSF-BS-BG15-21.5/23.5-20191008	8-Oct-19	21.5 - 23.5 ft	4.90

#### Notes:

ft	feet below ground surface
ID	identification
SU	Standard Unit

# **APPENDIX C - SUBSURFACE LOGS**

#### Subsurface Boring Legend

#### **Lithology Graphics**

Symbol	Lithology
	Fill
	Top Soil
07070700 0000000 0700000 07070700	Gravel
0 0 0 0 0 0 0 0 0 0 0 0	Well Graded Gravel (GW)
0 0 0 0 9 0 0 0 0 0 0	Poorly Graded Gravel (GP)
	Silty Gravel (GM)
	Silty, Clayey Gravel (GC-GM)
	Clayey Gravel (GC)
	Well Graded Gravel with Silt (GW-GM)
	Well Graded Gravel with Clay (GW-GC)
	Poorly Graded Gravel with Silt (GP-GM)
	Poorly Graded Gravel with Clay (GP-GC)
• • • • •	Well Graded Sand (SW)
	Poorly Graded Sand (SP)
	Silty Sand (SM)
	Silty, Clayey Sand (SC-SM)
	Clayey Sand (SC)
	Well Graded Sand with Silt (SW-SM)
$\cdot \cdot \square$	Well Graded Sand with Clay (SW-SC)
	Poorly Graded Sand with Silt (SP-SM)
$\boxed{\vdots}$	Poorly Graded Sand with Clay (SP-SC)
	Silt (ML)
	Silty Clay (CL-ML)
	Lean Clay (CL)
	Organic Silt (OL)
	Elastic Silt (MH)
	Fat Clay (CH)
	Organic Clay (OH)
	Shale
× × × × × × × × × × × × × × × × × × ×	Siltstone
	Coal
	Limestone
· · · · · · · · · · · · · · · · · · ·	Sandstone

**Other Graphics** 

Symbol	Description
	Denotes environmental analytical sample interval
	Denotes SS sample interval
	Denotes ST sample interval
	Denotes DP sample interval
	Denotes RS sample interval
	Denotes RC sample interval
Ā	First water level reading
Ţ	Second water level reading
<u> </u>	mmon Abbroviationa

#### **Common Abbreviations**

Abbreviation	Definition					
DP	Direct Push					
HA	Hand Auger					
HSA	Hollow Stem Auger					
N/A	Not Applicable					
NR	Not Recorded					
RC	Rock Core					
RQD	Rock Quality Designation					
RS	Rotary Sonic					
SS	Split Spoon					
ST	Shelby Tube					
WH	Weight of Hammer					
WR	Weight of Rod					

#### **General Notes**

The boring logs include sample numbering used during drilling. For assigned Environmental Analytical Sample ID numbers, see relevant Environmental Chain-of- Custody forms from the drilling date range listed on each log.

For pH readings and additional field data, see applicable field documentation (e.g., Soil pH Data Form) from the drilling date range listed on each log.

Lithology Graphics are based on TVA drafting standards.





Cli	ent E	Borehole	ID _N/A	Ą	S	stantec Boring	g No	D. JSF-	106			
Client Tennessee Valley Authority					В	Boring Location 733,018.92 N; 2,887,105.85 E NAD27 Plant Lo				' Plant Local		
Project Number 175568225					S	urface Eleva	ation	1094.8 ft	Elevatio	on D	Datum	NGVD29
Pro	oject	Name	JSF TE	DEC Order	D	ate Started		1/23/19	Comple	eted	1/24/	19
Pro	oject	Locatio	n Ha	wkins Co, Rogersville, Tennessee	D	epth to Wate	er	7.5 ft	 Date/Ti	me	1/23/	19 16:00
Ins	spect	or <u>C.</u> S	exton	Logger C. Sexton	D	epth to Wate	er _	5.6 ft	Date/Ti	me	1/24/	19 08:30
Dri	illing	Contract	tor Sta	antec Consulting Services Inc.	D	orill Rig Type	and	ID CME	55T#2, #711			
Ov	rerbu	rden Dril	lling and	I Sampling Tools (Type and S	Size)	4-1/4" HSA, 2" \$	SS w	/o liners,				
Ro	ck D	rilling an	d Samp	ling Tools (Type and Size) _	N/A							
Ov	erdri	ll Tooling	g (Type	and Size)8-1/4" HSA					Overdril	l De	epth	15.0 ft
Sa	mple	r Hamm	er Type	Automatic Weight	140 lb	Drop _3	30"		Efficiency	_	N/A	
Bo	reho	le Azimu	ith	N/A	B	orehole Incli	nati	on (from	Vertical)	N/	A	
Re	view	ed By _	B. Ev	ans	A	pproved By		P. Dunne				
	L	ithology				Overburden:	S	ample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI
Depth	n Ft <sup>3</sup>	Elevation	Graphic	Description		Rock Core:		RQD %	Run Ft		Rec. Ft	Rec. %
	0.0	1094.8		Top of Hole								
	0.5	1094 3		Topsoil								
	0.0	1004.0		SILTY LEAN CLAY, CL, 10YR 5/	3 (browr	n) and 10YR		SS01G	0.0 - 1.5	0.0 -	15	WH_3_4
- 1				6/8 (brownish yellow), low plastic	ity, soft t	, to medium		00010	0.0 - 1.0	1.5	1.5	
				stiff, dry to moist	5'							
				Color change to 10YR 5/4 (yellow	y vish brov	wn) at 1.5'						
- 2										<u></u>		
								SS02G	1.5 - 3.0	- 3.0	1.5	3-5-4
	3.0	1001 8										
- 3 -	3.0	1091.0	111	SILTY LEAN CLAY, CL. 10YR 6/	4 (liaht v	vellowish						-
				brown), medium plasticity, soft, d	ry to mo	ist, trace Mn				ω		
				nodules				SS03G	3.0 - 4.5	.0 - 4.5	1.0	2-1-2
- 4												-
					4 51						-	
5				Low to medium plasticity, stiff at 2	4.5'							_
								SS04G	4.5 - 6.0	4.5 - 6	1.5	3-5-5
∎ ¥										ō		
6 –	6.0	1088.8										-
200				SILTY LEAN CLAY, CL, 10YR 6/	4 (light y	/ellowish						
2				brown) and 10YR 7/1 (light gray), medium stiff dry to moist mottled	, mediun d	n plasticity,		SS05C	60 75	6.0 -	1.5	331
- 7								33039	0.0 - 7.5	.7.5	1.5	
				Color change to 10YR 6/6 (browr	nish yello	ow) and						
- 8				10YR 7/1 (light gray), low to med	ium plas	sticity, moist				7.5		-
5				at 7.5'				SS06G	7.5 - 9.0	5 - 9.0	1.3	2-3-3
770000			$\langle / / \rangle$									
- 9			$\langle / / \rangle$	Color change to 10VR 5/8 (vellow	vish brow	wn) and						-
				10YR 7/1 (light gray), trace Mn no	odules a	it 9.0'				9		
			$\langle / / \rangle$					SS07E	9.0 - 10.5	0 - 10	1.5	2-2-4



Page: 2 of 2

Client Borehole ID N/A		Stantec Boring	No. JSF-	106		
Client Tenness	see Valley Authority	Boring Location	י <u>יי</u> ן 733.018.9	2 N; 2,887.105.85	E NAD27	Plant Local
Project Number 1755682	225	Surface Elevati	ion 1094.8 ft	Elevation [	Datum N	IGVD29
Lithology		Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup> Elevation Graphic	Description	Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
- 10 10.5 1084.3 10.8 1084.0 - 11	SILTY LEAN CLAY TRACE GRAVEL, (light yellowish brown) with 10YR 7/1 (l to medium plasticity, soft, moist SILTY LEAN CLAY, CL, 10YR 5/6 (yell and 10Y 7/1 (light greenish gray), non-	CL, 10YR 6/4 ight gray), low	SS08E	10.5 - 12.0 - 10.5 - 12.0	1.5	_ 2-1-3
- 12	dry, thinly laminated weathered shale, laminations Color change to 10YR 6/4 (light yellowi 10Y 7/1 (light gray), low to medium pla moist, mottled; 0.3' dry brittle brown silf	high angle ish brown) and asticity, soft, ty clay at 12.0'	SS09G	12.0 - 13.5	1.5	- 2-1-3 -
- 14 14.2 1080.6 14.9 1079.9 15 15.0 1079.8	Color change to 10YR 5/3 (brown) and (gray) at 13.5' SILTY LEAN CLAY, CL, 10YR 4/2 (dar brown) and 10YR 4/1 (dark gray), low to plasticity, stiff, dry, thinly laminated	10YR 6/1 k grayish o medium	SS10G	13.5 - 15.0	1.5	2-6-40
	Shale, dry Refusal / Bottom of Hole at 15.0 Ft. Top of Rock = 14.9 Ft. Top of Rock Elevation = 1079.9 Ft.	/				-
See ins 1: E = E G = ( 2: a,b,c 3: Dept	tallation log for permanent well JSF-106 Environmental Sample Custody (two Split Geotechnical Sample Custody denote Split Spoon divided between En hs are reported in feet below ground surf	for backfill informati t Spoons may be rea vironmental and Geo ace	ion. quired to obtain otechnical San	n sufficient sample nples	)	-



	lient E	Borehole	ID N/A	A	Sta	ntec Boring	g١	No. JSF-	110			
c	lient		Tennes	ssee Valley Authority	Bor	ring Locatio	on	732,649.	53 N; 2,889,835	5.21	E NAD27	' Plant Local
P	roject	Number	175568	3225	Sur	face Eleva	ntic	n 1139.0 ft	Elevatio	on E	Datum	NGVD29
P	roject	Name	JSF TE	DEC Order	Dat	te Started		1/28/19	Comple	eted	1/30/	19
P	roject	Locatior	n Ha	wkins Co, Rogersville, Tennessee	Dep	oth to Wate	er -	10.2 ft	 Date/Ti	me	1/29/	19 11:28
Ir	, nspect	or C.Se	exton	Logger C. Sexton	Dep	oth to Wate	er -	N/A	 Date/Ti	me	N/A	
	Drilling	Contract	or Sta	antec Consulting Services Inc.	Dril	I Rig Type	ar	nd ID CME	55T#2, #711			
	)verbu	rden Dril	ling and	I Sampling Tools (Type and Size	e) 4-'	1/4" HSA, 2" a	anc	1 3" SS w/o li	iners			
R	lock D	rilling and	d Samp	ling Tools (Type and Size) N	/A							
	verdri	ill Tooling	(Type	and Size) 8-1/4" HSA					Overdril	l De	pth	17.2 ft
s	ample	er Hamme	er Type	Automatic Weight 140	) lb	_ Drop _3	80"		Efficiency		N/A	
В	oreho	le Azimu	th	N/A	Bor	ehole Incli	na	tion (from	Vertical)	N/.	A	
R	leview	ed By _	B. Ev	ans	Арр	proved By		P. Dunne				
		Lithology			(	Overburden:		Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI
Dep	oth Ft <sup>3</sup>	Elevation	Graphic	Description		Rock Core:		RQD %	Run Ft		Rec. Ft	Rec. %
_ 0	0.0	1139.0		Top of Hole								
ľ				Topsoil								
	0.8	1138.2	<b>PPP</b>						0.0 - 1.5	0.0 - 1.5	1.5	1-1-4
Γ'				SILTY LEAN CLAY, CL, 10YR 6/4 (I	LTY LEAN CLAY, CL, 10YR 6/4 (light yellowish					0		-
				moist	n oun, u	19 10						
<b>F</b> <sup>2</sup>				Color change to 10Y 6/4 (pale olive)	and 10	Y 7/1		SS02G	1.5 - 3.0	1.5 - 3	1.5	4-6-6
				(light greenish gray) low to medium medium stiff to stiff, with trace grave	plasticity	у,				Ö		
- 3				Color change to 10YR 6/6 (brownish	yellow	), medium						-
				stiff at 3.0'	-	-		SS03G	3.0 - 4.5	3.0 - 4	1.0	3-5-8
- 4				Root blocking recovery in SS03						ΰ		-
				Color change to 10YR 6/4 (light vello	owish br	rown) and						
- 5				10Y 7/1 (light greenish gray), very st	tiff, with	, sand at		SS04G	4.5 - 6.0	4.5 - 0	1.5	4-6-10
				4.5'	vallaw	) aaft ta				3.0		
- 6				medium stiff. drv at 5.0'	i yellow	), soit to						-
				Stiff, dry to moist, with trace gravel a	at 6.0'			SS05G	60-75	6.0 -	0.5	2-2-7
- 7								00000	0.0 - 1.0	7.5	0.0	
4/20												
- 8				3-inch SS used from 7.5' to refusal				00000	75 00	7.5		-
0.05608								5506G	7.5 - 9.0	- 9.0	1.1	0-11-13
- 9												-
12002				Medium stiff with trace gravel at 9.0'				SS07aG	9.0 - 9.9	9.0		
 ≝ − 10 v	9.9	1129.1			0 401/5	2.5/0				- 10.5	1.2	4-6-11 _
	Ť			(vellowish brown), medium, loose, d	C, 10YF rv to mo	k 5/6 bist	9.9/1	SS07bE	9.9 - 10.5			
5 - 11				Gravel is coarse to very coarse, rou	nded		2.0-20			10.		-
				Loose to medium dense at 10.5'			19012	SS08E	10.5 - 12.0	5 - 12.0	0.9	4-7-10
<sup>27</sup> - 12	12.0	1127.0	///				e					-
 99000 /1				LEAN CLAY, CL, 10YR 6/6 (brownis	sh yellov	w), low				12		
3 2 2 2 2 13			$\langle / / \rangle$	plasticity, very stiff, dry to moist, Mn	asticity, very stiff, dry to moist, Mn staining			SS09G	12.0 - 13.5	0 - 13.	1.5	10-7-12
BOKIN										5		



# SUBSURFACE LOG

Client	Borehole ID	N/A		Stantec Boring	J No. <b>JS</b>	F-110			
Client	Τε	ennessee Val	ley Authority	Boring Locatio	n <u>732,6</u>	49.53 N; 2,889,835	.21 E	NAD27	Plant Local
Projec	t Number17	75568225		Surface Elevat	tion <u>1139.</u>	oft Elevatio	on Da	atum_N	IGVD29
	Lithology			Overburden:	Sample <sup>1</sup>	<sup>2</sup> Depth Ft <sup>3</sup>	I	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation Gra	iphic [	Description	Rock Core:	RQD %	Run Ft		Rec. Ft	Rec. %
- 14 - 15 <u>15.0</u>	1124.0	LEAN plast (Con	N CLAY, CL, 10YR 6/6 (brownish icity, very stiff, dry to moist, Mn st <i>tinued)</i>	yellow), low aining	SS10	G 13.5 - 15.0	13.5 - 15.0	0.0	4-7-10
- 16		LEAN low p Mn s	N CLAY, CL, 10YR 6/4 (light yello plasticity, stiff to very stiff, dry to m taining	wish brown), oist, laminated,	SS11	G 15.0 - 16.5	15.0 - 16.5	1.5	9-9-18
- 17	1121.4	Color medi	r change to 10G 5/1 (greenish gra um plasticity, stiff with gravel at 10	y), low to 6.5'	SS12	G 16.5 - 18.0	16.5 - 18.0	0.2	 6-50+-10
- 18	s 1 2 3	Gee well insta Gee well insta : E = Environ G = Geotec : a,b,c denote : Depths are	e, uark gray usal / om of Hole at 18.0 Ft. of Rock = 17.6 Ft. of Rock Elevation = 1121.4 Ft. Ilation log for permanent well JSF umental Sample Custody (two Spli chnical Sample Custody e Split Spoon divided between En reported in feet below ground sur	-110 for backfill info t Spoons may be re vironmental and Ge face	prmation. equired to c	btain sufficient sam Samples	nple)		-
									-



С	lient E	Borehole	ID N/A	A	Star	ntec Borin	g No	JSF-	BG01Alt			
c	lient		Tennes	see Valley Authority	Bori	ing Locatio	on	732,654.	15 N; 2,890,399.	54	E NAD27	Plant Local
P	roject	Number	175568	3225	Sur	face Eleva	ation	1132.1 ft	Elevatio	n E	Datum I	NGVD29
P	roject	Name	JSF TD	DEC Order	Date	e Started		2/5/19	Complet	ed	2/5/19	9
P	roject	Locatio	n Ha	wkins Co, Rogersville, Tennessee	Dep	oth to Wate	er _	N/A	Date/Tin	ne	N/A	
In	spect	or M. E	dmunds	Logger M. Edmunds	Dep	oth to Wate	er	N/A	Date/Tin	ne	N/A	
D	rilling	Contrac	tor <u>Sta</u>	intec Consulting Services Inc.	Drill	Rig Type	and	ID Geop	probe 7730DT			
0	verbu	rden Dri	lling and	l Sampling Tools (Type and Size	e)Dir	ect Push - D	ual T	ube				
R	ock D	rilling an	d Samp	ling Tools (Type and Size)/	A							
0	verdr	ll Toolin	д (Туре	and Size) <u>N/A</u>					Overdrill	De	pth _	N/A
	ample	er Hamm	er Type	N/A Weight N/A		_ Drop _^	N/A		Efficiency		N/A	
	oreho				Bor	enole Incli	Inatio	on (from	Vertical)	N//	A	
	eview	еаву	K. Ca		Арр	полед ву		<sup>2</sup> . Dunne				
		_ithology			C	Overburden:	S	ample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI
Dep	th Ft <sup>3</sup>	Elevation	Graphic	Description		Rock Core:	F	RQD %	Run Ft		Rec. Ft	Rec. %
- 0	0.0	1132.1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Top of Hole			Ŧ		0.0.05	-117	0.5	
		1132.0		\Gravel pad material		/	A <sup>4</sup> 0.5/2	TIAUT	0.0 - 0.5	((	0.5	-
				SANDY FAT CLAY WITH SILT, CH, 7 (brown) to 7 5YR 5/8 (strong brown)	7.5YR { mediur	5/4 m	.5-201					
- 2	2 (brown) to 7.5YR 5/8 (strong brown), medium plasticity, soft, moist DP01 0.0-5.0											
- 3								DIGI	0.0 0.0	5.0	2.0	-
- 4												-
	5.0	1127.1								))		
- 5				FAT CLAY WITH SILT, CH, 7.5YR 5/	/1 (gray	) to	1			Ŵ	Ţ	_
- 6				7.5YR 5/6 (strong brown), medium to	high pl	asticity,				))		-
- 7				inni, moist, trace gravel throughout			6.8/			5.0		-
							8.8-20	DP02	5.0 - 10.0	0 - 10.0	4.3	N/A
0							190205			- [[[		
- 9												-
- 10	10.0	1122.1		<ul> <li>Saprolitic bedding structure visible from the structure visibl</li></ul>	om 9.5'	to 10.0'	5			Щ	Π	-
- 11				LEAN CLAY WITH SILT, CL, 7.5YR 4	4/3 (bro	wn) to	.0/12.4	5500	40.0 40.4	10.0		
3/16/20				7.5YR 4/6 (strong brown), non-plastic to moist	c, firm to	o stiff, dry	-20190	DP03	10.0 - 12.4	- 12.4	2.9	N/A
- 12	12.4	1119.7		<ul> <li>Recovery greater than run length due</li> </ul>	e to swe	ell /-	205			U		-
201905				Trace gravel from 12.1' to 12.4'		/						-
SURF DT				Bedrock Refusal /								-
EC SUBS				Bollom of Hole at 12.4 Ft.								
PU TD6												_
RDER.0												-
TDECO												-
25 - JSF												_
1755682			1: E =	Environmental Sample Custody (two Sp	olit Spoo	ons may be	requir	ed to obta	in sufficient sam	ple)	)	
VG LOG			G = 2: a h	Geotechnical Sample Custody	nvironn	nental and G	Jenter	chnical So	mples	. /		-
IP BORI			2: a,b, 3: Dep	oths are reported in feet below ground su	urface			unioar oa				_
TVAE			4: Gra	b sample (0.0/0.5-20190205) sampled u	ising ha	ind auger						



	Client E	Borehole	ID N/A	l l			Stantec Borin	ig No	JSF-	BG02Alt			
	Client Tennessee Valley Authority						Boring Locati	on	732,179.	98 N; 2,889,116	6.93	E NAD27	' Plant Local
F	roject	Number	175568	225			Surface Eleva	ation	1137.5 ft	Elevatio	on E	Datum_	NGVD29
F	roject	Name	JSF TD	EC Order			Date Started		2/4/19	Comple	eted	2/4/1	9
F	roject	Locatio	n <u>Hav</u>	wkins Co, Rogersvill	e, Tennessee	e l	Depth to Wat	er _	N/A	Date/Ti	me	N/A	
l Ir	nspect	or <u>M</u> . E	dmunds	Logger _	M. Edmunds	I	Depth to Wat	er	N/A	Date/Ti	me	N/A	
	rilling	Contract	or Sta	ntec Consulting Ser	vices Inc.		Drill Rig Type	and	ID Geop	probe 7730DT			
	Verbu	rden Dril	ling and	Sampling Tools	(Type and	d Size)_	Direct Push - D	ual T	ube				
F	Rock D	rilling an	d Samp	ling Tools (Type	and Size)	N/A							
	Verdr	ill Tooling	g (Type a	and Size) <u>N/A</u>						Overdrill	De	epth	N/A
	ample	er Hamm	er Type	<u>N/A</u>	_ Weight _	N/A	Drop _!	N/A		Efficiency		N/A	
	loreho	le Azimu	th	N/A			Borehole Incl	inatio	on (from	Vertical)	N/.	A	
	eview	ed By	K. Ca	rey			Approved By		<sup>2</sup> . Dunne				
		Lithology					Overburden:	S	ample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI
Dep	oth Ft <sup>3</sup>	Elevation	Graphic	Description			Rock Core:	F	RQD %	Run Ft		Rec. Ft	Rec. %
- 0	0.0	1137.5		Top of Hole									
	0.5	1137.0	FFF	Topsoil, roots				HA.	HA01	0.0 - 0.5		0.5	
- 1				SANDY LEAN CL	AY WITH SI	LT, CL, 10	0YR 5/3	0.9			l		
(brown), medium plasticity, very soft to soft, moist, moderately fat medium-graded sand and													
				organics/roots thr	oughout laye	er		019020	DP01	0.0 - 5.0	0.0 -	3.7	N/A
- 3								4			5.0		
- 4													
- 5	5.0	1132.5									((	4	_
Ŭ				GRAVELLY CLA	YEY SAND, S	SC, 10YR	6/1 (gray) to				10		
- 6				10YR 6/6 (brown dense, moist, sub	ish yellow), fil prounded, wit	ne to med h aravel c	lium, medium obbles	сл I			$ \rangle$		
								9/7.9-2					
- 7	7.5	1130.0						019020	000	50 100	5.0 -	37	- Ν/Λ
- 8				FAT CLAY, CH, 5	5YR 3/1 (very	/ dark gray	y) to 5YR 4/4	)4	DI 02	5.0 - 10.0	10.0	5.7	IN/A
				(reddish brown), to firm moist iror	medium to hi ovide staini	gh plastici na some	ity, very soft				18		
- 9				bedding structure	visible	ng, some	Sapronito						
10													_
													-
- 11													
								1					
- 12								.5/13.5	0000	40.0 45.0	10.0	50	
- 13								-20190	DP03	10.0 - 15.0	- 15.0	5.0	N/A
								204					
- 14													
	15.0	1122 5											
15	10.0	1122.0	111					1				∦	-
- 16													
1													
												(	



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Clien	Borehole	ID N/A		Stantec Boring	g No. JSF-	BG02Alt		
Clien	t	Tenness	see Valley Authority	Boring Locatio	on <u>732,179.9</u>	98 N; 2,889,116.93	E NAD27	Plant Local
Proje	ct Number	1755682	225	Surface Eleva	tion <u>1137.5 ft</u>	Elevation	Datum_N	NGVD29
	Lithology			Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft	Elevation	Graphic	Description	Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
- 17 - 18 - 19 _ 19.	5 1118.0		FAT CLAY WITH SILT, CH, 5YR 4/1 ( 5YR 3/2 (dark reddish brown), mediur plasticity, soft to firm, moist, with some non-plastic intervals, saprolitic beddin shale gravel, and inclined bedding (~4 (Continued)	(dark gray) to n to high e lean, g structure, l0 deg)	16.5/18.5-20190204	15.0 - 19.5 ខ្លាំ ខ្ល	4.5	N/A _
			Bedrock Refusal / Bottom of Hole at 19.5 Ft.					
		1: E = E G = 0 2: a,b,c 3: Dept 4: Grab	Environmental Sample Custody (two Sp. Geotechnical Sample Custody : denote Split Spoon divided between Er hs are reported in feet below ground su o sample (0.0/0.5-20190204) sampled us	lit Spoons may be re nvironmental and Ge rface sing hand auger	equired to obtai eotechnical Sar	n sufficient sample nples	e)	-
								-
3/10/20								-
1 201303030100								-
מטבאנקיע ועבר אעסא								_
3 1/3968225-JSF IDEC 0								-
VA EIP BORING LUI								-



С	lient E	Borehole	ID N/A	A	S	Stantec Borin	g N	IO. JSF	BG03 (JS	F-E	3G03/	Alt)
l c	lient		Tennes	see Valley Authority	_ E	Boring Locati	on	732,227.	96 N; 2,888,268	.92	E NAD27	Plant Local
P	roject	Number	175568	225		Surface Eleva	atio	n 1132.5 ft	Elevatio	n E	Datum	NGVD29
P	roject	Name	JSF TD	EC Order	_ [	Date Started		1/29/19	 Comple	ted	1/29/	19
P	roject	Locatior	ר Hav	wkins Co, Rogersville, Tennessee	_ C	Depth to Wat	er –	N/A	Date/Ti	me	N/A	
Ir	rspect	or M. E	dmunds	Logger M. Edmunds	_ [	Depth to Wat	er –	N/A	Date/Ti	me	N/A	
	rilling	Contract	or Sta	ntec Consulting Services Inc.	_ [	Drill Rig Type	an	d ID Geop	probe 7730DT			
C	Verbu	ırden Dril	ling and	Sampling Tools (Type and Siz	ze)_	Direct Push - D	ual	Tube				
R	lock D	rilling and	d Samp	ling Tools (Type and Size)	N/A							
C	Verdr	ill Tooling	(Туре	and Size) <u>N/A</u>					Overdrill	De	epth	N/A
s	ample	er Hamme	er Type	N/A Weight N/	/A	Drop _I	N/A		Efficiency		N/A	
B	oreho	le Azimu	th	N/A	_ E	Borehole Incl	inat	ion (from	Vertical)	N/.	A	
	leview	ed By	K. Ca	rey	A	Approved By		P. Dunne				
		Lithology				Overburden:		Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI
Dep	oth Ft <sup>3</sup>	Elevation	Graphic	Description		Rock Core:		RQD %	Run Ft		Rec. Ft	Rec. %
- 0	0.0	1132.5		Top of Hole			T		0.0.05		0.5	_
	0.5	1132.0		- Topsoil			P.	HAUT	0.0 - 0.5		0.5	
				SILTY LEAN CLAY WITH SAND, C	5YR 6/6	1.5/3			1 1			
				medium plasticity, dense, moist, wi	.5-201	DP01	0.0 - 5.0	0.0 - 5.	5.0	N/A		
- 3							90129			°		
- 4				Occasional vegetation roots from 4	0' to	5 0'				$ \rangle$		
- 5	5.0	1127.5		Increased sand from 4.5' to 5.0'			5.0/6.6				t l	-
- 6	6.5	1126.0		POORLY GRADED SAND WITH S	SILT V	/ITH CLAY,	\$-2019(					
- 7				SP-SM, 7.5YR 5/8 (strong brown),	mediu	im, loose to	0129 7			5.0		
- 8					, SOIII		.2/9.2-2	DP02	5.0 - 10.0	) - 10.0	5.0	N/A
				gray), non-plastic, stiff, moist		z (pinkish	201901					
- <del>-</del>	10.0	1122.5		Sand lens from 7.9' to 8.4'			29			1 1		
- 10				LEAN CLAY WITH SILT, CL, 7.5YF	R 5/6	(strong					1	-
- 11				brown), medium plasticity, firm, mo	oist, tra	ace sand,	11.5					
- 12				some saprolitic bedding structure, t inclusions throughout	trace	organic	5/13.5-	DP03	10.0 - 14.4	0.0 - 1	5.0	N/A
- 13				Ū			201901			4.4		
5 - 14	14.4	1118.1		Recovery greater than run length d	lue to	swell	29					
019000	1			Bedrock Refusal /			1 1	1		1 11	<u> </u>	-
2				Bottom of Hole at 14.4 Ft.								
SUBSU												
2 IVEC												
DEKG												
107-0												-
77900001			<b>4</b> . <b>F</b>	Environmental Course to the	Online of	hoope merch		und to the	in oufficient -	- I m	Ň	
L L UG			1:E= G=	Geotechnical Sample Custody (two s	Split	spoons may be	requ	iired to obta	In sumcient sam	iple	)	
BOKIN			2: a,b, 3: Der	c denote Split Spoon divided between oths are reported in feet below around	n Envir surfa	onmental and G	Seot	echnical Sa	mples			
VAEIr			4: Gra	b sample (0.0/0.5-20190129) sampled	d using	g hand auger						



Γ	Client Borehole ID     N/A     S       Client     Tennessee Valley Authority     B						Stantec Borir	ng N	₀. JSF-	BG04Alt				
	С	lient		Tennes	see Valley Authority	/		Boring Locati	on	731,221.	53 N; 2,888,415	.22	E NAD27	' Plant Local
	Pi	roject	Number	175568	225			Surface Eleva	atio	n 1164.9 ft	Elevatio	n E	)atum I	NGVD29
	Pi	roject	Name	JSF TD	EC Order			Date Started		1/30/19	Comple	ted	1/30/-	19
	Pi	roject	Locatior	ר Haי	wkins Co, Rogersvill	e, Tennessee	Э	Depth to Wat	er	N/A	 Date/Tii	me	N/A	
	In	spect	or M. E	dmunds	Logger	M. Edmunds		Depth to Wat	er	N/A	Date/Ti	me	N/A	
	D	rilling	Contract	or Sta	ntec Consulting Ser	vices Inc.		Drill Rig Type	e an	nd ID Geop	orobe 7730DT			
	0	verbu	ırden Dril	ling and	Sampling Tools	s (Type and	d Size)_	Direct Push - D	)ual	Tube				
	R	ock D	rilling and	d Samp	ling Tools (Type	and Size)	N/A							
	0	verdri	ill Tooling	(Туре	and Size) <u>N/A</u>						Overdrill	De	pth _I	N/A
	Sa	ample	er Hamme	er Type	N/A	_ Weight _	N/A	Drop _	N/A		Efficiency	1	N/A	
	Bo	oreho	le Azimu	th	N/A			Borehole Incl	ina	tion (from	Vertical)	N//	Ą	
L	R	eview	ed By	K. Ca	rey			Approved By		P. Dunne				
		I	Lithology					Overburden:		Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI
┝	Dept	th Ft <sup>3</sup>	Elevation	Graphic	Description			Rock Core:	$\left  \right $	RQD %	Run Ft		Rec. Ft	Rec. %
╞	0	0.0	1164.9		Top of Hole				- <u>-</u>	110.01	00.05		0.5	
		V.1/	1104.8		∖Topsoil, grass, ai	nd roots		/	A4	HAUT	0.0 - 0.5		0.5	
F	1				SILTY LEAN CLA	Y SOME GR	RAVEL, CI	L, 5YR 5/6	0.9/					-
	2				plasticity, soft to t	firm, moist, fir	ne to med	ium sand and	2.9-20			1 1		_
	2				occasional grave	l clasts throuç	ghout		190130	DP01	0.0 - 5.0	0.0 - 5	3.3	N/A
╞	3											0		-
F	4													-
	5	5.0	1159.9										_	_
					GRAVELLY WEL	L GRADED S	SAND WI	TH CLAY,						
┢	6			//	medium dense, n	(yellowish re noist, well gra	a), meaiu aded, suba	m to coarse, angular to						-
	_				subrounded cobb	le-sized grav	el through	nout						
	<b>'</b>			//					7.	DP02	50-100	5.0 -	36	– N/A
╞	8								2/9.2-2	51 02	0.0 10.0	10.0	0.0	-
				//					01901:					
6/20	9								30					-
GDT 3/1	10	10.0	1154.9	• • //										_
190530.				N /	No sample, malfu	unction in sam	nple tube							
JE DT 20	11			$ \rangle$ /										-
SUBSUF				$  \rangle /  $										
TDEC	12									0002	10.0 15.0	10.0 -	0.0	
DER.GPJ	13									DF03	10.0 - 15.0	- 15.0	0.0	IN/A
DEC OR				$  / \rangle  $										
- JSF TC	14			/										-
5568225	15	15.0	1149.9											_
L0G 17					LEAN CLAY WIT	H SILT, CL, 1	10YR 7/6	(yellow),						_
BORING	16			$\langle / / \rangle$	non-plastic, stiff,	moist, organio	c inclusior	ns throughout						-
VA EIP 1														



Page: 2 of 2

Client Borehole IDN/A		Stantec Boring	JNO. JSF-	BG04Alt		
Client Tenness	see Valley Authority	Boring Locatio	n <u>731,221.5</u>	53 N; 2,888,415.22	2 E NAD27	Plant Local
Project Number1755682	225	Surface Elevat	tion <u>1164.9 ft</u>	Elevation	Datum_N	NGVD29
Lithology		Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup> Elevation Graphic	Description	Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
- 17 - 18 18.9 1146.0	LEAN CLAY WITH SILT, CL, 10YR 7/ non-plastic, stiff, moist, organic inclus <i>(Continued)</i> Recovery greater than run length due	/6 (yellow), ions throughout to swell	15. 5/18 5.5/18	15.0 - 18.9 15.0 18.9	4.0	N/A -
18.9 1146.0 1: E = E G = 0 2: a,b,c 3: Dept 4: Grab	Recovery greater than run length due Bedrock Refusal / Bottom of Hole at 18.9 Ft.	to swell	equired to obtai	n sufficient samplen	e)	
VA EIP BONNING LOGI 175588222: - Jan I LIE-C UNUE-KUNJ I						-



#### SUBSURFACE LOG

	liont F	Porebole			Stantec Borin		JSF-	BG05Alt				
	liont	orenoie	Tennes		Boring Locati	on	731 311	74 N: 2 886 883	01		Plant Local	
	reiget	Number	475500		Surface Flave	on	100776	Flovetic	.911 			
	roject	Number	175568	<u>225</u>		auon	1087.7 π		ᇿ		NGVD29	
	roject	Name			Date Started		1/31/19	Comple	ted	1/31/	19	
	roject	Location	η <u>Hav</u>	Mkins Co, Rogersville, Tennessee	Depth to Wat	er_		Date/Th	ne	N/A		
	ispect		amunas		Depth to wat	er _		Date/ Hr	ne	N/A		
	rilling		or <u>sta</u>	Sempling Tools (Type and Size)		e and	ID Geot					
	verbu	rden Drii	ling and d Somol	Sampling Tools (Type and Size)	)Direct Push - D		ube					
	Nordri	II Tooling	u Sampi 1 (Type /	and Size) $N/A$	<b>`</b>			Overdrill	Do	nth I	N/A	
	ample	r Hamm	or Type	N/A Weight N/A	Drop	N/A		Overunii	De	μιι <u>'</u> \/Δ		
	oreho	le Azimu	th	N/A	Drop	inati	on (from	Vertical)	 N//	A		
	eview	ed By	K. Ca		Approved By	li la li I	P. Dunne		,,			
		<u> </u>					12	<b>D</b> (1 <b>C</b> <sup>3</sup>				
		Lithology			Overburden:	S	sample "*	Depth Ft <sup>o</sup>		Rec. Ft	Blows/PSI	
Dep	th Ft°	Elevation	Graphic	Description	Rock Core:		RQD %	Run Ft		Rec. Ft	Rec. %	
- 0	0.0	1087.7				- 7	HA01	00-05		0.5		
		1007.0		Parking lot material, dirt, roots, gravel	/	-	1 // 10 1	0.0 0.0		0.0	_	
				SANDY LEAN CLAY, CL, 7.5YR 6/1 (	gray) to 7.5YR /_firm_moist	1.3/3						
- 2	6/6 (reddish yellow), medium plasticity, firm, moist, trace subround gravel, silty											
- 3						90131	Brot	0.0 0.0	5.0		-	
- 4											_	
	50	1082 7										
- 5	0.0	1002.7		CLAYEY SAND TRACE GRAVEL. SC	C. 7.5YR 6/1	1				Ţ	_	
- 6				(gray) to 7.5YR 6/6 (reddish yellow), n	nedium dense,	6.0					-	
- 7				moist, subrounded, poorly graded		/8.0-20			л Л		-	
						)19013	DP02	5.0 - 10.0	.0 - 10	4.0	N/A	
- 8									Ö		-	
- 9											-	
- 10	10.0	1077.7							Ш		_	
			$\sim$	Shale, dark gray to brown, highly wea	thered, rotten,		<b>DD</b> 00	10.0 11.0	10.0		N1/A	
- 11	11.4	1076.3		saprolitic			DP03	10.0 - 11.8	- 11.8	1.4	N/A _	
0.GDT 11/	11.0	1075.9		Shale, dark gray to black, very soft, la weathered, moist, horizontal, saprolitic	minated, highly				1 144			
- 2019053				Bedrock Refusal /							-	
SURF D.				Bottom of Hole at 11.8 Ft.							-	
EC SUB				Top of Rock = 10.0 Ft.							_	
JDT L4				Top of Rock Elevation = 1077.7 Ft.								
RDER.0											-	
: TDEC											-	
25 - JSF											_	
1755682			G =	Geotechnical Sample Custody (two Spl	in opeons may be	requi		in suncient sam	ihie)	)	-	
GLOG			2: a,b, 3: Den	c denote Split Spoon divided between Er	nvironmental and G rface	Geote	chnical Sa	mples			-	
BORIN			4: Gra	b sample (0.0/0.5-20190131) sampled us	sing hand auger						_	
TVA EIF												



# SUBSURFACE LOG

С	lient E	Borehole	ID N/A	A	S	tantec Borin	ng N	No. JSF-	BG06Alt			
C	lient		Tennes	see Valley Authority	В	oring Locati	on	732,724.	08 N; 2,887,093.4	42	E NAD27	Plant Local
P	roject	Number	175568	3225	S	urface Eleva	atic	n 1120.8 ft	Elevation	n E	Datum I	NGVD29
P	roject	Name	JSF TD	DEC Order	D	ate Started		2/1/19	 Complet	ed	2/1/1	9
P	roject	Locatior	ן Hav	wkins Co, Rogersville, Tennessee	D	epth to Wat	er	N/A	 Date/Tin	ne	N/A	
l Ir	nspect	or M. E	dmunds	Logger M. Edmunds	D	epth to Wat	er	N/A	Date/Tin	ne	N/A	
	rilling	Contract	or Sta	intec Consulting Services Inc.	D	rill Rig Type	e ar	nd ID Geop	probe 7730DT			
C	verbu	ırden Dril	ling and	l Sampling Tools (Type and Siz	e)_l	Direct Push - D	)ual	Tube				
R	lock D	rilling and	d Samp	ling Tools (Type and Size) <u>N</u>	/A							
	verdr	ill Tooling	(Туре	and Size) <u>N/A</u>					Overdrill	De	epth	N/A
S	ample	er Hamme	er Type	N/A Weight N/A	4	Drop _I	N/A		Efficiency		N/A	
B	oreho	le Azimu	th	N/A	_ B	orehole Incl	ina	tion (from	Vertical)	N/.	A	
	leview	ed By	K. Ca	rey	A	pproved By		P. Dunne				
		Lithology				Overburden:		Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI
Dep	th Ft <sup>3</sup>	Elevation	Graphic	Description		Rock Core:		RQD %	Run Ft		Rec. Ft	Rec. %
- 0	0.0	1120.8		Top of Hole			I		0.0.05	-11	0.5	
	0.5	1120.3		<ul> <li>Topsoil and grass</li> </ul>			_ P <sub>4</sub>	HAUT	0.0 - 0.5		0.5	
				LEAN CLAY WITH SILT, CL, 7.5YR	5/8 (s	strong	1.5/3					
				material	si, iia	ce organic	.5-2019	DP01	0.0 - 5.0	0.0 - 5.	5.0	N/A
- 3							90201			°		
- 4										$\rangle\rangle$		
- 5				Increased organic material from 5.0	to 11	0'				*	H I	-
- 6				increased organic material norm 5.0	10 11	.0				<u> </u>		
- 7							6.5/8.5			5.0		
- 8							-20190	DP02	5.0 - 10.0	- 10.0	5.0	N/A
				Saprolite with hedded structure from	8 5' 1	to 10.0'	201					
					10.0	10.10.0				l		
- 10	11 0	1109.8									1	-
- 11	11.0	1100.0	///	LEAN CLAY TRACE SILT, CL, 7.5Y	R 4/6	(strong	11.2/1					
- 12				brown), non-plastic, firm to stiff, dam	np to r	noist	3.2-20	DP03	10.0 - 14.5	0.0 - 1/	5.0	N/A
- 13				Recovery greater than run length du	e to s	swell	190201			÷.5		
- 14	14.5	1106.3		Saprolite with bedded structure, son chunks/gravel from 13.5' to 14.5'	ne sha	ale/_						
				Bedrock Refusal /								-
				Bottom of Hole at 14.5 Ft.								
												-
2			1: E =	Environmental Sample Custody (two S	plit S	poons may be	req	uired to obta	in sufficient sam	ole	)	
			2: a,b,	c denote Split Spoon divided between I	Enviro	onmental and Q	Geo	technical Sa	mples			
			3: Dep 4: Gra	oths are reported in feet below ground s b sample (0.0/0.5-20190201) sampled	urfac using	e hand auger						
- <b></b>			_	, , , , , , , , , , , , , , , , , , , ,	3	5						



### SUBSURFACE LOG

С	lient E	Borehole	ID N/A	A Contraction of the second se		5	Stantec Borir	ng N	lo. <b>JSF</b> -	BG07			
c	lient		Tennes	see Valley Authority		E	Boring Locati	on	731,693.	73 N; 2,887,903	.64	E NAD27	Plant Local
P	roject	Number	175568	225		5	Surface Eleva	atio	n 1134.8 ft	Elevatio	on D	Datum I	NGVD29
P	roject	Name	JSF TD	EC Order		[	Date Started		1/29/19	Comple	ted	1/29/	19
P	roject	Locatio	n Ha	wkins Co, Rogersville,	Tennessee	[	Depth to Wat	er _	N/A	Date/Ti	me	N/A	
In	spect	or M.E	dmunds	Logger _ M. E	dmunds	[	Depth to Wat	er_	N/A	Date/Tir	me	N/A	
D	rilling	Contract	or Sta	ntec Consulting Servio	es Inc.	[	Drill Rig Type	e an	d ID Geop	probe 7730DT			
0	verbu	ırden Dril	ling and	Sampling Tools (	Type and \$	Size)_	Direct Push - D	Dual <sup>·</sup>	Tube				
R	ock D	rilling an	d Samp	ling Tools (Type a	nd Size)	N/A							
0	verdr	ill Tooling	g (Type	and Size) <u>N/A</u>						Overdrill	De	pth _	N/A
	ample	er Hamm	er lype	N/A	Weight	N/A	Drop _	N/A		Efficiency		N/A	
	oreno	e Azimu	tn			Ľ	Sorenole Incl	inat		vertical)	IN//	A	
	eview	еа ву	K. Ca	rey			Approved By		P. Dunne				
		Lithology					Overburden:	:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI
Dep	th Ft <sup>3</sup>	Elevation	Graphic	Description			Rock Core:	+	RQD %	Run Ft		Rec. Ft	Rec. %
- 0	0.0	1134.8		Top of Hole				Ŧ	НАО1	0.0 - 0.5	-	0.5	
- 1	14	1133.4		Gravel fill from 0.0'	to 1.4'			A4	TIA01	0.0 - 0.5		0.5	-
- 2	1.4	1100.4		FAT CLAY WITH S		YR 6/4 (I	light brown)	1.4					-
				to 7.5YR 4/6 (strong	g brown), me	dium to	high	4.1-20	DP01	0.0 - 5.0	).0 - 5.0	4.1	N/A
- 3				plasticity, firm, mois	st			190129					-
- 4													-
- 5												)	-
- 6								6.2					-
- 7								/8.2-20			5.0		-
- 8	0.5	1126.2						19012	DP02	5.0 - 10.0	- 10.0	4.8	N/A -
- 9	0.5	1120.3		CLAYEY SAND WI	TH GRAVEL	. SC. 7.5	5YR 6/6						-
10				(reddish yellow) to	7.5YR 4/2 (br	rown), m	edium to						_
- 10	10.5	1124.3		coarse, medium de ∫ is subangular to sul	nse, moist, po brounded, ar:	oorly gra	aded gravel						
- 11				increases with dept	h			11.0			1		-
- 12				LEAN CLAY WITH	SILT, CL, 10	YR 4/4 (	(dark	/14.0-2	DP03	10.0 - 14.2	.0 - 14.:	5.0	N/A <sup>-</sup>
- 13				yellowish brown), n	on-plastic, fir	m to stif	f, moist, trace	019012			$\left \right\rangle$		-
- 14	14.2	1120.6		Sand and trace orga $\neg$ Shale rock from 14	anic inclusion .0' to 14.2'	is inroug		<u>9</u> 9					
2019053				Bedrock Refusal /			/						_
URF DT				Bottom of Hole at 1	4.2 Ft.								-
C SUBS													-
PJ TDE													
RDER.G													-
TDEC O													-
25 - JSF													_
1755682			1: E =	Environmental Sample	e Custody (tw	vo Split \$	Spoons may be	requ	ired to obta	in sufficient sam	ple)	)	-
IGLOG			G = 2 <sup>.</sup> a b	Geotechnical Sample	Custody divided betwe	en Fnvi	ronmental and (	Geot	echnical Sa	mples	,		-
P BORIN			3: Dep	oths are reported in fee	t below grour	nd surfa	Ce a bond currer			F			-
TVA EII			4: Gra	b sample (0.0/0.5-201	90129) samp	nea usin	y nano auger						



Client Borehole ID								Stantec Boring No. JSF-BG08							
	CI	lient		Tennes	see Valley Authority		Boring Location 732,700.27 N; 2,892,122.11 E NAD27 Pla					Plant Local			
	Pr	roject	Number	175568	225		Surface Elevation 1143.9 ft Elevation Datum				atum I	NGVD29			
	Pr	roject	Name	JSF TE	EC Order			Date Started 1/28/19 Completed 1/2				1/28/	19		
	Pr	roject	Location	n Ha	wkins Co, Rogersville,	Tennessee		Depth to Water N/A Date/Time N/A				N/A			
	In	spect	or M. E	dmunds	LoggerM.	Edmunds		Depth to Water N/A Date/Time N/A							
	Dı	rilling	Contract	or Sta	ntec Consulting Servic	es Inc.		Drill Rig Type and ID_Geoprobe 7730DT							
	0	verbu	ırden Dril	ling and	Sampling Tools (	Type and S	Size)_	) Direct Push - Dual Tube							
	R	ock D	rilling an	d Samp	ling Tools (Type a	nd Size)_	N/A								
	0	verdri	ill Tooling	g (Type	and Size) <u>N/A</u>						Overdrill	Dep	oth _	N/A	
	Sa	ample	er Hamme	er Type	<u>N/A</u>	Weight	N/A	Drop _1	N/A		Efficiency	N	I/A		
	Bo	oreho	le Azimu	th	N/A			Borehole Incli	inat	ion (from	Vertical)	N/A	۱		
L	R	eview	ed By	K. Ca	rey			Approved By		P. Dunne					
		I	Lithology					Overburden:		Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI	
Ľ	Dept	th Ft <sup>3</sup>	Elevation	Graphic	Description			Rock Core:		RQD %	Run Ft	_	Rec. Ft	Rec. %	
ŀ	0	0.0	1143.9		Top of Hole				Ŧ	110.04	0.0.05	m	0.5		
		V.1/	1143.8		∖Topsoil, roots, and o	gravel		/	Α4	HAUT	0.0 - 0.5	(((	0.5		
F	1				LEAN CLAY WITH	SILT, CL, 7.5	YR 6/6	(reddish				M		-	
	,				yenow), non-plastic,	Soft to mini, n	noist, i	can				$\mathbb{N}$		-	
	2								2.0/4	DP01	0.0 - 5.0	0.0	4.0	N/A	
	3								.0-201			5 0		-	
									90128						
F '	4													-	
	5	5.0	1138.9									(((		_	
	-				LEAN CLAY WITH	SILT, CL, 7.5	YR 5/4	(brown) to				M			
-	6				some sand	on-plastic, firm	n to stif	t, moist,				$\mathbb{N}$		-	
	-								6.5						
	(								/8.5-20	DP02	50-100	5.0	5.0	- N/A	
- ;	в				lana af marail (lina			41	)19012	D1 02	0.0 10.0	10.0	0.0		
					Lens of gravel (lime	stone) from 7	.9' to 8	5.4	8						
9/30	9													-	
3DT 3/1	10	10.0	1133.9												
190530.0					SILTY LEAN CLAY	WITH SAND,	, CL-M	L, 7.5YR 5/3				221			
F DT 20	11				(brown) to 7.5YR 5/	8 (strong brov d moist mer	wn), me dium-ai	edium rained sand						-	
SUBSUR					lens mixed well with	clay, organic	c inclus	ions	1			)))			
TDEC	12				throughout interval				5/13.5	0000	10.0 15.0	10.0	5.0	-	
ER.GPJ	13								-20190	DP03	10.0 - 15.0	- 15.0	5.0	N/A	
EC ORD									128						
JSF TD	14											(((		-	
568225	15	15.0	1128.9									(((			
-0G 175	10	-	-						1			$\parallel$		_	
ORING	16											$\rangle\rangle\rangle$		-	
A EIP B															
≤ <b>∟_</b>	47											1111			



Page: 2 of 2

Client Borehole ID	Stantec Boring No. <b>JSF-BG08</b>								
Client Tennessee Valley Authority	Boring Location 732,700.27 N; 2,892,122.11 E NAD27 Plant Local								
Project Number 175568225	Surface Elevation 1143.9 ft Elevation Datum NGVD								
Lithology	Overburden: Sample <sup>1,2</sup>	Depth Ft <sup>3</sup> Rec. Ft Blows/PSI							
Depth Ft <sup>3</sup> Elevation Graphic Description	Rock Core: RQD %	Run Ft Rec. Ft Rec. %							
<ul> <li>17</li> <li>18</li> <li>19</li> <li>19.3</li> <li>1124.6</li> <li>CLAYEY SAND WITH GRAVEL, SC (brown) to 7.5YR 5/8 (strong brown), coarse, soft to medium dense, moist subround to subangular gravel strain increases with depth (Continued)</li> </ul>	, 7.5YR 5/4 DP04 , medium to , poorly graded, s, gravel content	15.0 - 19.3 (20) 							
Bedrock Refusal / Bottom of Hole at 19.3 Ft.									
1: E = Environmental Sample Custody (two S G = Geotechnical Sample Custody 2: a,b,c denote Split Spoon divided between E 3: Depths are reported in feet below ground s 4: Grab sample (0.0/0.5-20190128) sampled t	plit Spoons may be required to obta Environmental and Geotechnical Sa urface using hand auger	in sufficient sample) mples - -							
		- - - - - - - -							



Client Borehole ID							Stantec Boring No. JSF-BG09							
	Client		Tennes	see Valley Authority	y		Boring Location 733,250.92			92 N; 2,892,599	2 N; 2,892,599.19 E NAD27 Plant Local			
F	Project	Number	175568	225			Surface Elevation 1141.4 ft Elevation Da				)atum I	NGVD29		
F	Project	Name	JSF TD	EC Order			Date Started 1/25/19 Completed 1/2				1/25/	19		
F	roject	Locatior	n Hav	wkins Co, Rogersvil	le, Tennessee	Depth to Water N/A Date/Time N/A				N/A				
l li	nspect	or M. E	dmunds	Logger	M. Edmunds	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>								
	Drilling	Contract	or Sta	ntec Consulting Ser	vices Inc.	Drill Rig Type and ID Geoprobe 7730DT								
	Overbu	ırden Dril	ling and	Sampling Tools	s (Type and	d Size)	e)Direct Push - Dual Tube							
F	Rock D	rilling and	d Samp	ling Tools (Type	and Size)	N/A								
	Overdr	ill Tooling	g (Type a	and Size) <u>N/A</u>	۱					Overdrill	De	pth _	N/A	
S	Sample	er Hamme	er Type	N/A	_ Weight _	N/A	Drop	N/A		Efficiency	1	N/A		
	Boreho	le Azimu	th	N/A			Borehole Inc	linat	ion (from	Vertical)	N//	۹		
	Review	ed By	K. Ca	rey			Approved By	′ —	P. Dunne					
		Lithology					Overburden	: :	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI	
Dep	oth Ft <sup>3</sup>	Elevation	Graphic	Description			Rock Core:		RQD %	Run Ft		Rec. Ft	Rec. %	
- 0	0.0	1141.4		Top of Hole				-						
	0.5	1140.9		Topsoil, roots, cl	ay, and gravel			Þ	HA01	0.0 - 0.5	(	0.5		
- 1				SILTY LEAN CL	AY TRACE GI	RAVEL,	CL, 10YR 6/6				1 111		-	
				non-plastic, firm	to stiff	strong	brown),							
<b>2</b>				•				14.0-20	DP01	0.0 - 5.0	0.0 -	4.5	N/A	
- 3								19012			5.0		-	
								0.						
- 4													-	
- 5	5.0	1136.4		Soft from 4.5' to	5.0'								_	
				CLAYEY SAND	WITH SILT, S	C, 7.5YI	R 6/8 (reddish				1 111			
- 6				yellow) to 7.5YR	5/8 (strong br	rown), fir	ne to medium,						-	
				low to mealum p	asticity, loose	, moist		6.1/8.1						
F ′								-20190		50-100	5.0 -	42	- Ν/Δ	
- 8								125	51.02	0.0 10.0	10.0	7.2		
9 - 9													-	
3/1 3/10	10.0	1131.4		Organic material	in gravel at b	ase of d	eposit at 10.0'							
01 190530.0			8 8 8 8 8 8 8 8 8 8 8 8	WELL GRADED	GRAVEL WI7	TH SANI	D, GW-GM,	0.0/11						
6 - 11			8.8.8 <b>8</b> 8.8 <b>8</b>	medium to coars	e, non-plastic	, loose te	o medium	.7-2019					-	
SUBSUR	11.6	1129.8	8.84 8	dense, moist, wit	h sand, silt, an	nd clay		90125						
ũg – 12				SILTY LEAN CL	AY TRACE SA	AND, CL	-ML, 7.5YR		0000	10.0 15.0	10.0	5.0	-	
20 13				organic inclusion	is throughout l	layer, tra	nce gravel,	12	DP03	10.0 - 15.0	- 15.0	5.0	N/A	
				saprolitic bedding	g structure vis	ible	-	7/14.7-						
말 - 14								20190					-	
568225 -	15.0	1126.4						125			(			
<sub>经</sub> 一 15				LEAN CLAY WIT	TH SILT, CL, 7	7.5YR 5/	3 (brown),	11					_	
Jonard – 16				non-plastic, stiff t	to hard, moist,	, trace s	and, some						-	
A EIP B(			$\langle / / \rangle$	organic inclusion	s in places									
≥ <b>∟</b> ₄┮_			$\vee$ / /								11((			



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Client E	Borehole	ID N/A		Stantec Boring No. JSF-BG09								
Client		Tennes	see Valley Authority	Boring Location 733,250.92 N; 2,892,599.19 E NAD27 Plant Local								
Project	Number	175568	225	Surface Elevation 1141.4 ft Elevation Datum NGVD29								
	Lithology			Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI				
Depth Ft <sup>3</sup>	Elevation	Graphic	Description	Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %				
- 17 - 18 <u>- 19 19.1</u>	1122.3		LEAN CLAY WITH SILT, CL, 7.5YR 5 non-plastic, stiff to hard, moist, trace s organic inclusions in places <i>(Continu</i> Shale gravel with bedding from 17.1' t saprolitic bedding visible Recovery greater than run length due	/3 (brown), and, some <i>red)</i> o 19.1', to swell	DP04	15.0 - 19.1 ថ្ង ! ! !	5.0	N/A - 				
			Bedrock Refusal / Bottom of Hole at 19.1 Ft.					-				
		1: E = G = 2: a,b, 3: Dep 4: Gra	Environmental Sample Custody (two Spl Geotechnical Sample Custody c denote Split Spoon divided between Er ths are reported in feet below ground su b sample (0.0/0.5-20190125) sampled us	it Spoons may be r nvironmental and G rface sing hand auger	equired to obtai eotechnical Sar	n sufficient sample	9)	-				
								-				
								-				
								-				
								_				
								-				
								-				
								-				



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С	lient E	Borehole	ID N/A	A	Stantec Boring No. JSF-BG10								
c	lient		Tennes	see Valley Authority	Boring Location		n 734,574.59 N; 2,894,284.42 E NAD27 Pla						
Ρ	roject	Number	175568	2225	Surface Eleva	ation	1130.6 ft	Elevation D		Datum NGVD29			
Р	roiect	Name	JSF TD	DEC Order	Date Started		1/24/19	Complete	ed	1/24/19			
P P	roiect	Location	n Hav	wkins Co, Rogersville, Tennessee	Depth to Wat	er	N/A	Date/Time		N/A			
l ir	spect	or M.E	dmunds	Logger M. Edmunds	Depth to Water N/A Date/Time N/A								
	rilling	Contract	or Sta	Intec Consulting Services Inc.	Drill Rig Type and ID Geoprobe 7730DT								
c	verbu	ırden Dril	ling and	Sampling Tools (Type and Size)	Direct Push - Dual Tube								
R	ock D	rilling an	d Samp	ling Tools (Type and Size) N/A	/A								
C	verdri	ill Tooling	, (Type)	and Size) N/A	Overdrill Depth N/A								
s	ample	er Hamme	er Type	N/A Weight N/A	Drop _!	N/A		Efficiency	N/	/A			
В	oreho	le Azimu	th	N/A	Borehole Incl	inatic	n (from	Vertical)	N/A				
R	eview	ved By	K. Ca	rey	Approved By	P	. Dunne						
		Lithology			Overburden:	Sa	ample <sup>1,2</sup>	Depth Ft <sup>3</sup>	F	Rec. Ft	Blows/PSI		
Dep	th Ft <sup>3</sup>	Elevation	Graphic	Description	Rock Core:	R	QD %	Run Ft	F	Rec. Ft	Rec. %		
	0.0	1130.6		Top of Hole					T				
- 0	0.5	1130.1	FFF	Topsoil, grass, roots, and gravel		HA <sup>4</sup>	HA01	0.0 - 0.5	$\mathbb{N}$	0.5			
- 1				SILTY LEAN CLAY, CL, 10YR 6/8 (bro	wnish yellow)	1.4			)))		-		
- 2				to 10YR 5/8 (yellowish brown), non-pla	istic to low	1/3.4-20		0.0.50		1.9	N/A		
- 3				plasticity, soft to firm, moist		D19012	DPUT	0.0 - 5.0	л О	4.8	IN/A		
- 4						124							
	5.0	1125.6							M				
- 5				SILTY LEAN CLAY TRACE SAND, CL	, 10YR 6/8	1			$\mathbb{N}$		-		
- 6				(brownish yellow), non-plastic, firm to s	stiff, moist,	.o			)))		-		
- 7				some manganese concretions through	out	5/8.5-2	0000	50 100	л Э	FO	- NI/A		
- 8						01901	DP02	5.0 - 10.0		5.0	IN/A		
- 9						24			(((				
L 10									((		_		
				Color change to 10YR 5/6 (yellowish b	rown) to 10YR	10.5/			$\mathbb{N}$				
- 11				5/8 (yellowish brown) at 10.0'		DP03		10.0 - 12.9		5.0	N/A		
- 12	12.0	1117 7		Saprolitic bedding structure visible fron	n 11.9' to 12.9'	0190124		1.0			-		
	12.0			Bedrock Refusal /		+*							
				Bottom of Hole at 12.9 Ft.							-		
											_		
			1: E =	Environmental Sample Custody (two Spli	t Spoons may be	require	ed to obta	in sufficient samp	le)		-		
			G = 2: a.b.	Geotechnical Sample Custody c denote Split Spoon divided between En	vironmental and G	Geoteo	hnical Sa	nples			-		
			3: Dep	oths are reported in feet below ground sur	face								
			4: Gra	ש אוווידע (ט.טיט.ס-עט ואט ועען) sampled us	ing nanu auger						-		
											-		

10/15/20


# SUBSURFACE LOG

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	lient F	Borehole		A	S	stantec Borin	na N	JSF-	-BG11			
	lient		Tennes	see Valley Authority	_ 0 _ B	Soring Locati	on	736 964 9	98 N <sup>.</sup> 2 896 841	17	F NAD27	Plant Local
	roiect	Number	175568	2225	- 5	Surface Fleve	ation	1106.8 ft	Flevatio	 m Г	)atum I	
	roject	Nomo		)EC Order	- 0 - 0	oto Startad	auoi	1/2//10		tod	1/2//	10
	roject		- Ha	wkins Co. Rogersville Tennessee	_ L _ r	Pale Starleu		N/A	Comple Date/Tir	เยน ทอ	N/A	
	spect	tor M F	dmunds	Loggor M Edmunds	_ Ľ _ r	Peptin to Wat	רי בי	N/A	Date/Tir	mo	N/A	
	rillina	Contract	or Sta	LOUGE	_ Ľ	rill Rig Type	ים <u>-</u> מים מי	d ID Geor	Date/ III probe 7730DT	ne		
	)verbu	ırden Dril	ling and	Sampling Tools (Type and Si	_ Ľ ze)	Direct Push - D	) Jual 1	Tube				
	ock D	)rilling and	d Samo	ling Tools (Type and Size)	20) N/A							
	verdr	ill Tooling	i (Type	and Size) N/A					Overdrill	De	oth I	N/A
s	ample	er Hamme	er Type	N/A Weight N	I/A	Drop	N/A		Efficiency		N/A	
В	, oreho	le Azimu	th	5	В	Borehole Incl	inati	ion (from	Vertical)	N/	A	
R	eview	ved By	K. Ca	rey	Α	pproved By		P. Dunne	,			
		Lithology				Overburden:	5	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI
Dep	th Ft <sup>3</sup>	Elevation	Graphic	Description		Rock Core:		RQD %	Run Ft		Rec. Ft	Rec. %
	0.0	1106.8		Top of Hole								_
Γ	0.1	1106.7		Topsoil			HA4	HA01	0.0 - 0.5		0.5	
- 1				SILTY LEAN CLAY WITH SAND, (	CL, 7.5	6YR 5/6	1.1/3.					-
- 2				(strong brown) to 7.5YR 4/1 (dark g	gray), ı	non-plastic,	1-2019	DP01	00-50	0.0 -	43	- N/A
- 3				Trace gravel inclusions from 0.1' to	o 1.1'		0124	Brot	0.0 0.0	5.0	4.0	-
- 4				Red sand and clay interval from 2.	1' to 2.	3'						-
- 5	5.0	1101.8	[]]							I II	ŧ I	_
6				LEAN CLAY WITH SILT, CL, 7.5Y	R 6/8 (	reddish	5					_
				plasticity, soft to stiff, moist to wet	i), mea	lium to nign	.5/8.5-			$  \rangle$		
- 7							201901	DP02	5.0 - 10.0	5.0 - 1	4.1	N/A
- 8							24			0		-
- 9												-
- 10	10.0	1096.8	44				-					_
- 11				SILTY LEAN CLAY TRACE SAND (brown) to 7 5YR 4/4 (brown) non-	), CL, 7 -plastic	5YR 5/4 to low	_					-
L 12				plasticity, firm to stiff, moist	plaotic		1.3/13.			10		_
							3-2019	DP03	10.0 - 14.6	0 - 14.0	4.6	N/A
13							0124					-
9 – 14	14.6	1092.2										_
T 20190				Bedrock Refusal /								-
SURF				Bottom of Hole at 14.6 Ft.								-
EC SUB												-
GPJ TD												-
ORDER												
- TDEC												-
225 - JSF												_
175568			4	Environmental Romale Quete du l'	0000	noone merch-	re ~	irod to -ht-	in oufficient	- In	,	-
NGLOG			G =	Geotechnical Sample Custody (two	Spiit S	poons may be	requ		in suncient sam	ihie'	)	-
P BORI.			2: a,b, 3: Der	c denote Split Spoon divided betweer	n Envire Lsurfac	onmental and 0 ce	Geote	echnical Sa	mples			-
TVAE			4: Gra	b sample (0.0/0.5-20190124) sample	d using	g hand auger						



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С	lient E	Borehole	ID N/A	A	Stantec B	oring N	lo. JSF-	BG12			
C C	lient		Tennes	see Valley Authority	Boring Lo	cation	737,493.	41 N; 2,895,501	.86 I	E NAD27	' Plant Local
P	roject	Number	175568	3225	Surface E	evatio	n 1086.8 ft	Elevatio	n D	Datum	NGVD29
P	roject	Name	JSF TD	)EC Order	Date Star	ed	1/23/19	Comple	ted	1/23/	19
P	roject	Locatior	n Ha	wkins Co, Rogersville, Tennessee	Depth to \	Vater	N/A	 Date/Tir	ne	N/A	
Ir	nspect	or M. E	dmunds	Logger M. Edmunds	Depth to \	Vater	N/A	Date/Tir	ne	N/A	
	rilling	Contract	or Sta	intec Consulting Services Inc.	Drill Rig T	ype an	d ID Geop	probe 7300DT			
C	Verbu	rden Dril	ling and	Sampling Tools (Type and Size	e) Direct Pus	ı - Dual	Tube				
R	lock D	rilling an	d Samp	ling Tools (Type and Size) <u>N/</u>	A						
C	Verdri	ll Tooling	g (Type	and Size) <u>N/A</u>				Overdrill	De	pth _	N/A
S	ample	er Hamme	er Type	WeightN/A	Dro	N/A		Efficiency	1	N/A	
B	oreho	le Azimu	th	N/A	Borehole	nclinat -	ion (from	Vertical)	N//	Ą	
	leview	ed By	K. Ca	rey	Approved	Ву	P. Dunne				
	I	ithology	1		Overbur	len:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI
Dep	oth Ft <sup>3</sup>	Elevation	Graphic	Description	Rock Co	ore:	RQD %	Run Ft		Rec. Ft	Rec. %
- 0	0.0	1086.8		Top of Hole		-					
	0.5	1086.3	戸門	Topsoil, grass, roots, some gravel, pa	ad material	- A	HA01	0.0 - 0.5	((	0.5	
- 1									1 111		-
				(strong brown) to 7.5YR 5/8 (strong k	, 7.51R 5/6 prown),	8/2.8-2			))		
- 2				non-plastic to low plasticity, stiff to ha	ırd, dry	201901					-
						23	DP01	0.0 - 5.0	.0 - 5.0	3.6	N/A
- 3									[}}		-
									[((		
- 4									(((		-
	5.0	1081.8							[[[		
<b>-</b> 5				CLAYEY SAND, SC, 7.5YR 6/1 (gray	/) to 7.5YR 6/3				M		_
- 6				(light brown), medium dense, moist							_
- 7						5.0/1					-
						0.0-20	DP02	5.0 - 10.0	5.0 - 10	1.0	N/A
8 - 8						190123			<sup>19</sup>		-
2 1									(		
9									1 111		-
2017									$ \rangle\rangle\rangle$		
- 10				Color change to 7 5YR 5/6 (strong br	own) fine loos					Ī	-
				to medium dense, moderately graded	d at 10.0'						
- 11						10.75/1			(((		-
						2.75-2			(((		
u − 12						01901	0000	10.0 15.0	10.0	50	-
10						23	DP03	10.0 - 15.0	- 15.0	5.0	N/A
13	13.5	1073.3		Some manganese inclusions from 13	3.0' to 13.5'						=
14				POORLY GRADED SAND, SP, 10YF	R 6/6 (brownish	3.5/15					_
			· · · ·	yellow) to 10YR 5/3 (brown), medium	to coarse,	0-2019					
	15.0	1071.8	•••••	loose, wet, oxidation banding in sand	throughout	90123					

Stantec Consulting Services Inc.



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Client Bor	rehole l	IDN/A		Stantec Boring	g١	lo. JSF-	BG12		
Client		Tennes	see Valley Authority	Boring Location	on	737,493.4	41 N; 2,895,501.86	E NAD27	Plant Local
Project Nu	umber <sub>.</sub>	175568	225	Surface Eleva	atio	n <u>1086.8 ft</u>	Elevation [	Datum_I	NGVD29
Lith	nology			Overburden:		Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup> El	levation	Graphic	Description	Rock Core:		RQD %	Run Ft	Rec. Ft	Rec. %
- 15	1070.9	$\ge$	No recovery			DP04	15.0 - 15.9	0.0	N/A
			Bedrock Refusal / Bottom of Hole at 15.9 Ft.				Ű		-
									_
									-
									-
		1: E = G = 2: a,b,c	Environmental Sample Custody (two Spl Geotechnical Sample Custody c denote Split Spoon divided between Er	it Spoons may be r	requ Geot	uired to obta echnical Sa	in sufficient sample mples	)	-
		3: Dep 4: Gral	ths are reported in feet below ground sur o sample (0.0/0.5-20190123) sampled us	rface sing hand auger					-
									-
									-
									_
									-
									_
									-
									_
									_
									_
									_
									_
									_
			Stantec Consulting	g Services Inc.					3/16/20



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С	Client E	Borehole	ID N/A	A.		Stantec E	oring	No. JSF-	BG13		
c	lient		Tennes	see Valley Authority		Boring Lo	catior	n 734,206.4	45 N; 2,886,552.	.61 E NAD2	7 Plant Local
P	roject	Number	175568	225		Surface E	levati	on 1086.0 ft	Elevatio	n Datum	NGVD29
P	roject	Name	JSF TD	EC Order		Date Star	ted	10/7/19	Complet	ted 10/7	/19
P	roject	Locatio	n Ha	wkins Co, Rogersville, Tenr	ressee	Depth to	Nater	N/A	Date/Tir	ne N/A	
Ir	nspect	or <u>K</u> . C	arey	Logger <u>K.</u> Carey		Depth to	Nater	N/A	Date/Tir	ne N/A	
	rilling	Contrac	tor <u>Ha</u>	wkston (Subcontractor)		Drill Rig	ype a	nd ID Geop	probe 3230DT		
C	Verbu	rden Dri	lling and	Sampling Tools (Typ	e and Size	)DPT 2.0"	iner				
R	Rock D	rilling an	ld Samp	ling Tools (Type and S	Size) <u>N/</u>	٩					
	Overdr	ill Tooling	g (Type	and Size) <u>N/A</u>					Overdrill	Depth _	N/A
S	ample	er Hamm	er Type	N/A Wei	ght <u>N/A</u>	Dro	p_N//	۹	Efficiency	N/A	
B	loreho	le Azimu	ith	N/A		Borehole	Inclin	ation (from	Vertical)	N/A	
	Review	ed By	P. Du	nne		Approved	Ву _	L. Price			
		Lithology				Overbu	den:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. F	t Blows/PSI
Dep	oth Ft <sup>3</sup>	Elevation	Graphic	Description		Rock C	ore:	RQD %	Run Ft	Rec. F	t Rec. %
- 0	0.0	1086.0		Top of Hole				114.04	00.05	0.5	
	0.8	1085.2		SILTY GRAVEL, GM, 10	)YR 4/3 (brow	vn), dry	Þ,	HAU1	0.0 - 0.5	0.5	
- 1	1.6	1084.4		SILT, ML, 7.5YR 4/6 (str	rong brown), s	soft, dry					-
- 2				LEAN CLAY, CL, 7.5YR	5/6 (strong b	orown),	1.5/3.				-
				non-plastic, soft, dry			.5-2019	DP01	0.0 - 5.0	3.7	N/A
- 3	0.7	1000.0					91007				-
- 4	3.7	1082.3		FAT CLAY CH 10YR 4	/4 (dark vello	wish brown) to					-
				7.5YR 5/4 (brown), low p	plasticity, firm	, moist					
- 5											-
6											_
ľ											
- 7							6.5/8.5			5.0	-
							-20191	DP02	5.0 - 10.0	5.0	N/A
<sup>−</sup> <sup>8</sup>							007				-
- 9											-
074	10.0	1076.0									
≛ – 10				FAT CLAY, CH, 7.5YR 3	3/2 (dark brov	vn) to 10YR 3/	3			l III	-
- 11				(dark brown), medium pl	lasticity, firm,	moist					-
107 101 -							1				
- 12							5/13.5-	0002	10.0 15.0	10.0	
13							20191	DP03	10.0 - 15.0	5.0	- N/A
r.ep.							007				
- 14											-
≝ ⊴ – 15	15.0	1071.0								1 122	_
- 922890				FAT CLAY, CH, 10YR 3	/6 (dark yello	wish brown) to					
2 - 16				10YR 4/4 (dark yellowisl moist	n brown), meo	dium plasticity	16.				-
							5/18.5				_
1 EP BO							-20191	DP04	15.0 - 20.0	5.0	N/A
<u></u>							007			0.0	



Page: 2 of 2

	Client E	Borehole	IDN/A		Stantec Borin	g No. JSF-	BG13		
	Client		Tennes	see Valley Authority	Boring Location	on <u>734,206.</u>	45 N; 2,886,552.6	61 E NAD27	Plant Local
F	Project	Number	1755682	225	Surface Eleva	ation <u>1086.0 ft</u>	Elevation	Datum_	NGVD29
		Lithology			Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Dep	oth Ft <sup>3</sup>	Elevation	Graphic	Description	Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
- 18 - 19 - 20	20.0	1066.0		FAT CLAY, CH, 10YR 3/6 (dark yellov 10YR 4/4 (dark yellowish brown), med moist <i>(Continued)</i>	wish brown) to dium plasticity,				-
- 21 - 22				FAT CLAY, CH, 7.5YR 4/4 (brown), m plasticity, soft, moist	nedium to high	21.5/2:			-
- 23 - 24						DP05	20.0 - 25.0	4.3	N/A -
- 25 - 26	25.0	1061.0		SILTY SAND, SM, 7.5YR 4/3 (brown) (dark grayish brown), fine to medium,	to 10YR 4/2 moist to wet				-
- 27 - 28						26.5/28.5-20191(	25.0 - 29.0	4.0	N/A -
- 29	29.0	1057.0		$\sim$ Angular limestone pebbles/cobbles fro	om 28.7' to 29' 🦯	007			
				Bedrock Refusal / Bottom of Hole at 29.0 Ft.					_
									-
									-
									-
SUBSURF DT 20190530.GDT 11/4/2			1: E = I G = 2: a,b,c 3: Dep 4: Grat	Environmental Sample Custody (two Sp Geotechnical Sample Custody c denote Split Spoon divided between En ths are reported in feet below ground su o sample (0.0/0.5-20191008) sampled us	lit Spoons may be nvironmental and G rface sing hand auger	required to obta Geotechnical Sa	in sufficient samp mples	ole)	-
R.GPJ TDEC									-
- TDEC ORDE									-
75568225 - JSF									_
RING LOG 17									-
TVA EIP BO									_



Page: 1 of 2

С	lient E	Borehole	ID N/A	A	Ę	Stantec Borin	ng No	JSF	BG14			
C	lient		Tennes	ssee Valley Authority	E	Boring Locati	on	734,503.	56 N; 2,886,376	.22	E NAD27	' Plant Local
P	roject	Number	175568	3225	{	Surface Eleva	ation	1079.2 ft	Elevatio	n E	Datum I	NGVD29
P	roject	Name	JSF TE	DEC Order	[	Date Started		10/8/19	Comple	ted	10/8/	19
P	roject	Location	n Ha	wkins Co, Rogersville, Tennessee	[	Depth to Wat	er	N/A	 Date/Tir	me	N/A	
In	nspect	or K. Ca	arey	Logger K. Carey	[	Depth to Wat	er	N/A	Date/Tir	ne	N/A	
D	rilling	Contract	or Ha	wkston (Subcontractor)	[	Drill Rig Type	anc	I ID Geop	probe 3230DT			
0	verbu	ırden Dril	ling and	Sampling Tools (Type and	Size)_	DPT 2.0" liner						
R	lock D	rilling an	d Samp	ling Tools (Type and Size)	N/A							
0	verdri	ill Tooling	g (Type	and Size)					Overdrill	De	pth	N/A
S	ample	er Hamme	er Type	N/A Weight	N/A	Drop _I	N/A		Efficiency		N/A	
B	oreho	le Azimu	th	N/A	E	Borehole Incl	inati	on (from	Vertical)	N/.	A	
R	eview	ed By	P. Du	nne	A	Approved By		Price				
		Lithology				Overburden:	S	ample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI
Dep	th Ft <sup>3</sup>	Elevation	Graphic	Description		Rock Core:		RQD %	Run Ft		Rec. Ft	Rec. %
- 0	0.0	1079.2		Top of Hole			-					
				CLAYEY GRAVEL, GC, 10YR 4	4/4 (dark	yellowish	۲A4	HA01	0.0 - 0.5		0.5	
- 1				Fill from 0.0' to 2.0'	у					1 1		-
- 2			a a a a a	Angular, gray gravel zone from	1.4' to 2.4	0'						-
	2.8	1076.4						DP01	0.0 - 5.0	0.0 - 5.	2.8	N/A
- 3				FAT CLAY, CH, 10YR 3/3 (dark	(brown) 1	to 10YR 4/4	3.0			Î		-
- 4				(dark yellowish brown), low to m	nedium p	lasticity, firm,	/5.0-20					-
				dry to moist			019100					
- 5							8			{}		-
- 6												-
- 7							3.5/8.5			5.0		-
							-20191	DP02	5.0 - 10.0	- 10.0	5.0	N/A
۲°							800			$  \rangle$		-
- 9												-
07/0	10.0	1069.2								$ \rangle$		
= 10				FAT CLAY, CH, 10YR 4/4 (dark	vellowis	sh brown),					Π	_
- 11				medium plasticity, moist						$ \rangle$		-
1 20							11.5					
h – 12							5/13.5-:		10.0 - 15.0	10.0 -	5.0	- Ν/Δ
	13.3	1065.9					201910	DI 00	10.0 - 10.0	15.0	0.0	
292				SILTY SAND, SM, 10YR 4/4 (da	ark yellov	wish brown),	80					
g – 14			<b>₩</b> <u>₩</u> ₩₩₩	fine to medium, moist								-
= ġ − 15	15.0	1064.2	<u><u>∦↓↓↓↓</u></u>	i ransitions to a sandy material	at 13.3'					A	4	_
. 077900				POORLY GRADED SAND, SP,	, 7.5YR 4	/4 (brown),						
°⊢ 16				inte to medium, moist			16.5					-
- 17							/18.5-2					-
							01910	DP04	15.0 - 20.0	5.0 - 20	3.4	N/A
مه ا							8		l	lioll	M .	



Page: 2 of 2

C	lient I	Borehole	IDN/A		Stantec Boring	No. <b>JSF-</b>	BG14		
С	lient		Tennes	see Valley Authority	Boring Locatio	n <u>734,503.5</u>	6 N; 2,886,376	.22 E NAD27	Plant Local
Ρ	roject	Number	175568	225	Surface Elevat	ion 1079.2 ft	Elevatio	n Datum_	NGVD29
		Lithology			Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PS
Dep	th Ft <sup>3</sup>	Elevation	Graphic	Description	Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
<ul> <li>18</li> <li>19</li> <li>20</li> <li>21</li> <li>22</li> <li>23</li> <li>24</li> <li>25</li> </ul>	20.0 23.7 25.0	1059.2 1055.5 1054.2		POORLY GRADED SAND, SP, 7.5YI fine to medium, moist <i>(Continued)</i> Grades to a poorly graded, medium s to 20.0' WELL GRADED GRAVEL WITH SAN 4/6 (dark yellowish brown), coarse, m WELL GRADED GRAVEL WITH SAN 3/1 (very dark gray), coarse, moist, lig weathered bedrock fragments/ pebble Rock encountered at 23.7' Terminate to not advance further into bedrock Bedrock Refusal / Bottom of Hole at 25.0 Ft.	R 4/4 (brown), and from 19.7' ID, GW, 10YR oist to wet ID, GW, 10YR Jht gray es and cobbles d boring at 25.0'	DP05	20.0 - 25.0	200-250	N/A
			1: E = G = 2: a,b, 3: Dep 4: Gra	Environmental Sample Custody (two Sp Geotechnical Sample Custody c denote Split Spoon divided between E ths are reported in feet below ground su b sample (0.0/0.5-20191008) sampled u	lit Spoons may be re nvironmental and Ge rface sing hand auger	equired to obtai	n sufficient sam nples	ıple)	



Page: 1 of 2

С	lient E	Borehole	ID_N/A	N .			Stantec Borir	ng No	JSF	-BG15			
C C	lient		Tennes	see Valley Authority	1		Boring Locati	ion	734,653.	36 N; 2,886,121	.92	E NAD27	Plant Local
P	roject	Number	175568	225			Surface Eleva	ation	1078.7 ft	Elevatio	on E	Datum	NGVD29
P	roject	Name	JSF TD	EC Order			Date Started		10/8/19	Comple	eted	10/8/	19
P	roject	Locatior	ר Hav	wkins Co, Rogersvill	e, Tennessee	Э	Depth to Wat	er _	23.5 ft	Date/Ti	me	10/8/	19
In	spect	or K. Ca	arey	Logger <u>_K</u> .	Carey		Depth to Wat	er _	N/A	Date/Ti	me	N/A	
D	rilling	Contract	or <u>Hav</u>	wkston (Subcontract	ior)		Drill Rig Type	e and	ID Geop	probe 3230DT			
0	verbu	rden Dril	ling and	Sampling Tools	s (Type and	d Size)	DPT 2.0" liner						
R	ock D	rilling and	d Samp	ling Tools (Type	and Size)	N/A							
0	verdri	ill Tooling	(Type	and Size) <u>N/A</u>						Overdrill	De	epth	N/A
S	ample	er Hamme	er Type	N/A	_ Weight _	N/A	Drop _	N/A		Efficiency		N/A	
B	oreho	le Azimu	th	N/A			Borehole Incl	linati	on (from	Vertical)	N/.	A	
R	eview	ed By	C. Ko	cka			Approved By		P. Dunne				
		Lithology					Overburden:	S	ample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI
Dept	th Ft <sup>3</sup>	Elevation	Graphic	Description			Rock Core:		RQD %	Run Ft		Rec. Ft	Rec. %
- 0	0.0	1078.7		Top of Hole									
				SILTY GRAVEL,	GW, 10YR 2/	/1 (black	), dry, [FILL]	HA*	HA01	0.0 - 0.5	10	0.5	
- 1			e e e e e	Color change to <sup>2</sup>	10YR 6/1 (gra	ay) at 0.9	,				$ \rangle$		
-2	2.0	1076.7				,		1.5/					
2				LEAN CLAY, CL,	7.5YR 4/3 (b	prown), n	on to low	3.5-201	DP01	0.0 - 5.0	0.0 - 5	3.9	N/A
- 3				plasticity, dry				91008			0		
											18		
				Color change to 7	7.5YR 4/4 (bro	own) at 3	3.9'				1 🕅		
- 5											{}	1	-
6													
- 0											1 ((		
- 7								6.5/8.5			5.0		
								-20191	DP02	5.0 - 10.0	0 - 10.0	4.5	N/A
- 8								800			$ \rangle$		
- 9													
	10.0	1068.7											
- 10				FAT CLAY, CH, 7	7.5YR 4/4 (bru	own), me	edium to high	111				7	-
- 11				plasticity, moist									
								11.					
- 12								0/14.0-	0002	10.0 15.0	10.0	5.0	NI/A
- 13								20191	DF03	10.0 - 15.0	. 15.0	5.0	IN/A
								800					
- 14											1 11		
- 15											ΙŴ	1	-
				Color change to 7	7.5YR 4/6 (str	rong brov	wn) at 15.0'						
- 16								16.					
L 17								5/18.5-					
- 1/	17.5	1061.2						20191	DP04	15.0 - 20.0	15.0 - 2	NR	N/A
لمما								800			0.0	1	



# SUBSURFACE LOG

Page: 2 of 2

Client	Borehole	ID_N/A		Stantec Boring	g No. JSF-	BG15		
Client		Tennes	see Valley Authority	Boring Locatio	on 734,653.	36 N; 2,886,121.9	2 E NAD27	Plant Local
Project	Number	175568	225	Surface Eleva	tion <u>1078.7 ft</u>	Elevation	Datum_r	NGVD29
	Lithology			Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic	Description	Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
- 18 - 19 - 20 <u>20.0</u>	1058.7		SILTY SAND, SM, 7.5YR 4/4 (brown) medium, moist to wet <i>(Continued)</i>	, very fine to				-
- 21 - 22 - 23			POORLY GRADED SAND, SP, 7.5YF fine to medium, moist to wet, subangu subrounded pebbles/cobbles within sa material.	₹ 4/4 (brown), ılar and and, alluvial	21.5/23.5-20191008	20.0 - 24.5	2.7	- N/A -
- 24	1054.2		Encountered water from 23.5' to 24.5'					-
		1: E = G = 2: a,b, 3: Dep 4: Gral	Bottom of Hole at 24.5 Ft. Environmental Sample Custody (two Spl Geotechnical Sample Custody c denote Split Spoon divided between Er ths are reported in feet below ground su b sample (0.0/0.5-20191008) sampled us	lit Spoons may be n nvironmental and G rface sing hand auger	equired to obta eotechnical Sa	in sufficient sampl	le)	

# **APPENDIX D - PHOTOGRAPHIC LOGS**

# ATTACHMENT D.1

## PHOTOGRAPHIC LOGS OF SOIL CORES



















I

### Photographic Log

Client:	Tennessee Valley Authority Project: TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant Site Location: Rogersville, Tennessee
Photograph ID: 9	Courth East Eleventions
Photo Location:	South East Elevation
JSF-BG03	
1/29/2019	
<b>Comments:</b> Interval (5.0-10.0 feet) Photo location shown white board should be JSF-BG03.	on The second s
Photograph ID: 10	20 Jail 2019, 10.03.17
Photo Location:	South East Elevation
JSF-BG03	
<b>Photo Date:</b> 1/29/2019	and the second s
<b>Comments:</b> Interval (10.0-14.4 fee Photo location shown white board should be JSF-BG03.	et). on Berline Berline Berlin
	1755662225 356 - 256 - 254 - 544 - 5







Client:	Tenne	essee Valley Authority	Project:	TDEC Order
Site Name:	John	Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 13 Photo Location: JSF-BG04Alt Photo Date:				
1/30/2019				
Photo of interval (10.0 feet) unavailable.	ŀ-15.0		No Photo Applicab	ble
Photograph ID: 1/		The state has the light of the state of the	AT A DESCRIPTION OF THE OTHER DESCRIPTION OF T	
			South Eleval	tion
Photo Location: JSF-BG04Alt		© 347°N (T) © 3	South Eleval	tion 5"W +105.0ft ▲ 1173ft
Photo Location: JSF-BG04Alt Photo Date: 1/30/2019		© 347°N (T) © 3	South Eleva 6°21'47"N, 82°58'5	tion 55"W ±105.0ft ▲ 1173ft



Client:	Tenne	essee Valley Authority	Project:	TDEC Order
Site Name:	John	Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 15Photo Location: JSF-BG05AltPhoto Date: 1/31/2019				
<b>Comments:</b> First boring location in (0.0-5.0 feet), low reco photo unavailable.	iterval overy,		No Photo Applicab	ble
Photograph ID: 16		No	with East Eloy	vation
Photograph ID: 16 Photo Location: JSF-BG05Alt		● 223°SW (T) ●	orth East Elev 36°21'49"N, 82°59	vation '14"W ±39.4ft ▲ 1082ft
Photograph ID: 16 Photo Location: JSF-BG05Alt Photo Date: 1/31/2019		No @ 223°SW (T) @	orth East Elev 36°21'49"N, 82°59	vation '14"W ±39.4ft ▲ 1082ft



Client: Te	nnessee Valley Authority	Project:	TDEC Order
Site Name: Jo	hn Sevier Fossil (JSF) Plar	t Site Location:	Rogersville, Tennessee
Photograph ID: 17	N	orth East El	evation
JSF-BG05Alt	@ 215°SW (T)	) 36°21'48"N, 82°5	9'14"W ±210.0ft ▲ 1011ft
Photo Date: 1/31/2019			
Comments: Interval (5.0-10.0 feet). Photo location shown on white board should be JSF-BG05Alt.		1755LEZZE JSF. TALEGRAND SAL BGOD - ALT VISI/2017 RNN 2:5'-10' RECOVER 1: 4.0 10P-	S-repLipt.
Photograph ID: 18			31 Jan 2019, 11:44:14
Photo Location: JSF-BG05Alt	● 1089		Contraction of the second se
<b>Photo Date:</b> 1/31/2019	19.7ft		
Comments: Interval (10.0-11.8 feet). Boring refusal at 11.8 feet Photo location shown on white board should be JSF-BG05Alt.	© 217°SW (T) © 36°21'49"N, 82°59'14"W	175568225 JSF.BACKGROU BGOS-ALT 1/31/2019 RUN 3:10- RECOVER	ND SOL SAMPLING 11.81 A: 1.41 BTM















Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 25			
Photo Location: JSF-BG08	© 48°NE (T) (	36°22'0"N.82°58"	2Vation
Photo Date: 1/28/2019	AND CO		
<b>Comments:</b> Interval (0.0-5.0 feet). Photo location shown white board should be JSF-BG08.	on Statistical Sta	<u>A9</u>	
	Re Re	176566225 Dir Bac Fordundo San S 125/2015 121/2015	28 Jan 2019, 14:56:47
Photograph ID: 26		with Most El	
Photo Location: JSF-BG08	© 39°NE (T)	36°22'1"N, 82°58'1	0"W ±52,5ft 🔺 1038ft
Photo Date: 1/28/2019			
<b>Comments:</b> Interval (5.0-10.0 feet) Photo location shown white board should be JSF-BG08. Recovery shown on white board	on State Sta		
should be 5.0.		Inscreazes Dr Baceboardo Salas Baos 1/28/2017 RUNZ: 5-10' Reansery: 5.0 Gr Barro	28 Jan 2019, 15:03:59











Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 31		with Mont	
Photo Location:	50	outh west	levation _
JSF-BG09	@ 41°NE (T) 🔘	36°22'6"N, 82°5	58'4"W ±105.0ft ▲ 1130ft
1/25/2019	+ THE STORES		
<b>Comments:</b> Interval (10.0-15.0 fee Photo location shown white board should be JSF-BG09.	t). on		Buchall
		HEREFERENCE	25 Jan 2019, 10:13:29
Photograph ID: 32	Sec. Se	with West	Hovation
Photo Location: JSF-BG09	@ 32°NE (T) (0	36°22'5"N, 82°5	58'4"W ±105.0ft ▲ 1040ft
Photo Date: 1/25/2019			
<b>Comments:</b> Interval (15.0-19.1 feet Photo location shown white board should be JSF-BG09.	t). on		
		HISTORIZES JUR BACKGRAND BAD VIESTEON RUN 4:15'-19.1 RECARPY: 5.0'	



















Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 41	2500 625	West Eleva	ation
JSF-BG12	@ 79°E (T) 03	6°22'47"N, 82°57	"27"W ±26.2ft ▲ 1086ft
Photo Date: 1/23/2019			
<b>Comments:</b> Interval (10.0-15.0 fee Photo location shown white board should be JSF-BG12.	et). on e	Burletty Totall	
		176562225 JSF TDEC OFDER BAC B4-12 1/23/2099 RUNI 3:10'-15' RECOVERY 5:0'-5. Top	скоярьно била С С С С С С С С С С
Photograph ID: 42			
Photo Location: JSF-BG12			
Photo Date: 1/23/2019			
<b>Comments:</b> Interval (15.0-15.9 fee recovery, photo unavailable.	it), no	No Photo Applic	cable






























Client:	Tenn	essee Valley Authority	Project:	TDEC Order
Site Name:	John	Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 57 Photo Location: JSF-BG15		_		
<b>Photo Date:</b> 10/8/2019				
<b>Comments:</b> Photo of interval (15.0 feet) unavailable.	)-20.0		No Photo Applicat	ble
Photograph ID: 58			Level and	
Photo Location: JSF-BG15				
<b>Photo Date:</b> 10/8/2019			1	
Comments: Interval (20.0-24.5 fee	rt).		175562225 Т5F-ВС-15 10-09-2019, 20.0-245; КЕС:27; Тор Вотроп	

# **ATTACHMENT D.2**

# PHOTOGRAPHIC LOGS OF SOIL CORES – BACKGROUND WELLS



















Client:	Tenne	essee Valley Authority	Project:	TDEC Order
Site Name:	John	Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 9				
Photo Location: JSF-110				
Photo Date: 1/29/2019				
<b>Comments:</b> Photo of interval (13.5 feet) unavailable.	5-15.0		No Photo Applicat	ble

# **ATTACHMENT D.3**

# PHOTOGRAPHIC LOGS OF ROCK OUTCROPS



Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 1		AN A A A A A A A A A A A A A A A A A A	Jan 13, 2020 at 201 13 PM
Photo Location: Area 01			Rogersville
Direction: Northwest			
Photo Date: 1/13/2020			
Comments: JSF-ROC-Area01-01	JSF-R	175568225 01132020 ROC AREA 1 Sevier Shale ROC Area 01-01-20200113	
Photograph IU: 2	State State		Jan 13, 2020 at 2.02 37 PM Bodersville
Photo Location: Area 01		A Contraction	
Direction: West		Area Astro	
Photo Date: 1/13/2020		An Co	
Comments: JSF-ROC-Area01-01			



Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plar	t Site Location:	Rogersville, Tennessee
Photograph ID: 3		W 300 NW 32	N
Photo Location: Area 01	© 311°N	I • I • I • I • I • I • I • I • I • I IW (T) ● 36°23'5"N, 82°57'55	• I • I • I • I • I 5"W ±26.2ft ▲ 1188ft
Direction: Northwest		Sector Heritage	
Photo Date: 1/13/2020			
<b>Comments:</b> JSF-ROC-Area01-01	A01/501	Provide a series of the series	JSF ROC 13 Jan 2020, 14:02:36
Photograph ID: 4			Jan 14, 2020/at 11 39 49 AM
Photo Location: Area 02			Rogersville
Direction: North			
<b>Photo Date:</b> 1/14/2020			
Comments: JSF-ROC-Area02-01			ITESC 225 and and Server of the faile to performed the faile



Client:	Tennessee Valley Authority	Project:	TDEC Order	
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee	
Photograph ID: 5			Jan 14, 2020 at 11:39	59 AM
Photo Location: Area 02			Roge	ersville
Direction: North			Charles and a second	
Photo Date: 1/14/2020			175568225	
<b>Comments:</b> JSF-ROC-Area02-01			SEVIER SHALE - ROC-AREA02-01-2020114	
Photograph ID: 6			Jan 14, 2020 at 11,41	23 AM
Photo Location: Area 02		AX	Rog	ersville
<b>Direction:</b> North				
Photo Date: 1/14/2020		14 14 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
<b>Comments:</b> JSF-ROC-Area02-01				



Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 7 Photo Location: Area 02		<b>VAX</b>	Jan 14, 2020 at 12:16 25 PM Rogersville
Direction: North			
<b>Photo Date:</b> 1/14/2020			
<b>Comments:</b> JSF-ROC-Area02-02	I 7550 OII42 AREA SEVIER. JSF-ROC-PH	5225 02 5,4412 XEA02-02-2020014	
Photograph ID: 8			
Photo Location: Area 03			
Direction: N/A			
Photo Date: 1/14/2020			
<b>Comments:</b> JSF-ROC-Area03, No outcrop observed, pho unavailable.	otos	No Photo Applical	ble



Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 9			Jan 14, 2020 at 8:43:39 AV
Photo Location: Area 04			Rogersville
Direction: West			A Const
<b>Photo Date:</b> 1/14/2020	and the second of the state	Charles and	
<b>Comments:</b> JSF-ROC-Area04, No outcrop observed			
Photograph ID: 10			//Jan//4/2020 at 848 23 AM
Photo Location: Area 04			Rogersville
Direction: South-southwest			1 ANN
Photo Date: 1/14/2020			AL-ALSO
Comments: JSF-ROC-Area04, No outcrop observed			



Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 11		377 P 783	Jan 13, 2020 at 12:54:31 PM
Photo Location: Area 05			Rogersville
Direction: Northwest			
Photo Date: 1/13/2020			5
Comments: JSF-ROC-Area05-01		17556822 OII3202 ROCATE Sevier S JSF-ROCATEROS-D	ASE ASE ASSE
Photograph ID: 12		NA BAR	Jan 13, 2020 at 12:54:57 PM
Photo Location: Area 05			Rogersville
Direction: West			All see
Photo Date: 1/13/2020			den sta
Comments: JSF-ROC-Area05-01			



Client:	Tenn	essee Valley Authority	Project:	TDEC Order
Site Name:	John	Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 13		W	300 NW	N <sub>0</sub> 30
Photo Location: Area 05		• 1 • 1 • 321°NW	• 1 • 1 • 1 • 1 • 1 • 1 • 1 √ (T) ● 36°22'57"N, 82°57'59'	• I • I • I • I • I "W ±105.0ft ▲ 1078ft
Direction: Northwest			1/ à	
Photo Date: 1/13/2020			3 A	
<b>Comments:</b> JSF-ROC-Area05-01		A05/S01		JSF ROC 13 Jan 2020, 12:55:00
Photograph ID: 14			A REAL	
Photo Location: Area 06				A
Direction: North-northwest			國家	
Photo Date: 1/14/2020				17556 225 Dilypass HEEADS Sever Share
<b>Comments:</b> JSF-ROC-Area06-01				AL A A A A A A A A A A A A A A A A A A



Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 15			Jan 14, 2020 at 10:58:14 AM
Photo Location: Area 06			Rogersville
Direction: North		1 STAT	
Photo Date: 1/14/2020	AND A		
Comments: JSF-ROC-Area06-01		I 7556822 OII92020 AREAOG SEVIER SHA JSF-ROL-APEAW-Q-D	S LE bitool14
Photograph ID: 16			Jan 14, 2020 at 10,26 29 AV
Photo Location: Area 06	A		A LANK
Direction: North			
Photo Date: 1/14/2020			Marine and
<b>Comments:</b> JSF-ROC-Area06-01, Outcrop			



Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 17	S	SW	W NW
Photo Location:	150 •   •   •   •   •   •	• 1 • 1 • 1 • 1 • 1	270 300 33 • I • I • I • I • I • I • I • I
Area 06	© 237°SW (T) 🔘	36°22'15"N, 82°58	'47"W ±105.0ft ▲ 1089ft
Direction: Southwest			
<b>Photo Date:</b> 1/14/2020			
<b>Comments:</b> JSF-ROC-Area06, Po Branch	ılly's		
	Polly Branch/01	De A	JSF ROC 14 Jan 2020, 09:57:01
Photograph ID: 18	S	W	NW
Photo Location: Area 06	<sup>180</sup> 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1	240 1 • 1 • 1 • 1 • 1 • 1 36°22'17"N, 82°58	<sup>300</sup> 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1 '47''W ±19.7ft ▲ 1082ft
Direction: West			
<b>Photo Date:</b> 1/14/2020			
<b>Comments:</b> JSF-ROC-Area06, Po Branch	ılly's		
		1 des	
	Polly Branch/06		JSF ROC 14 Jan 2020, 10:07:43



Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 19		ANY WAR	Jan/14, 2020 at 2:16 57 PM
Photo Location: Area 07		R Bie	Rogersville
Direction: North			
Photo Date: 1/14/2020			
Comments: JSF-ROC-Area07-01		175565 OII42 AREA SEVIER JSF-ROC-AREAD	225 07 07 07-01-2020014
Photograph ID: 20			Jan 14, 2020 at 2,17-14 PM
Photo Location: Area 07			Rogersville
Direction: North			
<b>Photo Date:</b> 1/14/2020			
Comments: JSF-ROC-Area07-01	IT 55 67 Oligo Area Sevier Jer-Be-Area	22-5 XP SHALE STALL STAL	



Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee
Photograph ID: 21		Y A A A	Jan 14, 2020 at 2:38:52 PM
Photo Location: Area 07			Rogersville
Direction: Northeast			
<b>Photo Date:</b> 1/14/2020			
<b>Comments:</b> JSF-ROC-Area07-02	TSTORE ACCA DECEMBER	AT AN ANDER	