APPENDIX J –
SURFACE STREAM, SEDIMENT AND BENTHIC, AND FISH TISSUE INVESTIGATIONS

APPENDIX J.1
TECHNICAL EVALUATION OF SURFACE STREAM DATA

TENNESSEE VALLEY AUTHORITY

Appendix J.1 - Technical Evaluation of Surface Streams Data

John Sevier Fossil Plant

Rogersville, Tennessee

Tennessee Valley Authority

TVA

Title and Approval Page

Title of Document: Appendix J.1 – Technical Evaluation of Surface Stream Data
John Sevier Fossil Plant
Tennessee Valley Authority
Rogersville, Tennessee

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Acronyms and Abbreviations

ATL	Alternative Thermal Limit
BIP	Balanced Indigenous Population
CARA	Corrective Action and Risk Assessment
CC	Center Channel
CCR	Coal Combustion Residuals
CCR Parameters	CCR Constituents in 40 CFR 257, Appendices III and IV and the five inorganic constituents listed Appendix I of Tennessee Rule 0400-11-01-.04
CFR	Code of Federal Regulations
CWA	Clean Water Act
EAR	Environmental Assessment Report
EI	Environmental Investigation
EIP	Environmental Investigation Plan
ESV	Ecological Screening Value
HRM	Holston River Mile
JCC Plant	John Sevier Combined Cycle Plant
JSF Plant	John Sevier Fossil Plant
NPDES	National Pollution Discharge Elimination System
SAP	Sampling and Analysis Plan
SAR	Sampling and Analysis Report
TDEC	Tennessee Department of Environment and Conservation
TDEC Order	Commissioner’s Order No. OGC15-0177
TN	Tennessee
TVA	Tennessee Valley Authority
µg/L	micrograms per Liter
WET	Whole Effluent Toxicity

Chapter 1 Introduction

The Tennessee Valley Authority (TVA) has prepared this technical evaluation appendix to summarize historical and recent surface stream sampling data at TVA's John Sevier Fossil Plant (JSF Plant) in Rogersville, Tennessee. This technical appendix provides a detailed evaluation of these data to support information provided in the Environmental Assessment Report (EAR) to fulfill the requirements for the Tennessee Department of Environment and Conservation-issued Commissioner's Order No. OGC15-0177 (TDEC Order) Program (TDEC 2015).

Chapter 2 Surface Stream Investigation

The purpose of the surface stream investigation was to characterize surface stream water quality conditions in the vicinity of the Coal Combustion Residuals (CCR) management units at the JSF Plant. For this investigation, TVA reviewed historical and current/ongoing surface stream studies conducted within streams and rivers adjacent to the JSF Plant and performed a surface stream investigation as part of the TDEC Order Environmental Investigation (EI).

The following sections summarize the previous studies and present overall surface stream investigation and evaluation findings based on data obtained during previous studies and the EI for the JSF Plant.

2.1 Historical Studies

The JSF Plant was constructed on the southern bank of the Holston River within the inflow of the Holston River to the Cherokee Reservoir. The facility is located immediately downstream of the John Sevier detention dam. TDEC's assessment and reporting on the quality of surface waters throughout this area characterizes water quality within the Cherokee Reservoir and the John Sevier Detention impoundment as impacted and not supportive of intended water uses (TDEC 2020a and 2020b). Current and historically documented impairments to the reservoir system at the JSF Plant include impacts associated with the mercury source at the Saltville Virginia Superfund Site and from atmospheric deposition (TDEC 2014, 2020a, and 2020b). To date, no impacts have been documented that directly result from JSF Plant operations.

Surface stream monitoring conducted near the JSF Plant as part of the historical studies described below included evaluation of the listed general water quality parameters only; specific surface stream water quality sampling to evaluate CCR constituents was not performed during these historical studies.

Between 1973 and 1981, biological studies were performed to evaluate potential aquatic environmental effects of thermal discharge at the JSF Plant via the National Pollution Discharge Elimination System (NPDES) permitted outfall (Permit No. TN0005436). These studies were performed as required by the Clean Water Act (CWA) Sections 316(a) and 316(b) to establish an alternative thermal limit (ATL) and as part of the JSF Plant NPDES permit renewal requirements (TVA 1977, 1979a, 1979b, and 1984). The surface stream monitoring included measurements of water quality parameters (temperature, dissolved oxygen, conductivity, and pH), and evaluations of any impacts of the JSF Plant thermal discharge on phytoplankton, zooplankton, periphyton, benthic macroinvertebrates, and fish communities at Holston River locations upstream of and adjacent to the JSF Plant.

In 2003, fish community surveys were performed within the Cherokee Reservoir in support of fulfilling the 2004 NPDES permit renewal requirements for thermal variance (TVA 2003) under CWA Section 316(a). Monitoring concluded that balanced indigenous population (BIP) criteria were met at the three downstream locations (HRMs 100, 102.5, and 105.5).

Pre- and post-operational biological monitoring of the Holston River was performed in summer and autumn 2011 and 2012 to determine if ATLs established under CWA Section 316(a) for the JSF Plant and John Sevier Combined Cycle Plant (JCC) Plant thermal discharge were protective of a BIP of aquatic life (TVA 2012, 2013a, and 2013b). Samples were collected at Holston River transects upstream and downstream of the John Sevier detention dam to evaluate fish, benthic macroinvertebrate, plankton, and shoreline wildlife communities; shoreline aquatic and river bottom habitats; thermal plume intensity and extent; and general water quality parameters. The resulting aquatic community data were evaluated using community characteristics/metrics and statistical diversity comparisons. Water quality parameter data included temperature, conductivity, dissolved oxygen, and pH. Temperature profiles from 2011 indicated that the thermal plume extended from the JSF Plant discharge (HRM 106.1) downstream to HRM 103.2 and remained in the upper 1-2 meters of the water column; no thermal plume was detected in summer or autumn 2012. TVA found that comparisons of biological communities between sampling sites were difficult due to differences in flows, depths, and substrate types; the habitat of the thermally affected area downstream of the JSF Plant discharge is riverine (river-like), while the non-thermally affected areas upstream or downstream and outside of the influence of the JSF discharge are lacustrine (reservoir-like) (TVA 2012, 2013a, and 2013b). The studies found that downstream aquatic communities near the JSF and JCC Plants were ecologically similar to their upstream control sites. As such, TVA concluded that thermal effluent from the JSF Plant thermal discharge was not adversely affecting downstream biological communities, and water quality was satisfactory for aquatic life use.

Per NPDES Permit No.TN0005436, Whole Effluent Toxicity (WET) testing was conducted annually from 1994 through 2015 at JSF. From 1994 to 2012, effluent was monitored at Outfall 001. In 2012, Outfall 001 was closed, and Bottom Ash Pond discharges were re-routed through a new outfall structure discharging to the Holston River at Outfall 006. WET testing was conducted annually for Outfall 006 from 2013 until discharges ceased in 2016. Outfall 008 was put into service in 2016. The NPDES permit does not require toxicity monitoring of effluent from this outfall. Outfall 008 discharges leachate and toe drain from the dry fly ash stack. WET was conducted annually through December 31, 2019 at JCC Outfall 003, but it is now conducted once per permit cycle per the renewed permit.

2.2 Current and Ongoing Monitoring

The current NPDES Permit No. TN0005436 and its related monitoring activities applies to the JCC Plant, not the inactive JSF Plant (TDEC 2021). JCC Outfall 003 continues to be monitored once per permit cycle.

2.3 TDEC Order Environmental Investigation Activities

The objectives of the TDEC Order surface stream investigation were to collect surface stream data for characterization of surface stream water quality on or adjacent to the JSF Plant CCR management units and to evaluate if CCR material and/or dissolved CCR constituents have moved from those units into surface streams, potentially impacting aquatic life. TVA performed EI sample collection activities in accordance with the *Environmental Investigation Plan (EIP)* (TVA 2018), *Surface Stream Sampling and Analysis Plan (SAP)* (Stantec 2018), and *Quality Assurance Project Plan* (Environmental Standards 2018), including TVA- and TDEC-approved programmatic and project-specific changes that were made after approval of the EIP. Sample location selection, collection methodology, analyses and quality assurance/quality control completed for the investigation are provided in the *Surface Stream Sampling and Analysis Report (SAR)* included in Appendix J.2.

The scope of work for the surface stream investigation included collection of surface water samples and measurement of field parameters along sample transects or at individual sample locations from two waterbodies proximal to the JSF Plant: Holston River and Polly Branch. Each transect was made up of three sampling points, including the descending right bank (RB), center channel or thalweg (CC), and left bank (LB) positions within the channel. Depending on water depth at a station/sampling point, surface, mid-depth, and/or epibenthic (within 0.5 meters of the streambed) samples were collected. The sampling events were conducted in February and July 2019 as shown on Exhibits J.1-1 and J.1-2.

2.4 Results and Discussion

2.4.1 Field Parameters

Concurrent with surface water sample collection for laboratory analysis, and pursuant to the *Surface Stream SAP*, corresponding *in situ* water quality parameters were measured within the Holston River and Polly Branch using a Hydrolab® multi-parameter sonde. Parameters included temperature, dissolved oxygen, specific conductance, oxidation reduction potential, pH and turbidity, and measurements were performed on a depth gradient. These data were collected to document general existing water quality conditions within adjacent surface streams and are not used to indicate the presence or direct effects of CCR materials or potential associated impacts and are therefore not discussed in this EAR.

2.4.2 Analytical Results

Water sampling in surface streams near the JSF Plant CCR management units was performed during two monitoring events conducted in February and July 2019, as described in the SAR (Appendix J.2). Samples were collected at representative locations upstream, adjacent, and downstream of the JSF Plant CCR management units, with upstream locations representing unimpacted, control conditions. As shown on Exhibits J.1-1 and J.1-2, surface stream samples were collected along nine transects in the Holston River and two transects and seven center channel points in Polly Branch. Center channel samples were collected where transects were not feasible due to the small size of the channel and/or low flow volumes. The total number of samples collected within the representative zones of upstream, downstream, and adjacent locations within the water bodies is summarized below:

Waterbody	Total Number of Samples Collected		
	Upstream (Control)	Adjacent	Downstream
Holston River	6	50	34
Polly Branch	19	11	NA*

*NA – not applicable. Polly Branch reaches its confluence with the Holston River in the vicinity of the JSF Plant CCR management units; therefore reaches representative of downstream were not present and are captured through Holston River sampling locations.

During the investigation, 90 samples were collected from the Holston River, and 30 were collected from Polly Branch. Including duplicates, a total of 127 samples were collected within the study area; duplicate results were not evaluated in the statistical analysis (Appendix E.4). Based on the phased approach proposed in the *Surface Stream SAP*, additional Phase 2 surface stream sampling would have been required if over 20 percent (%) ash was observed in corresponding sediment samples. As described in Appendix J.3, none of the polarized light microscopy results for the sediment samples were above this threshold; therefore, Phase 2 surface stream sampling was not required.

Water samples were analyzed as total and dissolved fractions by an accredited laboratory for the following CCR-related constituents, hereafter referred to collectively as “CCR Parameters” for the Surface Stream Investigation.

- 40 CFR Part 257 Appendix III constituents including: boron, calcium, chloride, fluoride, sulfate, and total dissolved solids
- 40 CFR Part 257 Appendix IV constituents including: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, selenium, thallium, and radium 226/228

- Tennessee Rule 0400-11-01-.04, Appendix 1 inorganic constituents including: copper, nickel, silver, vanadium, and zinc
- Total suspended solids and additional cations including: magnesium, manganese, and iron.

TDEC approved acute and chronic ecological screening values (ESVs) for the EAR (Table 1-2 and Appendix A.2) which were used to evaluate whether identified CCR Parameter concentrations in surface stream samples may be indicative of potential impacts to aquatic life. Acute ESVs are concentrations of CCR Parameters that are protective of aquatic organisms for short-term exposure (typically a period of days), and chronic ESVs are protective of aquatic organisms for long-term exposure (typically the duration of an entire life cycle, although that can vary by species). ESVs for hardness-dependent parameters (cadmium, chromium, lead, copper, nickel, silver, and zinc) were expressed as dissolved concentrations and adjusted based on stream-specific water chemistry.

TDEC also approved EAR screening levels for human health, which are based on human exposure through use of surface water for drinking water supply (Table 1-2 and Appendix A.2). The human health screening levels were only applied to surface stream sampling results for the Holston River, as it is the only surface stream used as a potable water source near the JSF Plant.

The EAR screening levels are generic (not specific to an individual person or ecological receptor) and are protective of human and ecological health. Most screening levels are not regulatory standards and are conservatively based on published health studies. Concentrations above the screening level do not necessarily mean that an adverse health effect is occurring, but rather, that further evaluation is required in the Corrective Action and Risk Assessment (CARA) Plan to determine if an unacceptable risk exists and corrective action is required.

Statistical evaluation of the EI surface stream data for the JSF Plant is presented in Appendix E.4. This technical appendix summarizes the results of those evaluations relative to the objective of the surface stream investigation.

Exploratory Data Analysis

The exploratory data analysis showed that the CCR Parameter concentrations in the Holston River and Polly Branch were below the EAR screening levels (chronic ESVs, acute ESVs, and screening levels based on protection of human health; Table 1-2 and Appendix A.2). A summary of the surface stream analytical results compared to the surface stream ESVs for the 2019 sampling events are presented in Tables J.1-1 and J.1-2 for the Holston River and Polly Branch, respectively. As noted above, human health screening levels based on consumption of surface water as potable water were only applied to the Holston River samples.

Seasonal variability in data generally showed slightly higher concentrations of CCR constituents during low pool conditions; however, seasonal differences do not ultimately bear significance in this evaluation, as concentrations were not measured above the established, conservative ESVs or human health screening levels in either season. Therefore, no surface stream water quality impacts from JSF Plant operations or related to CCR management units were identified during the EI.

2.5 Summary

The exploratory data analysis found that CCR Parameter concentrations were below EAR human health screening levels and acute and chronic ESVs at sampling locations in both the Holston River and Polly Branch. The predominance of surface stream sampling results below the EAR screening levels in these water bodies demonstrate that potential current or historical impacts from CCR materials associated with JSF Plant CCR management units are unlikely and do not appear to be affecting water quality or associated biological communities within these systems (see Appendices J.3 and J.5). These surface stream water quality results are further evaluated in the context of other environmental data in the EAR and will be included in risk assessments as part of the CARA Plan.

Chapter 3 References

Environmental Standards, Inc. (2018). Quality Assurance Project Plan for the Tennessee Valley Authority, John Sevier Fossil Plant, Environmental Investigation, Revision 2. October 2018.

Stantec Consulting Services, Inc. (Stantec). (2018). Surface Stream Sampling and Analysis Plan, John Sevier Fossil Plant, Revision 3. October 19, 2018.

Tennessee Department of Environment and Conservation (TDEC). (2015). Commissioner's Order No. OGC15- 177. August 6.

TDEC. (2014). 2014 305(b) Report, The Status of Water Quality in Tennessee. December. https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html

TDEC. (2020a). Final 2020 EPA Approved 303(d) Lists of Impaired and Threatened Water. https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html

TDEC. (2020b). Division of Water Resources Public Data Viewer. https://tdeconline.tn.gov/dwr/. Accessed June 15, 2020.

TDEC. (2021). Water Resources Permit Data Viewer. https://dataviewers.tdec.tn.gov/pls/enf_reports/f?p=9034:34001. Accessed November 11, 2021.

Tennessee Valley Authority (TVA). (1977). 316(a) and 316(b) Demonstrations, John Sevier Steam Plant. Volumes 1 through 5. April.

TVA. (1979a). Supplemental Information to the Technical Report - Response of Biological Communities of the Holston River to Thermal Effluents from John Sevier Steam Plant.

TVA. (1979b). Investigations of Dynamics and Fate of Larval Fish in the Vicinity of John Sevier Stream-Electric Plant. April. JSF602

TVA. (1984). Responses of Selected Aquatic Biota to Discharges from John Sevier Steam-Electric Plant, Holston River, Tennessee, 1978 through 1981. June.

TVA. (2003). Results of Fish Community Monitoring in the Vicinity of John Sevier Fossil Plant During Spring 2003 in Support of a Continued 316(a) Thermal Variance.

TVA. (2012). Biological Monitoring of the Holston River Near John Sevier Fossil and Combined Cycle/Combustion Turbine Plant Discharges, Summer and Autumn 2011. June.

TVA. (2013a). Biological Monitoring of the Holston River Near John Sevier Fossil and Combined Cycle/Combustion Turbine Plant Discharges, Summer and Autumn 2012. April.

TVA. (2013b). Plankton Monitoring of the Holston River Near John Sevier Fossil and Combined Cycle/Combustion Turbine Plant Discharges, Summer and Autumn 2011. June.

TVA. (2018). Environmental Investigation Plan, Cumberland Fossil Plant, Revision 3 October 19, 2018.

TABLES

Table J.1-1: Surface Stream Analytical Results - Holston River
John Sevier Fossil Plant
February and July 2019

Sample Location					JSF-HR01						
Sample Date		Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels		5-Feb-19	5-Feb-19	5-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID					JSF-STR-HR01-LB-SUR-20190205	JSF-STR-HR01-CC-SUR-20190205	JSF-STR-HR01-RB-SUR-20190205	JSF-STR-HR01-LB-MID-20190717	JSF-STR-HR01-CC-MID-20190717	JSF-STR-DUP02-20190717	JSF-STR-HR01-RB-MID-20190717
Parent Sample ID										JSF-STR-HR01-CC-MID-20190717	
Sample Depth					0.3 m	0.2 m	0.3 m	1.2 m	1.5 m	1.5 m	1.5 m
Sample Type					Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Field Duplicate Sample	Normal Environmental Sample
Level of Review	Units		Holston River (Hardness = 100 mg/L)		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
			Chronic	Acute							
Total Metals											
Antimony	ug/L	6[A]	190[B]	900[C]	<0.378	0.646 J	<0.378	<0.378	<0.378	0.486 J	<0.378
Arsenic	ug/L	10[A]	150[B]	340[C]	0.406 J	0.533 J	0.648 J	0.945 J	0.951 J	0.993 J	0.929 J
Barium	ug/L	2,000[A]	220[B]	2,000[C]	25.0	23.8	24.2	39.7	39.0	41.6	40.3
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	27,600	27,100	28,200	31,900	31,900	34,300	32,500
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	<1.53	<1.53	<1.53	<1.53	<1.53	2.22	<1.53
Cobalt	ug/L	6[A]	19[B]	120[C]	0.454 J	0.459 J	0.435 J	1.36	1.34	1.44	1.45
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	0.793 J	0.697 J	0.756 J	2.64	2.70	2.61	2.99
Iron	ug/L	n/v	n/v	n/v	182	174	145	279	158 J	290 J	289
Lead	ug/L	5[A]	3.18[B]	81.6[C]	0.203 J	0.213 J	0.160 J	0.355 J	0.353 J	0.367 J	0.403 J
Lithium	ug/L	40[A]	440[B]	910[C]	<3.14	<3.14	<3.14	3.66 J	5.11	<3.39	3.90 J
Magnesium	ug/L	n/v	n/v	n/v	6,730	6,560	7,090	9,540	9,590	10,100	9,690
Manganese	ug/L	n/v	n/v	n/v	23.1	22.9	20.6	56.8	51.8	55.5	62.1
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	<0.610	2.15 U*	0.834 U*	0.786 J	0.708 J	0.775 J	0.770 J
Nickel	ug/L	100[A]	52.2[B]	469[C]	0.329 J	0.443 J	<0.312	0.841 J	0.703 J	0.833 J	0.780 J
Selenium	ug/L	50[A]	3.1[B]	20[C]	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	27[B]	79[C]	1.41 U*	1.79 U*	1.72 U*	1.19	1.38	1.70	1.31
Zinc	ug/L	2,000[A]	120[C]	120[C]	<3.22	<3.22	<3.22	5.43 U*	5.27 U*	6.30 U*	5.72 U*
Dissolved Metals											
Antimony	ug/L	6[A]	n/v	n/v	<0.378	<0.378	<0.378	0.415 J	0.392 J	0.381 J	0.379 J
Arsenic	ug/L	10[A]	150[D]	340[E]	0.465 J	0.442 J	0.481 J	0.960 J	0.948 J	0.953 J	0.945 J
Barium	ug/L	2,000[A]	n/v	n/v	24.5	24.5	24.3	39.0	39.3	40.2	38.0
Beryllium	ug/L	4[A]	n/v	n/v	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	n/v	n/v	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	n/v	n/v	27,200	27,400	26,500	32,400	32,800	33,100	32,600
Chromium	ug/L	100[A]	74.1[D]	570[E]	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	6[A]	n/v	n/v	0.280 J	0.263 J	0.252 J	1.07	1.11	1.10	1.09
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	1.12 J	<0.627	0.731 J	1.89 J	1.93 J	2.04	2.01
Iron	ug/L	n/v	n/v	n/v	22.7 J	<14.1	18.4 J	32.7 J	51.5	29.5 J	32.8 J
Lead	ug/L	5[A]	2.52[D]	64.6[E]	<0.128	<0.128	<0.128	<0.128	<0.128	0.156 J	<0.128
Lithium	ug/L	40[A]	n/v	n/v	<3.14	<3.14	<3.14	3.77 J	<3.39	<3.39	<3.39
Magnesium	ug/L	n/v	n/v	n/v	6,600	6,920	6,970	9,860	9,960	9,930	9,850
Manganese	ug/L	n/v	n/v	n/v	12.9	11.1	10.3	19.4	18.6	18.8	22.1
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	0.650 U*	1.17 U*	0.740 U*	0.857 J	0.805 J	0.859 J	0.822 J
Nickel	ug/L	100[A]	52.0[D]	468.24[E]	<0.312	<0.312	0.359 U*	0.586 J	0.611 J	0.675 J	0.541 J
Selenium	ug/L	50[A]	n/v	n/v	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	n/v	n/v	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	n/v	n/v	1.42 U*	1.31 U*	1.24 U*	1.34	1.23	1.07	1.25
Zinc	ug/L	2,000[A]	118[D]	117[E]	5.22 U*	<3.22	3.92 U*	3.70 U*	3.39 U*	7.42 U*	5.03 U*
Radiological Parameters											
Radium-226	pCi/L	n/v	n/v	n/v	0.0233 +/-(0.0536)U	0.0696 +/-(0.0676)U	0.0560 +/-(0.0559)U	-0.0127 +/-(0.111)U	0.0474 +/-(0.118)U	0.0763 +/-(0.156)U	0.0201 +/-(0.0909)U
Radium-228	pCi/L	n/v	n/v	n/v	-0.0448 +/-(0.228)U	0.235 +/-(0.261)U	-0.0492 +/-(0.188)U	-0.304 +/-(0.288)U	0.402 +/-(0.333)U	-0.0142 +/-(0.315)U	0.120 +/-(0.333)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	0.0233 +/-(0.234)U	0.305 +/-(0.270)U	0.0560 +/-(0.196)U	0.000 +/-(0.309)U	0.450 +/-(0.353)U	0.0763 +/-(0.352)U	0.140 +/-(0.345)U
Anions											
Chloride	mg/L	250[A]	230[B]	860[C]	10.7	11.2	11.4	15.0	15.2	15.2	15.4
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0763 J	0.0856 J	0.0762 J	0.0888 J	0.0910 J	0.0870 J	0.0909 J
Sulfate	mg/L	250[A]	n/v	n/v	12.2	11.9	11.9	28.6	28.9	29.5	29.5
General Chemistry											
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	96.6	94.7	99.6	119	119	127	121
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	129	118	138	167	184	182	224
Total Suspended Solids	mg/L	n/v	n/v	n/v	8.30	5.40	6.60	8.80	7.70	6.40	8.40

See last page for notes.

Table J.1-1: Surface Stream Analytical Results - Holston River
John Sevier Fossil Plant
February and July 2019

Sample Location		Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels		JSF-HR02									
Sample Date					5-Feb-19	5-Feb-19	5-Feb-19	5-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID					JSF-STR-HR02-LB-SUR-20190205	JSF-STR-HR02-CC-SUR-20190205	JSF-STR-DUP02-20190205	JSF-STR-HR02-RB-SUR-20190205	JSF-STR-HR02-LB-SUR-20190717	JSF-STR-HR02-LB-BOT-20190717	JSF-STR-HR02-CC-SUR-20190717	JSF-STR-HR02-CC-BOT-20190717	JSF-STR-HR02-RB-SUR-20190717	JSF-STR-HR02-RB-BOT-20190717
Parent Sample ID							JSF-STR-HR02-CC-SUR-20190205							
Sample Depth					0.3 m	0.3 m	0.3 m	0.3 m	0.5 m	2.3 m	0.5 m	2.9 m	0.5 m	2.7 m
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	Normal Environmental Sample
Level of Review	Units		Holston River (Hardness = 100 mg/L)		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
			Chronic	Acute										
Total Metals														
Antimony	ug/L	6[A]	190[B]	900[C]	<0.378	<0.378	<0.378	<0.378	<0.378	0.411 J	0.417 J	0.493 J	<0.378	0.456 J
Arsenic	ug/L	10[A]	150[B]	340[C]	0.694 J	0.632 J	0.390 J	0.557 J	1.08	1.10	1.05	1.09	1.03	1.10
Barium	ug/L	2,000[A]	220[B]	2,000[C]	24.8	25.5	25.4	24.4	40.5	40.1	42.4	42.1	41.0	40.2
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<30.3	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	27,800	28,000	25,900	27,600	32,400	32,200	33,000	32,500	32,100	32,700
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	<1.53	<1.53	<1.53	<1.53	<1.53	1.63 J	1.61 J	<1.53	<1.53	2.16
Cobalt	ug/L	6[A]	19[B]	120[C]	0.564	0.449 J	0.537	0.571	1.53	1.47	1.50	1.40	1.42	1.46
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	0.973 J	0.784 J	0.960 J	1.11 J	2.78	3.01	2.91	2.84	2.96	3.18
Iron	ug/L	n/v	n/v	n/v	298	184	193 J	269	298	345	326	309	311	352
Lead	ug/L	5[A]	3.18[B]	81.6[C]	0.357 J	0.218 J	0.213 J	0.346 J	0.437 J	0.425 J	0.411 J	0.428 J	0.391 J	0.446 J
Lithium	ug/L	40[A]	440[B]	910[C]	<3.14	<3.14	<3.14	<3.14	6.34	6.64	5.86	3.59 J	5.01	6.51
Magnesium	ug/L	n/v	n/v	n/v	6,460	6,710	6,820	6,940	9,680	9,750	10,000	9,850	9,800	9,820
Manganese	ug/L	n/v	n/v	n/v	33.0	23.2	20.9	29.8	62.6	63.0	62.3	60.6	60.4	62.0
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	<0.610	<0.610	0.667 J	<0.610	0.818 J	0.795 J	0.842 J	0.840 J	0.833 J	0.801 J
Nickel	ug/L	100[A]	52.2[B]	469[C]	0.433 J	<0.312	0.312 J	0.460 J	0.880 J	0.872 J	0.916 J	0.831 J	0.842 J	0.971 J
Selenium	ug/L	50[A]	3.1[B]	20[C]	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	<0.128	<0.128	<0.128	<0.128	0.155 J	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	27[B]	79[C]	2.26 U*	2.26 U*	1.47 U*	2.27 U*	1.46	1.73	1.55	1.41	1.42	1.74
Zinc	ug/L	2,000[A]	120[C]	120[C]	<3.22	<3.22	<3.22	<3.22	5.65 U*	6.24 U*	6.33 U*	6.21 U*	6.48 U*	6.40 U*
Dissolved Metals														
Antimony	ug/L	6[A]	n/v	n/v	<0.378	<0.378	<0.378	<0.378	0.476 J	0.488 J	<0.378	0.393 J	0.417 J	0.503 J
Arsenic	ug/L	10[A]	150[D]	340[E]	0.523 J	0.497 J	0.504 J	0.532 J	1.02	1.01	0.897 J	0.949 J	0.959 J	0.988 J
Barium	ug/L	2,000[A]	n/v	n/v	23.7	23.2	23.7	22.5	40.1	39.9	38.2	38.4	39.2	39.3
Beryllium	ug/L	4[A]	n/v	n/v	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	n/v	n/v	<30.3	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	n/v	n/v	28,600	25,300	26,600	27,500	32,800	32,900	32,300	32,700	32,900	32,800
Chromium	ug/L	100[A]	74.1[D]	570[E]	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	1.76 J
Cobalt	ug/L	6[A]	n/v	n/v	0.266 J	0.240 J	0.276 J	0.238 J	1.12	1.11	1.05	1.07	1.09	1.13
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	<0.627	<0.627	<0.627	<0.627	2.14	2.11	1.89 J	2.07	2.27	2.10
Iron	ug/L	n/v	n/v	n/v	23.1 J	15.7 J	15.5 U*	18.1 J	57.6	36.1 J	29.9 J	36.3 J	30.8 J	31.9 J
Lead	ug/L	5[A]	2.52[D]	64.6[E]	<0.128	<0.128	<0.128	<0.128	0.189 J	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	40[A]	n/v	n/v	<3.14	<3.14	<3.14	<3.14	4.62 J	4.25 J	<3.39	3.40 J	<3.39	4.26 J
Magnesium	ug/L	n/v	n/v	n/v	6,670	6,170	6,600	6,630	9,860	9,960	9,740	9,880	9,970	9,980
Manganese	ug/L	n/v	n/v	n/v	15.5	9.20	9.47	13.4	27.0	22.5	24.7	25.0	22.7	23.6
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	<0.610	<0.610	<0.610	<0.610	0.820 J	0.826 J	0.838 J	0.836 J	0.819 J	0.824 J
Nickel	ug/L	100[A]	52.0[D]	468.24[E]	<0.312	<0.312	<0.312	<0.312	0.646 J	0.623 J	0.580 J	0.611 J	0.605 J	0.604 J
Selenium	ug/L	50[A]	n/v	n/v	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	n/v	n/v	<0.128	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	n/v	n/v	1.62 U*	2.00 U*	1.55 U*	1.99 U*	1.29	1.46	1.09	1.21	1.30	1.54
Zinc	ug/L	2,000[A]	118[D]	117[E]	<3.22	<3.22	<3.22	<3.22	5.56 U*	3.95 U*	3.63 U*	5.24 U*	4.83 U*	3.84 U*
Radiological Parameters														
Radium-226	pCi/L	n/v	n/v	n/v	0.129 +/-(0.0698)	0.0397 +/-(0.0557)U	0.0333 +/-(0.0585)U	0.00648 +/-(0.0543)U	-0.108 +/-(0.140)U	0.154 +/-(0.149)U	0.0946 +/-(0.109)U	0.0539 +/-(0.111)U	-0.0808 +/-(0.0626)U	-0.0140 +/-(0.135)U
Radium-228	pCi/L	n/v	n/v	n/v	0.141 +/-(0.237)U	0.115 +/-(0.260)U	0.0197 +/-(0.207)U	-0.0678 +/-(0.246)U	0.526 +/-(0.448)U	0.0701 +/-(0.294)U	0.341 +/-(0.378)U	-0.424 +/-(0.264)U	-0.0734 +/-(0.255)U	-0.0127 +/-(0.322)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	0.270 +/-(0.247)J	0.155 +/-(0.266)U	0.0530 +/-(0.215)U	0.00648 +/-(0.252)U	0.526 +/-(0.469)U	0.224 +/-(0.330)U	0.436 +/-(0.393)U	0.0539 +/-(0.286)U	0.000 +/-(0.263)U	0.000 +/-(0.349)U
Anions														
Chloride	mg/L	250[A]	230[B]	860[C]	11.5	11.3	11.2	11.2	14.8	14.7	15.1	15.0	14.8	14.6
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0763 J	0.0802 J	0.0847 J	0.0777 J	0.0927 J	0.0921 J	0.0890 J	0.0901 J	0.0911 J	0.0859 J
Sulfate	mg/L	250[A]	n/v	n/v	14.5	11.9	12.4	11.7	28.1	28.0	28.6	28.5	28.1	27.5
General Chemistry														
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	96.0	97.5	92.8	97.5	121	121	124	122	120	122
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	141	136	135	135	190	206	188	176	191	185
Total Suspended Solids	mg/L	n/v	n/v	n/v	11.7	5.70	5.30	9.60	9.90	10.2	8.60	8.60	9.50	9.20

See last page for notes.

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Table J.1-1: Surface Stream Analytical Results - Holston River
John Sevier Fossil Plant
February and July 2019

Sample Location					JSF-HR03									
Sample Date		Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels		5-Feb-19	5-Feb-19	5-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID					JSF-STR-HR03-LB-SUR-20190205	JSF-STR-HR03-CC-SUR-20190205	JSF-STR-HR03-RB-SUR-20190205	JSF-STR-HR03-LB-SUR-20190717	JSF-STR-HR03-LB-BOT-20190717	JSF-STR-HR03-CC-SUR-20190717	JSF-STR-HR03-CC-MID-20190717	JSF-STR-HR03-CC-BOT-20190717	JSF-STR-HR03-RB-SUR-20190717	JSF-STR-HR03-RB-BOT-20190717
Parent Sample ID														
Sample Depth					0.3 m	1 m	0.3 m	0.5 m	2.5 m	0.5 m	2 m	3.7 m	0.5 m	2.7 m
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	Normal Environmental Sample
Level of Review	Units		Holston River (Hardness = 100 mg/L)		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
			Chronic	Acute										
Total Metals														
Antimony	ug/L	6[A]	190[B]	900[C]	<0.378	<0.378	<0.378	<0.378	0.417 J	<0.378	<0.378	<0.378	0.419 J	0.400 J
Arsenic	ug/L	10[A]	150[B]	340[C]	0.573 J	0.906 J	0.597 J	0.910 J	1.03	0.987 J	1.03	1.03	1.12	1.01
Barium	ug/L	2,000[A]	220[B]	2,000[C]	27.0	24.9	23.9	39.6	39.5	41.4	39.7	39.2	39.9	39.5
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	28,100	26,200	27,800	33,000	32,800	34,300	33,000	32,900	32,900	32,600
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	<1.53	<1.53	<1.53	<1.53	1.63 J	<1.53	<1.53	<1.53	1.68 J	1.60 J
Cobalt	ug/L	6[A]	19[B]	120[C]	0.560	0.388 J	0.475 J	1.74	1.80	1.82	1.81	1.84	1.79	1.82
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	3.16	0.892 J	0.995 J	2.74 U*	2.88 U*	2.94 U*	2.94 U*	2.84 U*	2.92 U*	3.05 U*
Iron	ug/L	n/v	n/v	n/v	278	196	289	329	406	356	388	387	408	456
Lead	ug/L	5[A]	3.18[B]	81.6[C]	0.343 J	0.237 J	0.349 J	0.481 J	0.532 J	0.479 J	0.497 J	0.522 J	0.536 J	0.524 J
Lithium	ug/L	40[A]	440[B]	910[C]	<3.14	<3.14	<3.14	4.11 J	4.02 J	<3.39	<3.39	<3.39	3.82 J	3.71 J
Magnesium	ug/L	n/v	n/v	n/v	6,700	6,320	6,800	9,780	9,840	10,300	9,850	9,880	9,780	9,720
Manganese	ug/L	n/v	n/v	n/v	31.3	21.7	30.8	66.4	69.9	69.7	68.4	70.0	71.0	70.2
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	<0.610	<0.610	0.643 U*	0.712 J	0.725 J	0.730 J	0.764 J	0.702 J	0.693 J	0.707 J
Nickel	ug/L	100[A]	52.2[B]	469[C]	0.323 J	0.342 J	0.338 J	0.919 J	1.01 J	0.948 J	1.00	1.08	0.976 J	1.05 J
Selenium	ug/L	50[A]	3.1[B]	20[C]	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	27[B]	79[C]	1.97 U*	1.99 U*	2.18 U*	1.62	1.86	1.59	1.51	1.53	1.73	1.77
Zinc	ug/L	2,000[A]	120[C]	120[C]	<3.22	<3.22	<3.22	7.25 U*	7.80 U*	6.86 U*	6.67 U*	13.4 U*	6.97 U*	7.37 U*
Dissolved Metals														
Antimony	ug/L	6[A]	n/v	n/v	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	0.418 J	<0.378
Arsenic	ug/L	10[A]	150[D]	340[E]	0.526 J	0.352 J	0.591 J	0.861 J	0.819 J	1.00	0.924 J	0.847 J	0.893 J	0.897 J
Barium	ug/L	2,000[A]	n/v	n/v	24.3	24.0	22.8	35.9	36.3	36.4	35.5	36.7	36.8	35.5
Beryllium	ug/L	4[A]	n/v	n/v	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	n/v	n/v	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	n/v	n/v	25,300	24,000	27,800	32,300	32,800	32,500	31,900	32,300	32,500	31,500
Chromium	ug/L	100[A]	74.1[D]	570[E]	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	6[A]	n/v	n/v	0.278 J	0.274 J	0.256 J	1.22	1.24	1.28	1.20	1.29	1.27	1.20
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	<0.627	<0.627	<0.627	1.87 J	1.71 J	2.10	1.77 J	1.82 J	1.92 J	1.68 J
Iron	ug/L	n/v	n/v	n/v	16.5 J	<14.1	24.9 J	27.9 J	25.2 J	27.6 J	26.1 J	27.9 J	29.3 J	25.1 J
Lead	ug/L	5[A]	2.52[D]	64.6[E]	<0.128	<0.128	<0.128	<0.128	<0.128	0.184 J	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	40[A]	n/v	n/v	<3.14	<3.14	<3.14	<3.39	<3.39	3.59 J	<3.39	<3.39	3.40 J	<3.39
Magnesium	ug/L	n/v	n/v	n/v	5,980	6,280	6,850	9,640	9,720	9,650	9,630	9,740	9,690	9,370
Manganese	ug/L	n/v	n/v	n/v	12.4	7.57	15.0	19.1	19.6	17.9	17.3	16.8	17.1	16.6
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	<0.610	<0.610	0.623 U*	0.671 J	0.741 J	0.705 J	0.669 J	0.704 J	0.700 J	0.677 J
Nickel	ug/L	100[A]	52.0[D]	468.24[E]	<0.312	<0.312	<0.312	1.72	2.22 J	2.57 J	1.61	2.08	1.55	2.77 J
Selenium	ug/L	50[A]	n/v	n/v	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	n/v	n/v	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	n/v	n/v	1.78 U*	1.14 U*	2.05 U*	1.21	<0.991	1.10	1.18	1.25	1.32	1.19
Zinc	ug/L	2,000[A]	118[D]	117[E]	<3.22	<3.22	<3.22	4.34 U*	3.87 U*	9.15 U*	3.90 U*	4.32 U*	4.66 U*	3.98 U*
Radiological Parameters														
Radium-226	pCi/L	n/v	n/v	n/v	0.0223 +/-(0.0586)U	0.0414 +/-(0.0592)U	0.0694 +/-(0.0665)U	0.0567 +/-(0.152)U	-0.00211 +/-(0.0990)U	0.0606 +/-(0.0876)U	0.117 +/-(0.140)U	-0.0156 +/-(0.137)U	0.303 +/-(0.183)J	-0.0548 +/-(0.155)U
Radium-228	pCi/L	n/v	n/v	n/v	0.265 +/-(0.230)UJ	0.0389 +/-(0.216)UJ	0.145 +/-(0.223)UJ	-0.0505 +/-(0.265)U	-0.101 +/-(0.298)U	-0.00558 +/-(0.258)U	0.102 +/-(0.255)U	0.418 +/-(0.319)U	0.0940 +/-(0.293)U	-0.113 +/-(0.308)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	0.287 +/-(0.237)UJ	0.0803 +/-(0.224)UJ	0.214 +/-(0.233)UJ	0.0567 +/-(0.305)U	0.000 +/-(0.314)U	0.0606 +/-(0.272)U	0.219 +/-(0.291)U	0.418 +/-(0.347)U	0.397 +/-(0.345)J	0.000 +/-(0.345)U
Anions														
Chloride	mg/L	250[A]	230[B]	860[C]	11.1	11.0	11.3	14.4	14.6	14.7	14.6	14.7	14.8	14.7
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0832 J	0.0763 J	0.0799 J	0.0916 J	0.0916 J	0.0909 J	0.0894 J	0.0924 J	0.0949 J	0.0909 J
Sulfate	mg/L	250[A]	n/v	n/v	13.6	11.6	11.9	27.0	27.5	27.5	27.3	27.4	27.0	26.9
General Chemistry														
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	97.8	91.4	97.4	123	122	128	123	123	123	121
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	144	136	128	182	159	164	171	217 J	231	202
Total Suspended Solids	mg/L	n/v	n/v	n/v	10.6	5.30	10.6	9.00	12.0	10.3	11.5	11.4	11.5	12.5

See last page for notes.

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Table J.1-1: Surface Stream Analytical Results - Holston River
John Sevier Fossil Plant
February and July 2019

Sample Location					JSF-HR04										
Sample Date		Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels		5-Feb-19	5-Feb-19	5-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID					JSF-STR-HR04-LB-SUR-20190205	JSF-STR-HR04-CC-SUR-20190205	JSF-STR-HR04-RB-SUR-20190205	JSF-STR-HR04-LB-SUR-20190717	JSF-STR-HR04-LB-BOT-20190717	JSF-STR-HR04-CC-SUR-20190717	JSF-STR-HR04-CC-MID-20190717	JSF-STR-HR04-CC-BOT-20190717	JSF-STR-HR04-RB-SUR-20190717	JSF-STR-HR04-RB-BOT-20190717	JSF-STR-DUP01-20190717
Parent Sample ID															JSF-STR-HR04-RB-BOT-20190717
Sample Depth					0.3 m	1 m	0.3 m	0.5 m	2.8 m	0.5 m	2 m	3.8 m	0.5 m	2.6 m	2.6 m
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	Normal Environmental Sample	Field Duplicate Sample
Level of Review	Units		Holston River (Hardness = 100 mg/L)		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
			Chronic	Acute											
Total Metals															
Antimony	ug/L	6[A]	190[B]	900[C]	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	0.622 J	0.522 J	<0.378
Arsenic	ug/L	10[A]	150[B]	340[C]	0.325 J	0.341 J	0.698 J	0.781 J	0.845 J	0.804 J	0.799 J	0.748 J	0.956 J	1.14	0.980 J
Barium	ug/L	2,000[A]	220[B]	2,000[C]	32.6	30.9	26.1	41.6	42.1	39.8	41.3	41.5	39.0	40.3	43.2
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	0.250 J	<0.182	<0.182
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	45.5 J	<38.6	<38.6
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	29,000	27,400	28,100	32,500	33,100	31,700	32,900	32,500	32,000	32,500	33,000
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	<1.53	<1.53	<1.53	1.57 J	2.06	1.70 J	<1.53	<1.53	1.61 J	1.83 J	1.54 J
Cobalt	ug/L	6[A]	19[B]	120[C]	0.614	0.553	0.531	1.67	1.76	1.66	1.69	1.63	1.77	1.89	1.74
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	1.14 J	0.997 J	1.01 J	2.67	2.77	2.53	2.52	2.33	2.81 U*	3.45 U*	3.44
Iron	ug/L	n/v	n/v	n/v	326	240	296	354	400	334	221	206	268	591 J	480 J
Lead	ug/L	5[A]	3.18[B]	81.6[C]	0.340 U*	0.357 U*	0.365 J	0.413 J	0.443 J	0.374 J	0.402 J	0.381 J	0.523 J	0.765 J	0.591 J
Lithium	ug/L	40[A]	440[B]	910[C]	3.22 U*	3.24 U*	<3.14	3.49 J	3.70 J	<3.39	<3.39	3.43 J	4.99 J	4.43 J	4.67 J
Magnesium	ug/L	n/v	n/v	n/v	7,210	7,110	6,960	9,520	9,650	9,300	9,720	9,460	9,620	9,760	9,860
Manganese	ug/L	n/v	n/v	n/v	27.2	20.7	30.0	62.2	65.4	62.5	64.7	64.7	69.0	78.4	74.8
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	<0.610	<0.610	1.14 U*	0.676 J	0.700 J	0.674 J	<0.610	<0.610	0.652 J	0.772 J	0.761 J
Nickel	ug/L	100[A]	52.2[B]	469[C]	0.464 J	0.470 J	0.563 J	0.813 J	0.850 J	0.771 J	0.662 J	0.733 J	0.842 J	1.24 J	0.975 J
Selenium	ug/L	50[A]	3.1[B]	20[C]	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	27[B]	79[C]	1.17 U*	1.26 U*	2.32 U*	1.65	1.83	1.63	1.40	1.36	1.62	1.86	1.61
Zinc	ug/L	2,000[A]	120[C]	120[C]	3.30 J	<3.22	<3.22	6.03 U*	6.04 U*	7.15 U*	5.52 U*	5.20 U*	6.10 U*	27.6 U*	8.80 U*
Dissolved Metals															
Antimony	ug/L	6[A]	n/v	n/v	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	0.429 J	<0.378	<0.378
Arsenic	ug/L	10[A]	150[D]	340[E]	<0.323	<0.323	0.525 J	0.700 J	0.773 J	0.770 J	0.678 J	0.747 J	0.904 J	0.808 J	0.955 J
Barium	ug/L	2,000[A]	n/v	n/v	31.5	30.5	22.4	39.8	43.1	41.3	39.3	39.7	36.4	36.2	39.4
Beryllium	ug/L	4[A]	n/v	n/v	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	0.277 J	<0.182	<0.182
Boron	ug/L	4,000[A]	n/v	n/v	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	42.2 J	<38.6	<38.6
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	n/v	n/v	29,400	28,700	27,800	32,900	33,000	34,000	32,300	33,100	32,100	32,100	32,400
Chromium	ug/L	100[A]	74.1[D]	570[E]	<1.53	<1.53	<1.53	<1.53	1.87 J	2.43	<1.53	<1.53	<1.53	<1.53	1.63 J
Cobalt	ug/L	6[A]	n/v	n/v	0.338 J	0.328 J	0.257 J	1.27	1.21	1.28	1.22	1.26	1.30	1.28	1.18
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	0.648 J	<0.627	<0.627	3.09	1.91 J	1.97 J	1.82 J	1.65 J	1.91 J	1.84 J	1.87 J
Iron	ug/L	n/v	n/v	n/v	172	17.1 J	19.7 J	227	27.2 J	27.4 J	27.1 J	24.8 J	26.0 J	27.5 J	32.4 J
Lead	ug/L	5[A]	2.52[D]	64.6[E]	<0.128	<0.128	<0.128	<0.128	0.316 J	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	40[A]	n/v	n/v	3.17 U*	<3.14	<3.14	<3.39	<3.39	3.42 J	<3.39	<3.39	3.53 J	<3.39	3.68 J
Magnesium	ug/L	n/v	n/v	n/v	7,360	7,380	6,680	9,670	9,750	10,200	9,680	9,790	9,500	9,560	9,890
Manganese	ug/L	n/v	n/v	n/v	12.5	7.78	14.6	16.9	15.5	15.8	15.5	14.9	16.9	18.3	17.6
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	<0.610	<0.610	0.765 U*	0.808 J	0.681 J	0.703 J	0.691 J	0.656 J	0.722 J	0.704 J	0.766 J
Nickel	ug/L	100[A]	52.0[D]	468.24[E]	<0.312	<0.312	<0.312	0.988 J	0.535 J	0.564 J	0.561 J	0.511 J	1.11	2.40 J	0.570 J
Selenium	ug/L	50[A]	n/v	n/v	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	n/v	n/v	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	n/v	n/v	0.922 U*	0.934 U*	2.13 U*	1.57	1.57	1.89	1.37	1.26	1.17	1.16	1.43
Zinc	ug/L	2,000[A]	118[D]	117[E]	<3.22	<3.22	<3.22	3.85 U*	4.40 U*	4.38 U*	3.66 U*	4.67 U*	3.98 U*	3.67 U*	3.29 U*
Radiological Parameters															
Radium-226	pCi/L	n/v	n/v	n/v	0.0773 +/-(0.0702)U	-0.0144 +/-(0.0429)U	0.0601 +/-(0.0619)U	0.160 +/-(0.150)U	-0.0248 +/-(0.127)U	-0.113 +/-(0.102)U	0.0116 +/-(0.146)U	0.172 +/-(0.167)U	0.0630 +/-(0.169)U	0.0366 +/-(0.0861)U	0.0165 +/-(0.146)U
Radium-228	pCi/L	n/v	n/v	n/v	0.133 +/-(0.263)UJ	0.125 +/-(0.210)UJ	0.257 +/-(0.267)UJ	0.288 +/-(0.263)U	0.216 +/-(0.255)U	0.241 +/-(0.271)U	0.282 +/-(0.263)U	0.160 +/-(0.292)U	0.294 +/-(0.425)U	-0.152 +/-(0.333)U	0.451 +/-(0.373)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	0.210 +/-(0.272)UJ	0.125 +/-(0.214)UJ	0.318 +/-(0.274)UJ	0.448 +/-(0.303)U	0.216 +/-(0.285)U	0.241 +/-(0.290)U	0.294 +/-(0.301)U	0.332 +/-(0.336)U	0.357 +/-(0.457)U	0.0366 +/-(0.344)U	0.468 +/-(0.401)U
Anions															
Chloride	mg/L	250[A]	230[B]	860[C]	11.5	11.3	11.8	15.4	14.9	14.8	14.8	14.9	14.8	14.9	14.7
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0691 J	0.0658 J	0.0968 J	0.0920 J	0.0891 J	0.0909 J	0.0897 J	0.0907 J	0.0933 J	0.0943 J	0.0891 J
Sulfate	mg/L	250[A]	n/v	n/v	14.1	12.3	13.2	28.0	27.0	27.0	27.2	27.5	26.8	26.8	26.4
General Chemistry															
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	102	97.7	98.8	120	122	117	122	120	120	121	123
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	132	124	142	159	213	179	186	145	179	132	158
Total Suspended Solids	mg/L	n/v	n/v	n/v	9.90	5.00	9.90	7.80	12.1	9.60	10.7	10.7	11.6	13.4	13.8

See last page for notes.

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Table J.1-1: Surface Stream Analytical Results - Holston River
John Sevier Fossil Plant
February and July 2019

Sample Location					JSF-HR05										
Sample Date		Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels		5-Feb-19	5-Feb-19	5-Feb-19	5-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID					JSF-STR-HR05-LB-SUR-20190205	JSF-STR-DUP01-20190205	JSF-STR-HR05-CC-SUR-20190205	JSF-STR-HR05-RB-SUR-20190205	JSF-STR-HR05-LB-SUR-20190717	JSF-STR-HR05-LB-BOT-20190717	JSF-STR-HR05-CC-SUR-20190717	JSF-STR-HR05-CC-MID-20190717	JSF-STR-HR05-CC-BOT-20190717	JSF-STR-HR05-RB-SUR-20190717	JSF-STR-HR05-RB-BOT-20190717
Parent Sample ID						JSF-STR-HR05-LB-SUR-20190205									
Sample Depth					0.3 m	0.3 m	0.3 m	0.3 m	0.5 m	2.5 m	0.5 m	2 m	3 m	0.5 m	2.5 m
Sample Type					Normal Environmental Sample	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	Normal Environmental Sample
Level of Review	Units		Holston River (Hardness = 100 mg/L)		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
			Chronic	Acute											
Total Metals															
Antimony	ug/L	6[A]	190[B]	900[C]	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[B]	340[C]	0.324 J	0.448 J	<0.323	0.370 J	0.809 J	0.893 J	0.880 J	0.891 J	1.03	0.918 J	0.911 J
Barium	ug/L	2,000[A]	220[B]	2,000[C]	32.6	25.9	30.5	31.7	40.8	39.1	38.8	38.5	38.6	38.9	40.0
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<30.3	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	28,600	27,400	27,200	28,700	32,500	32,700	31,500	32,000	32,700	32,600	32,200
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	1.76 J	1.53 J	1.91 J	1.78 J	1.75 J
Cobalt	ug/L	6[A]	19[B]	120[C]	0.664	0.622	0.526	0.641	1.56	1.75	1.67	1.70	1.71	1.65	1.84
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	1.26 J	0.928 J	0.955 J	1.13 J	2.58	2.95 U*	3.11 U*	2.82 U*	2.95 U*	3.20 U*	3.27 U*
Iron	ug/L	n/v	n/v	n/v	364 J	287 J	239	406	314	381	317	317	333	362	466
Lead	ug/L	5[A]	3.18[B]	81.6[C]	0.410 U*	0.325 J	0.285 U*	0.370 U*	0.384 J	0.491 J	0.760 J	0.412 J	0.472 J	0.494 J	0.617 J
Lithium	ug/L	40[A]	440[B]	910[C]	4.50 U*	<3.14	3.71 U*	3.80 U*	<3.39	<3.39	3.88 J	3.65 J	4.15 J	4.45 J	3.97 J
Magnesium	ug/L	n/v	n/v	n/v	7,240	7,180	6,930	7,540	9,450	9,550	9,280	9,470	9,550	9,670	9,510
Manganese	ug/L	n/v	n/v	n/v	27.4	28.0	20.6	27.7	59.0	64.0	57.4	59.2	62.5	63.1	71.4
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	<0.610	1.54 J	<0.610	<0.610	0.720 J	0.763 J	0.678 J	0.671 J	0.641 J	0.635 J	0.633 J
Nickel	ug/L	100[A]	52.2[B]	469[C]	0.549 J	0.345 J	0.337 J	0.573 J	0.751 J	0.931 J	0.843 J	0.813 J	0.881 J	0.962 J	1.01
Selenium	ug/L	50[A]	3.1[B]	20[C]	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	<0.128	0.156 J	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	27[B]	79[C]	1.27 U*	1.16 U*	1.04 U*	1.44 U*	1.40	1.61	1.80	1.68	1.83	1.90	1.84
Zinc	ug/L	2,000[A]	120[C]	120[C]	<3.22	<3.22	<3.22	<3.22	7.06 U*	6.44 U*	8.10 U*	6.42 U*	7.00 U*	7.32 U*	7.65 U*
Dissolved Metals															
Antimony	ug/L	6[A]	n/v	n/v	<0.378	<0.378	<0.378	<0.378	0.523 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[D]	340[E]	<0.323	0.390 J	<0.323	<0.323	0.705 J	0.870 J	0.808 J	0.894 J	0.803 J	0.772 J	0.792 J
Barium	ug/L	2,000[A]	n/v	n/v	29.5	24.0	27.6	28.4	38.8	37.8	36.6	37.0	37.7	36.1	35.8
Beryllium	ug/L	4[A]	n/v	n/v	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	n/v	n/v	<30.3	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	n/v	n/v	28,400	26,500	26,100	27,700	32,100	33,500	32,500	33,100	33,000	32,200	31,800
Chromium	ug/L	100[A]	74.1[D]	570[E]	<1.53	<1.53	<1.53	<1.53	1.65 J	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	6[A]	n/v	n/v	0.323 J	0.292 J	0.303 J	0.318 J	1.21	1.33	1.25	1.28	1.31	1.17	1.18
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	0.658 J	<0.627	<0.627	<0.627	1.72 J	1.87 J	1.74 J	1.72 J	1.72 J	1.67 J	1.74 J
Iron	ug/L	n/v	n/v	n/v	18.6 J	30.8 U*	<14.1	<14.1	27.2 J	28.9 J	24.6 J	25.1 J	24.7 J	25.0 J	22.7 J
Lead	ug/L	5[A]	2.52[D]	64.6[E]	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	40[A]	n/v	n/v	4.33 U*	<3.14	3.54 U*	3.20 U*	<3.39	3.93 J	<3.39	<3.39	<3.39	<3.39	<3.39
Magnesium	ug/L	n/v	n/v	n/v	7,140	6,750	6,720	7,320	9,510	10,000	9,700	9,860	9,650	9,500	9,440
Manganese	ug/L	n/v	n/v	n/v	10.6	10.9	6.69	12.5	11.9	13.0	9.81	9.80	10.3	9.56	11.9
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	<0.610	0.836 J	<0.610	<0.610	0.737 J	0.826 J	0.711 J	0.658 J	0.656 J	0.668 J	<0.610
Nickel	ug/L	100[A]	52.0[D]	468.24[E]	<0.312	<0.312	<0.312	<0.312	0.521 J	0.778 J	1.56	1.23	0.962 J	0.642 J	0.653 J
Selenium	ug/L	50[A]	n/v	n/v	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	n/v	n/v	<0.128	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	n/v	n/v	1.03 U*	1.20 U*	<0.899	0.956 U*	1.46	1.34	1.24	1.36	<0.991	1.18	1.13
Zinc	ug/L	2,000[A]	118[D]	117[E]	<3.22	4.18 U*	<3.22	<3.22	4.36 U*	3.35 U*	4.28 U*	4.15 U*	4.63 U*	4.12 U*	4.43 U*
Radiological Parameters															
Radium-226	pCi/L	n/v	n/v	n/v	0.104 +/-(0.0842)U	0.0328 +/-(0.0548)U	0.0675 +/-(0.0755)U	-0.00764 +/-(0.0778)U	0.0516 +/-(0.114)U	-0.0746 +/-(0.100)U	0.0560 +/-(0.151)U	0.0374 +/-(0.125)U	-0.105 +/-(0.0903)U	-0.0131 +/-(0.103)U	-0.0842 +/-(0.0959)U
Radium-228	pCi/L	n/v	n/v	n/v	-0.118 +/-(0.226)UJ	0.223 +/-(0.216)U	0.432 +/-(0.308)UJ	0.0602 +/-(0.234)UJ	0.165 +/-(0.242)U	0.111 +/-(0.248)U	-0.0416 +/-(0.250)U	0.379 +/-(0.276)U	0.348 +/-(0.267)U	-0.0664 +/-(0.229)U	0.0490 +/-(0.282)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	0.104 +/-(0.241)UJ	0.256 +/-(0.223)U	0.500 +/-(0.317)UJ	0.0602 +/-(0.247)UJ	0.217 +/-(0.268)U	0.111 +/-(0.267)U	0.0560 +/-(0.292)U	0.416 +/-(0.303)U	0.348 +/-(0.282)U	0.000 +/-(0.251)U	0.0490 +/-(0.298)U
Anions															
Chloride	mg/L	250[A]	230[B]	860[C]	11.8	12.0	10.9	11.3	14.8	14.6	14.7	14.6	14.6	14.6	14.4
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0748 J	0.0901 J	0.0656 J	0.0703 J	0.0897 J	0.0894 J	0.0930 J	0.0898 J	0.0880 J	0.0905 J	0.0903 J
Sulfate	mg/L	250[A]	n/v	n/v	14.8	14.8	12.1	12.1	26.0	25.7	25.7	25.7	25.7	24.0	24.0
General Chemistry															
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	101	98.0	96.5	103	120	121	117	119	121	121	119
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	126	141	124	125	158	183	188	193	177	162	161
Total Suspended Solids	mg/L	n/v	n/v	n/v	10.1	9.70	5.90	9.70	10.9	12.0	8.40	9.50	9.70	10.7	15.1

See last page for notes.

Table J.1-1: Surface Stream Analytical Results - Holston River
John Sevier Fossil Plant
February and July 2019

Sample Location	Units	Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels		JSF-HR06										
Sample Date					5-Feb-19	5-Feb-19	5-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	18-Jul-19
Sample ID					JSF-STR-HR06-LB-SUR-20190205	JSF-STR-HR06-CC-SUR-20190205	JSF-STR-HR06-RB-SUR-20190205	JSF-STR-HR06-LB-SUR-20190717	JSF-STR-HR06-LB-BOT-20190717	JSF-STR-HR06-CC-SUR-20190717	JSF-STR-HR06-CC-MID-20190717	JSF-STR-HR06-CC-BOT-20190717	JSF-STR-HR06-RB-SUR-20190717	JSF-STR-HR06-RB-BOT-20190717	JSF-STR-HR06-CC-MID-20190718
Parent Sample ID															
Sample Depth					0.3 m	0.4 m	0.3 m	0.5 m	2.8 m	0.5 m	1.5 m	3.1 m	0.5 m	2.7 m	1.5 m
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	Normal Environmental Sample	Normal Environmental Sample
Level of Review			Holston River (Hardness = 100 mg/L)		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
			Chronic	Acute											
Total Metals															
Antimony	ug/L	6[A]	190[B]	900[C]	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[B]	340[C]	0.347 J	0.522 J	0.609 J	0.731 J	0.774 J	0.913 J	0.935 J	0.964 J	0.916 J	0.836 J	0.836 J
Barium	ug/L	2,000[A]	220[B]	2,000[C]	34.3	25.1	24.8	40.2	39.7	38.1	38.0	39.7	38.7	38.3	41.7
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<30.3	<30.3	<30.3	<38.6	<38.6	39.8 J	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	28,400	25,700	27,100	32,600	31,800	31,700	32,300	32,700	32,100	32,200	33,900
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	<1.53	<1.53	<1.53	<1.53	1.68 J	1.62 J	<1.53	1.59 J	1.72 J	<1.53	1.86 J
Cobalt	ug/L	6[A]	19[B]	120[C]	0.632	0.613	0.433 J	1.57	1.63	1.60	1.60	1.71	1.73	1.68	1.31
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	1.21 J	0.948 J	0.946 J	2.44	2.61	3.85 U*	6.79	3.51 U*	3.14 U*	2.89 U*	2.48
Iron	ug/L	n/v	n/v	n/v	314	231	247	261	368	284	257	324	351	195	401
Lead	ug/L	5[A]	3.18[B]	81.6[C]	0.372 U*	0.316 J	0.316 J	0.318 J	0.404 J	0.519 J	0.541 J	0.494 J	0.492 J	0.515 J	0.492 J
Lithium	ug/L	40[A]	440[B]	910[C]	6.00 U*	<3.14	<3.14	<3.39	3.55 J	5.23	3.86 J	5.60	4.34 J	<3.39	<3.39
Magnesium	ug/L	n/v	n/v	n/v	7,220	6,490	6,830	9,340	9,190	9,450	9,500	9,560	9,520	9,450	9,650
Manganese	ug/L	n/v	n/v	n/v	25.6	23.4	27.1	50.6	54.9	53.7	53.8	59.5	62.4	67.2	59.2
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	<0.610	<0.610	<0.610	0.658 J	0.666 J	0.659 J	0.615 J	0.672 J	<0.610	<0.610	0.625 J
Nickel	ug/L	100[A]	52.2[B]	469[C]	0.470 J	0.418 J	0.481 J	0.737 J	0.779 J	0.778 J	0.849 J	0.923 J	0.918 J	0.774 J	0.860 J
Selenium	ug/L	50[A]	3.1[B]	20[C]	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	27[B]	79[C]	1.35 U*	1.47 U*	2.07 U*	1.19	1.62	1.98	1.58	1.69	1.81	1.26	1.49
Zinc	ug/L	2,000[A]	120[C]	120[C]	<3.22	3.62 J	<3.22	5.63 U*	5.67 U*	7.40 U*	8.57 U*	7.66 U*	7.28 U*	6.68 U*	7.76 U*
Dissolved Metals															
Antimony	ug/L	6[A]	n/v	n/v	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	0.440 J
Arsenic	ug/L	10[A]	150[D]	340[E]	<0.323	0.459 J	0.574 J	0.785 J	0.640 J	0.893 J	0.787 J	0.846 J	0.837 J	0.770 J	0.874 J
Barium	ug/L	2,000[A]	n/v	n/v	30.3	24.7	23.4	37.6	37.6	36.4	36.1	36.3	35.4	35.3	39.0
Beryllium	ug/L	4[A]	n/v	n/v	<0.155	<0.155	<0.155	<0.182	<0.182	0.194 J	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	n/v	n/v	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	n/v	n/v	28,300	25,500	27,600	31,800	31,600	32,900	32,200	32,200	32,400	32,100	31,900
Chromium	ug/L	100[A]	74.1[D]	570[E]	<1.53	<1.53	<1.53	<1.53	1.60 J	<1.53	<1.53	<1.53	<1.53	<1.53	1.68 J
Cobalt	ug/L	6[A]	n/v	n/v	0.327 J	0.263 J	0.298 J	1.14	1.17	1.23	1.18	1.17	1.21	1.18	0.790
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	0.696 J	<0.627	<0.627	1.64 J	1.73 J	2.24	1.66 J	1.81 J	1.72 J	1.58 J	1.71 J
Iron	ug/L	n/v	n/v	n/v	32.8 J	14.8 J	67.2	20.8 J	20.0 J	23.9 J	22.8 J	24.9 J	23.1 J	22.4 J	33.9 J
Lead	ug/L	5[A]	2.52[D]	64.6[E]	<0.128	<0.128	<0.128	0.265 J	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	40[A]	n/v	n/v	5.72 U*	<3.14	<3.14	<3.39	<3.39	4.70 J	3.60 J	3.57 J	3.42 J	<3.39	3.43 J
Magnesium	ug/L	n/v	n/v	n/v	7,080	6,390	7,000	9,320	9,300	9,740	9,490	9,490	9,590	9,470	9,470
Manganese	ug/L	n/v	n/v	n/v	10.0	6.44	16.6	5.65	7.33	5.25	5.25	5.12	7.69	8.76	8.40
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	<0.610	<0.610	<0.610	0.686 J	0.675 J	0.666 J	0.645 J	0.639 J	0.621 J	0.632 J	0.700 J
Nickel	ug/L	100[A]	52.0[D]	468.24[E]	<0.312	<0.312	<0.312	0.492 J	0.433 J	0.613 J	0.641 J	0.704 J	0.612 J	0.577 J	0.527 J
Selenium	ug/L	50[A]	n/v	n/v	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	n/v	n/v	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	n/v	n/v	1.03 U*	1.72 U*	1.99 U*	1.35	1.37	1.37	1.25	1.35	1.38	1.19	1.36
Zinc	ug/L	2,000[A]	118[D]	117[E]	<3.22	<3.22	<3.22	3.77 U*	4.13 U*	5.11 U*	3.84 U*	4.07 U*	4.11 U*	3.70 U*	3.80 U*
Radiological Parameters															
Radium-226	pCi/L	n/v	n/v	n/v	-0.0436 +/-(0.0645)U	0.0435 +/-(0.0634)U	-0.00758 +/-(0.0771)U	0.00745 +/-(0.117)U	0.00307 +/-(0.121)U	-0.00675 +/-(0.0897)U	0.0450 +/-(0.121)U	0.00898 +/-(0.0990)U	0.00442 +/-(0.135)U	0.00260 +/-(0.116)U	0.00476 +/-(0.180)U
Radium-228	pCi/L	n/v	n/v	n/v	0.236 +/-(0.278)UJ	-0.183 +/-(0.236)UJ	0.268 +/-(0.276)UJ	0.0742 +/-(0.297)U	0.0505 +/-(0.328)U	0.423 +/-(0.283)U	-0.0347 +/-(0.252)U	-0.0742 +/-(0.247)U	0.268 +/-(0.282)U	0.185 +/-(0.225)U	0.0838 +/-(0.275)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	0.236 +/-(0.285)UJ	0.0435 +/-(0.244)UJ	0.268 +/-(0.287)UJ	0.0817 +/-(0.319)U	0.0536 +/-(0.350)U	0.423 +/-(0.297)U	0.0450 +/-(0.280)U	0.00898 +/-(0.266)U	0.273 +/-(0.313)U	0.188 +/-(0.253)U	0.0886 +/-(0.329)U
Anions															
Chloride	mg/L	250[A]	230[B]	860[C]	11.5	11.7	11.9	14.4	14.6	14.4	14.5	14.4	14.2	14.1	14.5
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0719 J	0.0703 J	0.0725 J	0.0890 J	0.0911 J	0.0914 J	0.0888 J	0.0920 J	0.0886 J	0.0884 J	0.0861 J
Sulfate	mg/L	250[A]	n/v	n/v	13.7	12.8	13.2	23.8	24.0	23.9	24.3	24.0	23.2	23.1	24.8
General Chemistry															
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	101	90.9	95.8	120	117	118	120	121	119	119	124
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	128	117	125	154	184	164	175	178	174	152	185
Total Suspended Solids	mg/L	n/v	n/v	n/v	8.60	7.80	9.50	9.80	11.9	7.40	8.40	10.2	9.60	13.5	11.0

See last page for notes.

Table J.1-1: Surface Stream Analytical Results - Holston River
John Sevier Fossil Plant
February and July 2019

Sample Location					JSF-HR07									
Sample Date					6-Feb-19	6-Feb-19	6-Feb-19	17-Jul-19	18-Jul-19	18-Jul-19	18-Jul-19	18-Jul-19	18-Jul-19	18-Jul-19
Sample ID		Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels		JSF-STR-HR07-LB-SUR-20190206	JSF-STR-HR07-CC-SUR-20190206	JSF-STR-HR07-RB-SUR-20190206	JSF-STR-HR07-RB-MID-20190717	JSF-STR-HR07-LB-SUR-20190718	JSF-STR-HR07-LB-BOT-20190718	JSF-STR-HR07-CC-SUR-20190718	JSF-STR-HR07-CC-MID-20190718	JSF-STR-HR07-CC-BOT-20190718	JSF-STR-HR07-RB-MID-20190718
Parent Sample ID														
Sample Depth					0.1 m	0.3 m	0.3 m	0.9 m	0.5 m	2.8 m	0.5 m	1.8 m	3.3 m	1.5 m
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	Normal Environmental Sample
Level of Review	Units		Holston River (Hardness = 100 mg/L)		Validated	Validated	Validated	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
			Chronic	Acute										
Total Metals														
Antimony	ug/L	6[A]	190[B]	900[C]	<0.378	<0.378	<0.378	0.404 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[B]	340[C]	0.648 J	0.614 J	0.489 J	0.962 J	1.01	0.871 J	0.834 J	0.891 J	0.832 J	0.930 J
Barium	ug/L	2,000[A]	220[B]	2,000[C]	27.0	26.6	25.6	42.7	40.8	41.7	40.5	40.9	40.9	40.2
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	29,300 J	28,300 J	26,600 J	34,700	33,800	34,800	33,600	33,800	33,600	33,300
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	<1.53	<1.53	<1.53	1.98 J	<1.53	1.94 J	<1.53	2.12	1.53 J	1.97 J
Cobalt	ug/L	6[A]	19[B]	120[C]	0.769	0.779	0.757	1.47	1.12	1.45	1.14	1.19	1.25	1.39
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	1.05 J	0.956 J	0.926 J	2.48	2.13	2.53	2.49	2.33	2.35	2.61
Iron	ug/L	n/v	n/v	n/v	229 J	362 J	221 J	279	274	586	254	288	325	475
Lead	ug/L	5[A]	3.18[B]	81.6[C]	0.297 J	0.288 J	0.333 J	0.377 J	0.407 J	0.607 J	0.350 J	0.363 J	0.435 J	0.566 J
Lithium	ug/L	40[A]	440[B]	910[C]	<3.14	<3.14	<3.14	<3.39	<3.39	<3.39	<3.39	<3.39	<3.39	<3.39
Magnesium	ug/L	n/v	n/v	n/v	7,270 J	7,310 J	7,070 J	10,100	9,480	9,430	9,630	9,580	9,620	9,520
Manganese	ug/L	n/v	n/v	n/v	28.3	28.4	29.1	57.0	49.9	80.6	48.5	49.1	55.3	69.9
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	0.610 UJ	0.632 J	0.610 UJ	0.735 J	0.721 J	<0.610	0.630 J	<0.610	0.642 J	0.610 J
Nickel	ug/L	100[A]	52.2[B]	469[C]	<0.312	0.392 J	0.385 J	0.796 J	0.739 J	0.917 J	0.713 J	0.808 J	0.779 J	0.880 J
Selenium	ug/L	50[A]	3.1[B]	20[C]	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	0.121 UJ	<0.121	0.121 UJ	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	27[B]	79[C]	2.22 U*	1.72 U*	1.66 U*	1.61	1.25	1.65	1.30	1.67	1.38	1.66
Zinc	ug/L	2,000[A]	120[C]	120[C]	<3.22	3.52 J	4.49 J	5.85 U*	5.18 U*	6.40 U*	5.16 U*	7.52 U*	5.64 U*	8.36 U*
Dissolved Metals														
Antimony	ug/L	6[A]	n/v	n/v	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[D]	340[E]	0.534 J	0.612 J	0.424 J	0.892 J	0.858 J	0.859 J	0.830 J	0.843 J	0.855 J	0.871 J
Barium	ug/L	2,000[A]	n/v	n/v	24.4	25.5	23.0	39.3	37.0	37.6	38.8	38.7	38.0	37.6
Beryllium	ug/L	4[A]	n/v	n/v	0.155 UJ	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	n/v	n/v	30.3 UJ	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	n/v	n/v	28,600 J	27,100 J	29,000 J	32,600	31,800	32,800	32,200	32,000	31,900	31,400
Chromium	ug/L	100[A]	74.1[D]	570[E]	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	6[A]	n/v	n/v	0.544	0.486 J	0.916	1.06	0.755	0.733	0.809	0.768	0.763	0.787
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	<0.627	<0.627	0.664 J	2.24	1.73 J	1.58 J	1.76 J	1.92 J	1.83 J	1.72 J
Iron	ug/L	n/v	n/v	n/v	19.0 U*	19.9 U*	18.3 U*	31.2 J	31.4 J	39.2 J	32.2 J	31.1 J	39.5 J	37.1 J
Lead	ug/L	5[A]	2.52[D]	64.6[E]	<0.128	<0.128	<0.128	<0.128	<0.128	0.128 J	<0.128	<0.128	0.128 J	<0.128
Lithium	ug/L	40[A]	n/v	n/v	3.14 UJ	<3.14	<3.14	<3.39	<3.39	<3.39	<3.39	<3.39	<3.39	<3.39
Magnesium	ug/L	n/v	n/v	n/v	7,180 J	6,780 J	8,000 J	9,870	9,290	9,150	9,520	9,360	9,420	9,300
Manganese	ug/L	n/v	n/v	n/v	11.4	8.76	15.3	6.66	7.06	16.8	6.19	6.05	6.71	12.7
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	0.610 UJ	0.610 UJ	<0.610	0.762 J	0.697 J	0.670 J	0.719 J	0.698 J	0.688 J	0.676 J
Nickel	ug/L	100[A]	52.0[D]	468.24[E]	<0.312	<0.312	<0.312	0.606 J	0.502 J	0.473 J	0.537 J	0.467 J	0.521 J	0.533 J
Selenium	ug/L	50[A]	n/v	n/v	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	0.121 UJ	0.121 UJ	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	n/v	n/v	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	n/v	n/v	1.61 U*	1.67 U*	1.14 U*	1.03	1.21	1.25	<0.991	1.18	1.18	1.06
Zinc	ug/L	2,000[A]	118[D]	117[E]	<3.22	<3.22	<3.22	4.08 U*	4.47 U*	5.49 U*	4.01 U*	3.52 U*	5.89 U*	3.64 U*
Radiological Parameters														
Radium-226	pCi/L	n/v	n/v	n/v	0.0337 +/-(0.0579)U	-0.00145 +/-(0.0374)U	0.00501 +/-(0.0496)U	-0.109 +/-(0.0889)U	-0.0234 +/-(0.197)U	-0.0125 +/-(0.211)U	-0.105 +/-(0.172)U	-0.0469 +/-(0.192)U	-0.0562 +/-(0.178)U	-0.125 +/-(0.143)U
Radium-228	pCi/L	n/v	n/v	n/v	0.236 +/-(0.284)U	0.0376 +/-(0.227)U	-0.0984 +/-(0.214)U	-0.124 +/-(0.278)U	0.0469 +/-(0.277)U	0.0300 +/-(0.267)U	0.0829 +/-(0.281)U	0.202 +/-(0.294)U	0.289 +/-(0.326)U	0.289 +/-(0.238)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	0.270 +/-(0.290)U	0.0376 +/-(0.230)U	0.00501 +/-(0.220)U	0.000 +/-(0.292)U	0.0469 +/-(0.340)U	0.0300 +/-(0.340)U	0.0829 +/-(0.329)U	0.202 +/-(0.351)U	0.289 +/-(0.371)U	0.289 +/-(0.278)U
Anions														
Chloride	mg/L	250[A]	230[B]	860[C]	13.7	12.9	13.2	14.6	13.6	13.1	13.6	13.6	13.8	13.2
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0862 J	0.0826 J	0.0825 J	0.0906 J	0.0842 J	0.0846 J	0.0866 J	0.0881 J	0.0820 J	0.0872 J
Sulfate	mg/L	250[A]	n/v	n/v	16.6	15.4	15.2	26.7	24.8	23.0	24.4	23.4	23.6	24.0
General Chemistry														
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	103	101	95.5	128	123	126	124	124	124	122
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	138	125	134	175	171	170	169	160	173	173
Total Suspended Solids	mg/L	n/v	n/v	n/v	8.80	7.70	10.6	6.60	7.90	17.7	6.80	7.50	11.0	13.7

See last page for notes.

Stantec

Table J.1-1: Surface Stream Analytical Results - Holston River
John Sevier Fossil Plant
February and July 2019

Sample Location					JSF-HR08									
Sample Date		Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels		6-Feb-19	6-Feb-19	6-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID					JSF-STR-HR08-LB-SUR-20190206	JSF-STR-HR08-CC-SUR-20190206	JSF-STR-HR08-RB-SUR-20190206	JSF-STR-HR08-LB-SUR-20190717	JSF-STR-HR08-LB-MID-20190717	JSF-STR-HR08-LB-BOT-20190717	JSF-STR-HR08-CC-SUR-20190717	JSF-STR-DUP03-20190717	JSF-STR-HR08-CC-MID-20190717	JSF-STR-HR08-CC-BOT-20190717
Parent Sample ID												JSF-STR-HR08-CC-SUR-20190717		
Sample Depth					0.3 m	1 m	0.4 m	0.5 m	2 m	3.7 m	0.5 m	0.5 m	2.9 m	5.5 m
Sample Type					Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Field Duplicate Sample	Normal Environmental Sample	Normal Environmental Sample
Level of Review	Units		Holston River (Hardness = 100 mg/L)		Validated	Validated	Validated	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
			Chronic	Acute										
Total Metals														
Antimony	ug/L	6[A]	190[B]	900[C]	<0.378	<0.378	<0.378	0.480 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[B]	340[C]	0.664 J	0.583 J	0.630 J	1.11	1.02	0.929 J	0.933 J	0.879 J	0.842 J	0.908 J
Barium	ug/L	2,000[A]	220[B]	2,000[C]	88.0	24.4	28.4	40.1	42.5	42.6	41.6	41.8	41.6	42.6
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.155	<0.155	<0.155	0.188 J	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<30.3	<30.3	<30.3	40.5 J	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	0.159 J	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	29,000 J	26,300 J	29,400	32,200	35,200	35,100	34,900	34,500	33,800	34,800
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	<1.53	<1.53	<1.53	1.65 J	1.55 J	1.66 J	1.62 J	1.57 J	<1.53	2.06
Cobalt	ug/L	6[A]	19[B]	120[C]	0.734	0.607	0.776	1.50	1.55	1.49	1.47	1.46	1.49	1.59
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	1.05 J	0.797 J	1.02 J	2.85	2.60	2.58	2.80	2.39	2.46	2.64
Iron	ug/L	n/v	n/v	n/v	300 J	162 J	238 J	295	316	324	282	291	287	383
Lead	ug/L	5[A]	3.18[B]	81.6[C]	0.323 J	0.243 J	0.327 J	0.448 J	0.462 J	0.442 J	0.376 J	0.387 J	0.399 J	0.439 J
Lithium	ug/L	40[A]	440[B]	910[C]	<3.14	<3.14	<3.14	4.12 J	<3.39	<3.39	<3.39	<3.39	<3.39	<3.39
Magnesium	ug/L	n/v	n/v	n/v	7,390 J	6,750 J	8,380	9,710	10,200	10,200	10,300	10,100	9,830	10,100
Manganese	ug/L	n/v	n/v	n/v	28.3	22.1	30.9	55.7	60.9	62.6	59.9	58.0	61.7	73.0
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	0.610 UJ	0.610 UJ	<0.610	0.897 J	0.816 J	0.724 J	0.712 J	0.699 J	0.697 J	0.717 J
Nickel	ug/L	100[A]	52.2[B]	469[C]	0.485 J	0.418 J	0.465 J	0.889 J	0.852 J	0.839 J	0.906 J	0.835 J	0.799 J	0.900 J
Selenium	ug/L	50[A]	3.1[B]	20[C]	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	0.121 UJ	0.121 UJ	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	<0.128	<0.128	<0.128	0.165 J	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	27[B]	79[C]	1.77 U*	1.85 U*	1.80 U*	1.53	1.57	1.67	1.50	1.40	1.35	1.76
Zinc	ug/L	2,000[A]	120[C]	120[C]	3.57 J	<3.22	<3.22	6.80 U*	6.34 U*	6.87 U*	5.63 U*	5.42 U*	6.25 U*	7.00 U*
Dissolved Metals														
Antimony	ug/L	6[A]	n/v	n/v	<0.378	<0.378	0.740 J	0.460 J	0.409 J	<0.378	0.406 J	0.403 J	<0.378	0.382 J
Arsenic	ug/L	10[A]	150[D]	340[E]	0.438 J	0.531 J	0.565 J	0.967 J	1.16	0.999 J	0.985 J	0.867 J	0.995 J	0.988 J
Barium	ug/L	2,000[A]	n/v	n/v	24.2	25.5	25.1	38.8	39.1	39.0	38.3	39.1	39.5	39.4
Beryllium	ug/L	4[A]	n/v	n/v	<0.155	<0.155	0.155 UJ	<0.182	0.226 J	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	n/v	n/v	<30.3	<30.3	30.3 UJ	<38.6	44.6 J	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	<0.125	<0.125	<0.125	<0.125	0.215 U*	<0.125	<0.125	<0.125	0.207 U*	<0.125
Calcium	ug/L	n/v	n/v	n/v	30,300 J	28,200 J	29,900 J	33,000	32,700	32,700	32,300	32,600	32,400	32,500
Chromium	ug/L	100[A]	74.1[D]	570[E]	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	6[A]	n/v	n/v	0.399 J	0.482 J	0.529	1.08	1.14	1.09	1.09	1.04	1.13	1.10
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	<0.627	<0.627	<0.627	2.01	1.90 J	1.96 J	2.00	1.83 J	2.12	1.79 J
Iron	ug/L	n/v	n/v	n/v	17.5 U*	15.0 U*	169 J	28.9 J	29.9 J	33.7 J	29.4 J	29.5 J	36.0 J	28.7 J
Lead	ug/L	5[A]	2.52[D]	64.6[E]	<0.128	<0.128	<0.128	<0.128	0.147 J	<0.128	<0.128	<0.128	0.299 J	<0.128
Lithium	ug/L	40[A]	n/v	n/v	<3.14	<3.14	3.14 UJ	3.55 J	<3.39	<3.39	<3.39	<3.39	<3.39	3.41 J
Magnesium	ug/L	n/v	n/v	n/v	7,290 J	7,600 J	7,920 J	9,910	9,700	9,820	9,800	9,850	9,780	9,700
Manganese	ug/L	n/v	n/v	n/v	11.3	8.10	15.3	9.08	9.08	9.74	8.90	8.52	9.80	12.4
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	0.610 UJ	<0.610	2.48 U*	0.859 J	0.900 J	0.811 J	0.792 J	0.783 J	0.783 J	0.779 J
Nickel	ug/L	100[A]	52.0[D]	468.24[E]	<0.312	<0.312	<0.312	0.551 J	0.650 J	0.637 J	0.608 J	0.525 J	0.682 J	0.547 J
Selenium	ug/L	50[A]	n/v	n/v	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	0.121 UJ	<0.121	0.121 UJ	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	n/v	n/v	<0.128	<0.128	<0.128	<0.148	0.206 J	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	n/v	n/v	1.65 U*	1.38 U*	1.73 U*	1.32	1.19	<0.991	1.27	1.20	1.17	1.12
Zinc	ug/L	2,000[A]	118[D]	117[E]	<3.22	<3.22	<3.22	6.20 U*	9.97 U*	11.8 U*	5.07 U*	4.57 U*	5.15 U*	4.27 U*
Radiological Parameters														
Radium-226	pCi/L	n/v	n/v	n/v	0.0747 +/-(0.0726)U	0.0770 +/-(0.0621)U	0.0584 +/-(0.0573)U	-0.0181 +/-(0.174)U	-0.0663 +/-(0.103)U	0.0654 +/-(0.162)U	0.0219 +/-(0.167)U	0.0972 +/-(0.200)U	0.0879 +/-(0.182)U	-0.00916 +/-(0.154)U
Radium-228	pCi/L	n/v	n/v	n/v	0.217 +/-(0.258)U	0.190 +/-(0.238)U	-0.153 +/-(0.194)U	-0.190 +/-(0.277)U	0.0825 +/-(0.282)U	0.119 +/-(0.335)U	-0.00294 +/-(0.279)U	0.259 +/-(0.367)U	0.199 +/-(0.335)U	0.0506 +/-(0.258)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	0.292 +/-(0.268)U	0.267 +/-(0.246)U	0.0584 +/-(0.202)U	0.000 +/-(0.327)U	0.0825 +/-(0.300)U	0.185 +/-(0.372)U	0.0219 +/-(0.325)U	0.356 +/-(0.418)U	0.287 +/-(0.381)U	0.0506 +/-(0.300)U
Anions														
Chloride	mg/L	250[A]	230[B]	860[C]	13.1	12.8	12.5	14.4	14.5	14.5	14.4	14.4	14.6	14.4
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0865 J	0.0853 J	0.0775 J	0.0864 J	0.0865 J	0.0916 J	0.0863 J	0.0844 J	0.0879 J	0.0880 J
Sulfate	mg/L	250[A]	n/v	n/v	16.9	15.0	14.1	26.9	27.2	27.0	27.0	27.3	27.4	26.4
General Chemistry														
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	103	93.5	108	120	130	130	130	128	125	128
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	140	144	144	172	160	193	172	178	188	192
Total Suspended Solids	mg/L	n/v	n/v	n/v	9.20	6.30	10.4	8.00	8.40	9.20	6.20	6.60	8.80	11.2

See last page for notes.

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Table J.1-1: Surface Stream Analytical Results - Holston River
John Sevier Fossil Plant
February and July 2019

Sample Location					JSF-HR08			JSF-HR09						
Sample Date		Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels		17-Jul-19	17-Jul-19	17-Jul-19	6-Feb-19	6-Feb-19	6-Feb-19	6-Feb-19	17-Jul-19	17-Jul-19
Sample ID					JSF-STR-HR08-RB-SUR-20190717	JSF-STR-HR08-RB-MID-20190717	JSF-STR-HR08-RB-BOT-20190717	JSF-STR-HR09-LB-SUR-20190206	JSF-STR-HR09-CC-SUR-20190206	JSF-STR-DUP01-20190206	JSF-STR-HR09-RB-SUR-20190206	JSF-STR-HR09-CC-MID-20190717	JSF-STR-HR09-CC-BOT-20190717
Parent Sample ID										JSF-STR-HR09-CC-SUR-20190206			
Sample Depth					0.5 m	2 m	3.7 m	0.3 m	0.5 m	0.5 m	1 m	2.5 m	4.8 m
Sample Type					Normal Environmental Sample	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	Units		Holston River (Hardness = 100 mg/L)		Final-Verified	Final-Verified	Final-Verified	Validated	Validated	Validated	Validated	Final-Verified	Final-Verified
			Chronic	Acute									
Total Metals													
Antimony	ug/L	6[A]	190[B]	900[C]	0.556 J	0.502 J	0.394 J	0.379 J	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[B]	340[C]	0.995 J	0.945 J	0.886 J	0.504 J	0.440 J	0.457 J	0.543 J	0.969 J	0.875 J
Barium	ug/L	2,000[A]	220[B]	2,000[C]	42.7	45.2	41.8	34.1	33.0	30.9	32.3	42.1	40.3
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.182	<0.182	<0.182	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<38.6	<38.6	<38.6	33.2 U*	<30.3	<30.3	200 U*	<38.6	<38.6
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	35,100	34,500	34,800	30,500	31,200	27,800	29,200	33,300	32,300
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	1.77 J	1.81 J	<1.53	1.57 J	<1.53	1.56 J	2.17	1.69 J	1.83 J
Cobalt	ug/L	6[A]	19[B]	120[C]	1.50	1.50	1.49	0.948	0.848	0.806	0.867	1.38	1.47
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	2.62	2.65	2.52	1.47 J	1.30 J	1.17 J	1.41 J	2.70	2.77
Iron	ug/L	n/v	n/v	n/v	290	307	283	327	250	252	312	219	312
Lead	ug/L	5[A]	3.18[B]	81.6[C]	0.420 J	0.465 J	0.386 J	0.350 J	0.305 J	0.261 J	0.409 J	0.315 J	0.383 J
Lithium	ug/L	40[A]	440[B]	910[C]	4.52 J	<3.39	<3.39	3.67 J	3.61 J	3.22 J	4.94 J	4.42 J	4.38 J
Magnesium	ug/L	n/v	n/v	n/v	10,300	10,200	10,200	8,460	8,380	7,920	8,290	10,000	9,720
Manganese	ug/L	n/v	n/v	n/v	57.8	59.7	58.6	26.8	23.1	21.9	32.9	54.1	61.1
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	0.748 J	0.727 J	0.692 J	<0.610	<0.610	<0.610	<0.610	0.715 J	0.695 J
Nickel	ug/L	100[A]	52.2[B]	469[C]	0.857 J	0.894 J	0.771 J	0.576 J	0.515 J	0.488 J	0.562 J	0.752 J	0.757 J
Selenium	ug/L	50[A]	3.1[B]	20[C]	<1.51	<1.51	<1.51	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	<0.177	<0.177	<0.177	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	<0.148	<0.148	<0.148	<0.128	<0.128	<0.128	<0.128	<0.148	<0.148
Vanadium	ug/L	86[A]	27[B]	79[C]	1.59	1.55	1.41	1.57 U*	1.19 U*	1.42 U*	1.85 U*	1.64	1.67
Zinc	ug/L	2,000[A]	120[C]	120[C]	5.69 U*	8.82 U*	5.82 U*	<3.22	<3.22	<3.22	3.24 J	4.68 U*	5.25 U*
Dissolved Metals													
Antimony	ug/L	6[A]	n/v	n/v	0.686 J	0.414 J	0.503 J	0.455 J	<0.378	<0.378	0.446 J	<0.378	<0.378
Arsenic	ug/L	10[A]	150[D]	340[E]	1.17	0.936 J	1.03	0.448 J	0.397 J	0.427 J	0.454 J	0.872 J	0.814 J
Barium	ug/L	2,000[A]	n/v	n/v	40.4	39.0	40.2	32.7	32.0	30.4	31.1	39.3	39.5
Beryllium	ug/L	4[A]	n/v	n/v	0.313 J	0.191 J	<0.182	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182
Boron	ug/L	4,000[A]	n/v	n/v	52.8 J	41.6 J	<38.6	<30.3	<30.3	<30.3	47.5 U*	<38.6	<38.6
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	0.146 U*	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	n/v	n/v	32,300	32,100	32,300	29,600	30,300	28,900	29,700	32,900	32,900
Chromium	ug/L	100[A]	74.1[D]	570[E]	<1.53	<1.53	<1.53	1.91 J	<1.53	<1.53	1.61 J	<1.53	<1.53
Cobalt	ug/L	6[A]	n/v	n/v	1.29	1.08	1.05	0.615	0.575	0.561	0.594	1.08	1.09
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	2.39	1.91 J	1.87 J	0.855 J	0.801 J	0.819 J	0.901 J	1.85 J	2.02
Iron	ug/L	n/v	n/v	n/v	168	65.3	25.7 J	20.2 J	18.6 J	16.4 J	18.8 J	31.8 J	25.0 J
Lead	ug/L	5[A]	2.52[D]	64.6[E]	0.332 J	0.131 J	<0.128	0.235 U*	<0.128	<0.128	<0.128	0.149 J	<0.128
Lithium	ug/L	40[A]	n/v	n/v	3.79 J	<3.39	<3.39	3.65 J	3.31 J	3.46 J	3.74 J	<3.39	<3.39
Magnesium	ug/L	n/v	n/v	n/v	9,890	9,680	9,740	8,370	8,250	8,200	8,380	9,890	9,860
Manganese	ug/L	n/v	n/v	n/v	35.1	7.99	8.40	10.4	8.26	8.08	12.7	3.68 J	4.65 J
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	0.830 J	0.841 J	0.857 J	<0.610	<0.610	<0.610	<0.610	0.733 J	0.726 J
Nickel	ug/L	100[A]	52.0[D]	468.24[E]	0.733 J	0.642 J	0.590 J	0.376 U*	0.331 U*	<0.312	0.363 U*	0.615 J	0.530 J
Selenium	ug/L	50[A]	n/v	n/v	<1.51	<1.51	<1.51	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	<0.177	<0.177	<0.177	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177
Thallium	ug/L	2[A]	n/v	n/v	0.250 J	0.152 J	0.161 J	<0.128	<0.128	<0.128	<0.128	<0.148	<0.148
Vanadium	ug/L	86[A]	n/v	n/v	1.35	1.08	1.34	1.48 U*	1.03 U*	1.06 U*	1.56 U*	1.30	1.11
Zinc	ug/L	2,000[A]	118[D]	117[E]	4.66 U*	4.00 U*	4.60 U*	<3.22	<3.22	<3.22	<3.22	4.99 U*	3.92 U*
Radiological Parameters													
Radium-226	pCi/L	n/v	n/v	n/v	-0.198 +/-(0.101)U	-0.00941 +/-(0.158)U	-0.142 +/-(0.147)U	0.0595 +/-(0.0592)U	0.0427 +/-(0.0611)U	0.0241 +/-(0.0463)U	0.0706 +/-(0.0585)U	0.0560 +/-(0.203)U	0.0909 +/-(0.201)U
Radium-228	pCi/L	n/v	n/v	n/v	-0.0433 +/-(0.281)U	-0.00642 +/-(0.337)U	-0.0584 +/-(0.282)U	0.151 +/-(0.230)U	-0.0128 +/-(0.263)U	0.324 +/-(0.279)U	0.140 +/-(0.237)U	0.00946 +/-(0.483)U	-0.00945 +/-(0.357)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	0.000 +/-(0.299)U	0.000 +/-(0.372)U	0.000 +/-(0.318)U	0.210 +/-(0.237)U	0.0427 +/-(0.270)U	0.348 +/-(0.283)U	0.210 +/-(0.244)U	0.0655 +/-(0.524)U	0.0909 +/-(0.410)U
Anions													
Chloride	mg/L	250[A]	230[B]	860[C]	14.6	14.5	14.5	13.4	12.4	12.2	12.6	14.7	14.4
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0860 J	0.0861 J	0.0875 J	0.0653 J	0.0828 J	0.0747 J	0.0736 J	0.0900 J	0.0903 J
Sulfate	mg/L	250[A]	n/v	n/v	27.2	27.1	27.0	15.7	14.0	13.1	13.6	26.3	25.3
General Chemistry													
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	130	128	129	111	112	102	107	124	121
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	187	180	184	144	150	133	180	178	169
Total Suspended Solids	mg/L	n/v	n/v	n/v	7.30	7.50	8.20	8.20	6.60	6.30	9.60	6.70	9.70

See last page for notes.

Table J.1-1: Surface Stream Analytical Results - Holston River
John Sevier Fossil Plant
February and July 2019

Sample Location		Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels		JSF-HR09						
Sample Date					17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID					JSF-STR-HR09-LB-SUR-20190717	JSF-STR-HR09-LB-MID-20190717	JSF-STR-HR09-LB-BOT-20190717	JSF-STR-HR09-CC-SUR-20190717	JSF-STR-HR09-RB-SUR-20190717	JSF-STR-HR09-RB-MID-20190717	JSF-STR-HR09-RB-BOT-20190717
Parent Sample ID											
Sample Depth					0.5 m	2.5 m	4.6 m	0.5 m	0.5 m	2.5 m	4.7 m
Sample Type					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		Holston River (Hardness = 100 mg/L)		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
			Chronic	Acute							
Total Metals											
Antimony	ug/L	6[A]	190[B]	900[C]	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	0.549 J
Arsenic	ug/L	10[A]	150[B]	340[C]	0.907 J	0.931 J	0.925 J	0.936 J	0.971 J	0.904 J	1.05
Barium	ug/L	2,000[A]	220[B]	2,000[C]	40.0	41.4	40.7	38.3	39.6	40.6	40.7
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	0.280 J
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	47.4 J
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	32,000	33,700	32,700	31,300	32,100	32,800	33,100
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	1.76 J	<1.53	<1.53	<1.53	1.59 J	1.56 J	<1.53
Cobalt	ug/L	6[A]	19[B]	120[C]	1.37	1.53	1.57	1.29	1.37	1.41	1.52
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	2.80	2.78	2.80	2.51	2.42	2.64	2.62
Iron	ug/L	n/v	n/v	n/v	179	324	456	154	194	272	306
Lead	ug/L	5[A]	3.18[B]	81.6[C]	0.356 J	0.390 J	0.499 J	0.307 J	0.262 J	0.377 J	0.468 J
Lithium	ug/L	40[A]	440[B]	910[C]	5.11	4.00 J	3.95 J	3.87 J	4.57 J	3.66 J	4.23 J
Magnesium	ug/L	n/v	n/v	n/v	9,570	10,000	9,590	9,320	9,590	9,860	9,900
Manganese	ug/L	n/v	n/v	n/v	54.0	64.0	79.1	46.6	47.0	54.4	62.4
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	0.756 J	0.732 J	0.717 J	0.712 J	0.718 J	0.737 J	0.798 J
Nickel	ug/L	100[A]	52.2[B]	469[C]	0.786 J	0.841 J	0.912 J	0.653 J	0.697 J	0.781 J	0.800 J
Selenium	ug/L	50[A]	3.1[B]	20[C]	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	0.238 J
Vanadium	ug/L	86[A]	27[B]	79[C]	1.63	1.44	1.53	1.28	1.55	1.41	1.49
Zinc	ug/L	2,000[A]	120[C]	120[C]	6.04 U*	5.36 U*	7.53 U*	4.91 U*	4.15 U*	5.40 U*	5.94 U*
Dissolved Metals											
Antimony	ug/L	6[A]	n/v	n/v	<0.378	<0.378	<0.378	0.410 J	<0.378	0.378 J	0.663 J
Arsenic	ug/L	10[A]	150[D]	340[E]	0.963 J	0.812 J	0.926 J	0.937 J	0.833 J	0.892 J	1.10
Barium	ug/L	2,000[A]	n/v	n/v	39.5	39.6	39.7	38.1	40.8	38.6	39.4
Beryllium	ug/L	4[A]	n/v	n/v	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	0.269 J
Boron	ug/L	4,000[A]	n/v	n/v	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	47.7 J
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	<0.125	<0.125	<0.125	<0.125	0.649 U*	<0.125	<0.125
Calcium	ug/L	n/v	n/v	n/v	33,100	32,200	32,700	32,600	33,800	32,700	32,600
Chromium	ug/L	100[A]	74.1[D]	570[E]	<1.53	<1.53	1.67 J	1.73 J	<1.53	1.65 J	<1.53
Cobalt	ug/L	6[A]	n/v	n/v	1.07	1.04	1.07	1.07	1.09	1.08	1.10
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	1.69 J	1.77 J	1.83 J	1.92 J	1.85 J	2.14	1.91 J
Iron	ug/L	n/v	n/v	n/v	34.1 J	26.6 J	30.3 J	25.3 J	27.2 J	39.5 J	25.3 J
Lead	ug/L	5[A]	2.52[D]	64.6[E]	<0.128	<0.128	0.185 J	<0.128	<0.128	<0.128	0.132 J
Lithium	ug/L	40[A]	n/v	n/v	3.91 J	<3.39	3.79 J	3.64 J	<3.39	3.50 J	4.09 J
Magnesium	ug/L	n/v	n/v	n/v	9,900	9,750	9,780	9,820	10,100	9,850	9,890
Manganese	ug/L	n/v	n/v	n/v	4.34 J	5.48	13.3	4.92 J	4.75 J	6.04	6.11
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	0.782 J	0.744 J	0.743 J	0.762 J	0.764 J	0.709 J	0.801 J
Nickel	ug/L	100[A]	52.0[D]	468.24[E]	0.537 J	0.538 J	0.546 J	0.521 J	0.546 J	0.531 J	0.561 J
Selenium	ug/L	50[A]	n/v	n/v	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	n/v	n/v	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	0.219 J
Vanadium	ug/L	86[A]	n/v	n/v	1.36	1.06	1.52	1.44	1.23	1.51	1.41
Zinc	ug/L	2,000[A]	118[D]	117[E]	4.11 U*	4.30 U*	6.25 U*	4.19 U*	4.60 U*	3.99 U*	6.89 U*
Radiological Parameters											
Radium-226	pCi/L	n/v	n/v	n/v	1.86 +/-(0.435)	0.0312 +/-(0.174)U	-0.0212 +/-(0.204)U	0.0349 +/-(0.151)U	0.112 +/-(0.192)U	-0.0992 +/-(0.163)U	-0.0649 +/-(0.172)U
Radium-228	pCi/L	n/v	n/v	n/v	0.638 +/-(0.340)	0.218 +/-(0.332)U	-0.131 +/-(0.298)U	0.294 +/-(0.374)U	-0.0840 +/-(0.341)U	0.201 +/-(0.352)U	0.0848 +/-(0.310)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	2.50 +/-(0.552)	0.249 +/-(0.375)U	0.000 +/-(0.361)U	0.328 +/-(0.403)U	0.112 +/-(0.391)U	0.201 +/-(0.388)U	0.0848 +/-(0.355)U
Anions											
Chloride	mg/L	250[A]	230[B]	860[C]	14.5	14.3	14.0	14.5	14.6	14.4	14.5
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0932 J	0.0856 J	0.0902 J	0.0899 J	0.0890 J	0.0875 J	0.0884 J
Sulfate	mg/L	250[A]	n/v	n/v	25.1	24.6	23.7	25.6	26.0	25.0	25.1
General Chemistry											
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	119	125	121	117	120	123	123
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	175	191	161	177	175	195	182
Total Suspended Solids	mg/L	n/v	n/v	n/v	7.80	9.90	14.6	6.20	5.60	7.40	9.10

Notes:
Please note that units have been converted automatically in this table, and significant figures may not have been maintained.
[A] Human Health Surface Water Screening Levels
[B] Ecological Surface Water Screening Levels - Holston River (Hardness = 100 mg/L) Total Chronic
[C] Ecological Surface Water Screening Levels - Holston River (Hardness = 100 mg/L) Total Acute
[D] Ecological Surface Water Screening Levels - Holston River (Hardness = 100 mg/L) Dissolved Chronic
[E] Ecological Surface Water Screening Levels - Holston River (Hardness = 100 mg/L) Dissolved Acute

15.2 Measured concentration did not exceed the indicated standard.
<0.03 Analyte was not detected at a concentration greater than the laboratory reporting limit.
m meters

ID identification
mg/L milligrams per Liter
n/v No standard/guideline value.
J quantitation is approximate due to limitations identified during data validation

pCi/L picocuries per Liter
U* 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.
ug/L micrograms per Liter
1. Level of review is defined in the Quality Assurance Project Plan.

Stantec

Table J.1-2: Surface Stream Analytical Results - Polly Branch
John Sevier Fossil Plant
February and July 2019

Sample Location					JSF-PB01		JSF-PB02			JSF-PB03						
Sample Date		Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels		4-Feb-19	18-Jul-19	4-Feb-19	18-Jul-19	18-Jul-19	4-Feb-19	4-Feb-19	4-Feb-19	18-Jul-19	18-Jul-19	18-Jul-19	18-Jul-19
Sample ID					JSF-STR-PB01-CC-SUR-20190204	JSF-STR-PB01-CC-SUR-20190718	JSF-STR-PB02-CC-SUR-20190204	JSF-STR-PB02-CC-SUR-20190718	JSF-STR-DUP01-20190718	JSF-STR-PB03-LB-SUR-20190204	JSF-STR-PB03-CC-SUR-20190204	JSF-STR-PB03-RB-SUR-20190204	JSF-STR-PB03-LB-MID-20190718	JSF-STR-PB03-CC-SUR-20190718	JSF-STR-PB03-CC-BOT-20190718	JSF-STR-PB03-RB-MID-20190718
Parent Sample ID									JSF-STR-PB02-CC-SUR-20190718							
Sample Depth					0.1 m	0.1 m	0.2 m	0.3 m	0.3 m	0.5 m	0.6 m	0.6 m	0.4 m	0.3 m	1 m	0.5 m
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	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample
Level of Review	Units		Polly Branch (Hardness = 100 mg/L)		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
			Chronic	Acute												
Total Metals																
Antimony	ug/L	6[A]	190[B]	900[C]	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	0.535 J	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[B]	340[C]	0.637 J	1.55	0.384 J	0.805 J	0.987 J	0.326 J	0.332 J	0.387 J	0.995 J	0.950 J	1.11	0.919 J
Barium	ug/L	2,000[A]	220[B]	2,000[C]	27.1	35.9	24.4	24.8	27.2	22.9	22.2	22.4	26.6	26.9	32.2	25.9
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.155	<0.182	<0.155	<0.182	0.209 J	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<30.3	<38.6	<30.3	<38.6	40.4 J	<30.3	<30.3	<30.3	39.7 J	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	60,800	45,900	42,600	43,800	45,100	40,400	38,600	38,700	45,200	46,300	48,400	44,700
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	2.16 U*	<1.53	<1.53	1.58 U*
Cobalt	ug/L	6[A]	19[B]	120[C]	0.157 J	0.193 J	0.168 J	0.0910 J	0.129 J	0.190 J	0.180 J	0.159 J	0.146 J	0.100 J	0.168 J	0.160 J
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627
Iron	ug/L	n/v	n/v	n/v	483	1,890	717	312	358	703	689	693	282	319	2,110	483
Lead	ug/L	5[A]	3.18[B]	81.6[C]	<0.128	<0.128	0.199 J	<0.128	<0.128	0.180 J	0.209 J	0.226 J	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	40[A]	440[B]	910[C]	<3.14	<3.39	<3.14	<3.39	11.3 U*	<3.14	<3.14	<3.14	<3.39	<3.39	<3.39	<3.39
Magnesium	ug/L	n/v	n/v	n/v	4,320	4,340	3,310	4,050	4,170	3,100	2,990	2,970	4,070	4,290	4,270	4,170
Manganese	ug/L	n/v	n/v	n/v	164	567	114	131	142	93.7	90.7	89.8	151	116	497	172
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	1.55 U*	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610
Nickel	ug/L	100[A]	52.2[B]	469[C]	<0.312	<0.336	0.358 J	<0.336	<0.336	0.346 J	0.355 J	0.377 J	<0.336	<0.336	<0.336	<0.336
Selenium	ug/L	50[A]	3.1[B]	20[C]	<2.62	<1.51	<2.62	<1.51	<1.51	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	<0.121	<0.177	<0.121	<0.177	<0.177	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	0.131 J	<0.148	<0.128	<0.148	<0.148	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	27[B]	79[C]	1.36 U*	<0.991	1.03 U*	<0.991	<0.991	<0.899	0.999 U*	1.46 U*	<0.991	<0.991	<0.991	<0.991
Zinc	ug/L	2,000[A]	120[B]	120[C]	<3.22	3.87 U*	<3.22	<3.22	3.77 U*	<3.22	<3.22	<3.22	4.38 U*	3.48 U*	<3.22	4.57 U*
Dissolved Metals																
Antimony	ug/L	6[A]	n/v	n/v	<0.378	<0.378	0.455 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[D]	340[E]	0.694 J	1.07	<0.323	0.859 J	0.897 J	<0.323	<0.323	<0.323	0.831 J	0.887 J	0.867 J	0.957 J
Barium	ug/L	2,000[A]	n/v	n/v	27.9	31.8	23.4	25.4	26.2	20.8	22.4	21.0	25.6	25.0	31.2	24.9
Beryllium	ug/L	4[A]	n/v	n/v	<0.155	<0.182	<0.155	<0.182	<0.182	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	4,000[A]	n/v	n/v	<30.3	<38.6	<30.3	<38.6	<38.6	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	n/v	n/v	59,500	45,300	44,800	44,600	45,000	40,000	41,800	40,400	45,200	45,500	47,800	44,400
Chromium	ug/L	100[A]	74.1[D]	570[E]	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	1.59 U*	1.58 U*	<1.53	1.84 U*
Cobalt	ug/L	6[A]	n/v	n/v	<0.0750	0.111 J	0.200 J	0.0860 J	0.0870 J	0.0960 J	0.0960 J	0.0860 J	0.104 J	0.0900 J	0.134 J	0.141 J
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627
Iron	ug/L	n/v	n/v	n/v	113	156	195	41.4 J	48.1 J	181	212	180	128	196	2,090	393
Lead	ug/L	5[A]	2.52[D]	64.6[E]	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	40[A]	n/v	n/v	<3.14	<3.39	<3.14	<3.39	9.00 U*	<3.14	<3.14	<3.14	<3.39	<3.39	<3.39	<3.39
Magnesium	ug/L	n/v	n/v	n/v	4,090	4,320	3,440	4,140	4,190	3,040	3,180	3,090	4,120	4,150	4,190	4,150
Manganese	ug/L	n/v	n/v	n/v	109	409	107	125	127	79.8	83.5	81.4	123	98.3	497	176
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	0.687 U*	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610
Nickel	ug/L	100[A]	52.0[D]	468[E]	<0.312	<0.336	0.323 U*	<0.336	<0.336	<0.312	<0.312	<0.312	<0.336	<0.336	<0.336	<0.336
Selenium	ug/L	50[A]	n/v	n/v	<2.62	<1.51	<2.62	<1.51	<1.51	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	<0.121	<0.177	<0.121	<0.177	<0.177	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	2[A]	n/v	n/v	<0.128	<0.148	<0.128	<0.148	<0.148	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	86[A]	n/v	n/v	1.58 U*	<0.991	0.901 U*	<0.991	<0.991	<0.899	<0.899	<0.899	<0.991	<0.991	<0.991	<0.991
Zinc	ug/L	2,000[A]	118[D]	117[E]	<3.22	<3.22	<3.22	<3.22	<3.22	<3.22	<3.22	<3.22	3.33 U*	4.25 U*	4.42 U*	<3.22
Radiological Parameters																
Radium-226	pCi/L	n/v	n/v	n/v	0.0415 +/-(0.0532)U	-0.00360 +/-(0.0567)UJ	0.0690 +/-(0.0630)U	0.0355 +/-(0.138)UJ	0.0344 +/-(0.157)UJ	0.0691 +/-(0.0672)U	-0.0123 +/-(0.0350)U	0.00875 +/-(0.0578)U	-0.0300 +/-(0.112)UJ	-0.122 +/-(0.127)UJ	0.0286 +/-(0.123)UJ	0.0787 +/-(0.151)UJ
Radium-228	pCi/L	n/v	n/v	n/v	0.119 +/-(0.201)UJ	0.207 +/-(0.331)U	0.211 +/-(0.220)U	0.107 +/-(0.255)U	0.312 +/-(0.329)U	0.159 +/-(0.314)U	0.0578 +/-(0.211)U	-0.0704 +/-(0.191)U	0.0490 +/-(0.311)U	0.146 +/-(0.308)U	0.0956 +/-(0.322)U	0.0382 +/-(0.314)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	0.161 +/-(0.208)UJ	0.207 +/-(0.336)UJ	0.280 +/-(0.229)U	0.143 +/-(0.290)UJ	0.346 +/-(0.365)UJ	0.229 +/-(0.321)U	0.0578 +/-(0.214)U	0.00875 +/-(0.200)U	0.0490 +/-(0.331)UJ	0.146 +/-(0.333)UJ	0.124 +/-(0.345)UJ	0.117 +/-(0.348)UJ
Anions																
Chloride	mg/L	250[A]	230[B]	860[C]	1.71	1.14	1.26	1.11	1.10	1.46	1.16	1.18	1.08	1.10	0.979 J	1.13
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0516 J	0.0586 J	0.0475 J	0.0609 J	0.0622 J	0.0320 J	0.0465 J	0.0430 J	0.0622 J	0.0629 J	0.0649 J	0.0620 J
Sulfate	mg/L	250[A]	n/v	n/v	19.8	3.16	13.1	5.21	5.23	12.4	12.1	12.3	5.42	5.53	2.56	5.31
General Chemistry																
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	170	133	120	126	130	114	109	109	130	133	138	129
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	188	149	150	142	144	148	146	139	162	147	147	139
Total Suspended Solids	mg/L	n/v	n/v	n/v	2.60	8.63	4.10	3.70	3.40	2.00	3.20	3.10	3.60	3.10	4.70	3.00

See last page for notes.

Table J.1-2: Surface Stream Analytical Results - Polly Branch
John Sevier Fossil Plant
February and July 2019

Sample Location					JSF-PB04								JSF-PB05		
Sample Date					4-Feb-19	4-Feb-19	4-Feb-19	4-Feb-19	18-Jul-19	18-Jul-19	18-Jul-19	18-Jul-19	5-Feb-19	18-Jul-19	18-Jul-19
Sample ID					JSF-STR-PB04-LB-SUR-20190204	JSF-STR-PB04-CC-SUR-20190204	JSF-STR-PB04-CC-BOT-20190204	JSF-STR-PB04-RB-SUR-20190204	JSF-STR-PB04-LB-MID-20190718	JSF-STR-PB04-CC-SUR-20190718	JSF-STR-PB04-CC-BOT-20190718	JSF-STR-PB04-RB-MID-20190718	JSF-STR-PB05-CC-SUR-20190205	JSF-STR-PB05-CC-BOT-20190718	JSF-STR-PB05-CC-SUR-20190718
Parent Sample ID		Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels												
Sample Depth					0.6 m	0.5 m	2 m	0.5 m	0.3 m	0.5 m	2.2 m	0.3 m	1 m	1.3 m	0.3 m
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	Normal Environmental Sample	Normal Environmental Sample
Level of Review	Units		Polly Branch (Hardness = 100 mg/L)		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
			Chronic	Acute											
Total Metals															
Antimony	ug/L	6[A]	190[B]	900[C]	<0.378	<0.378	<0.378	<0.378	0.533 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[B]	340[C]	0.596 J	0.428 J	0.437 J	0.628 J	1.02	0.849 J	0.956 J	1.11	0.610 J	0.890 J	0.807 J
Barium	ug/L	2,000[A]	220[B]	2,000[C]	17.7	17.0	22.8	18.0	24.5	25.0	53.2	25.3	20.7	23.7	23.2
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.155	<0.182	<0.182
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<30.3	<30.3	<30.3	<30.3	59.9 J	<38.6	<38.6	44.6 J	<30.3	<38.6	<38.6
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	37,000	35,800	45,200 J	39,000	46,400	47,000	45,400	47,200	40,600	46,000	44,100
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	6[A]	19[B]	120[C]	0.126 J	0.113 J	0.167 J	0.136 J	0.150 J	0.0990 J	0.131 J	0.135 J	0.123 J	<0.0750	<0.0750
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	<0.627	0.731 J	0.666 J	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627
Iron	ug/L	n/v	n/v	n/v	405	420	365	428	447	191	760	585	182	161	78.6
Lead	ug/L	5[A]	3.18[B]	81.6[C]	0.156 J	0.178 J	<0.128	0.155 J	0.131 J	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	40[A]	440[B]	910[C]	<3.14	<3.14	<3.14	<3.14	<3.39	<3.39	<3.39	<3.39	<3.14	<3.39	<3.39
Magnesium	ug/L	n/v	n/v	n/v	2,740	2,840	4,300	2,940	4,330	4,340	4,110	4,470	3,470	4,480	4,340
Manganese	ug/L	n/v	n/v	n/v	83.7	83.1	141	87.8	56.9	132	364	122	182	177	57.4
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610
Nickel	ug/L	100[A]	52.2[B]	469[C]	<0.312	<0.312	<0.312	0.376 J	<0.336	<0.336	<0.336	<0.336	<0.312	<0.336	<0.336
Selenium	ug/L	50[A]	3.1[B]	20[C]	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<2.62	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.121	<0.177	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	<0.128	<0.128	<0.128	<0.128	0.238 J	<0.148	<0.148	<0.148	<0.128	<0.148	<0.148
Vanadium	ug/L	86[A]	27[B]	79[C]	1.71 U*	1.31 U*	0.970 U*	1.41 U*	<0.991	<0.991	<0.991	<0.991	1.70 U*	<0.991	<0.991
Zinc	ug/L	2,000[A]	120[B]	120[C]	<3.22	<3.22	<3.22	<3.22	<3.22	<3.22	5.30 U*	3.28 U*	<3.22	3.88 U*	3.44 U*
Dissolved Metals															
Antimony	ug/L	6[A]	n/v	n/v	<0.378	<0.378	<0.378	<0.378	0.424 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[D]	340[E]	0.435 J	<0.323	0.495 J	<0.323	0.844 J	0.949 J	0.845 J	0.972 J	0.498 J	0.739 J	0.674 J
Barium	ug/L	2,000[A]	n/v	n/v	15.6 U*	15.3 U*	21.2	16.5 U*	23.6	22.9	24.8	23.0	17.1 U*	23.2	21.8
Beryllium	ug/L	4[A]	n/v	n/v	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.155	<0.182	<0.182
Boron	ug/L	4,000[A]	n/v	n/v	<30.3	<30.3	<30.3	<30.3	44.4 J	<38.6	<38.6	<38.6	<30.3	<38.6	<38.6
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	n/v	n/v	37,700	35,300	50,900 J	38,500	47,600	44,800	46,100	45,000	39,900	45,300	44,600
Chromium	ug/L	100[A]	74.1[D]	570[E]	<1.53	<1.53	<1.53	<1.53	1.56 U*	2.45 U*	<1.53	2.48 U*	<1.53	<1.53	<1.53
Cobalt	ug/L	6[A]	n/v	n/v	0.0810 J	0.0820 J	0.124 J	0.0810 J	0.102 J	<0.0750	0.122 J	0.103 J	0.126 J	<0.0750	<0.0750
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627
Iron	ug/L	n/v	n/v	n/v	154	119	113	122	<19.5	<19.5	125	99.8	68.6	22.2 J	25.4 J
Lead	ug/L	5[A]	2.52[D]	64.6[E]	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	0.163 J	<0.128
Lithium	ug/L	40[A]	n/v	n/v	<3.14	<3.14	<3.14	<3.14	<3.39	<3.39	<3.39	<3.39	<3.14	<3.39	<3.39
Magnesium	ug/L	n/v	n/v	n/v	2,940	2,770	4,550	3,080	4,510	4,100	4,140	4,260	3,660	4,440	4,400
Manganese	ug/L	n/v	n/v	n/v	71.3	67.5	139	72.3	27.1	4.83 J	312	66.1	118	35.1	3.28 J
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610
Nickel	ug/L	100[A]	52.0[D]	468[E]	<0.312	<0.312	<0.312	<0.312	<0.336	<0.336	<0.336	<0.336	<0.312	0.555 J	<0.336
Selenium	ug/L	50[A]	n/v	n/v	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<2.62	<1.51	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.121	<0.177	<0.177
Thallium	ug/L	2[A]	n/v	n/v	<0.128	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.128	<0.148	<0.148
Vanadium	ug/L	86[A]	n/v	n/v	1.20 U*	<0.899	1.45 U*	<0.899	<0.991	<0.991	<0.991	<0.991	1.15 U*	<0.991	<0.991
Zinc	ug/L	2,000[A]	118[D]	117[E]	<3.22	<3.22	<3.22	<3.22	<3.22	<3.22	4.86 U*	<3.22	<3.22	<3.22	<3.22
Radiological Parameters															
Radium-226	pCi/L	n/v	n/v	n/v	0.0413 +/-(0.0553)U	0.0473 +/-(0.0637)U	0.0628 +/-(0.0690)U	0.0700 +/-(0.0743)U	0.150 +/-(0.143)UJ	-0.0140 +/-(0.128)UJ	-0.0494 +/-(0.0624)UJ	-0.155 +/-(0.115)UJ	0.0248 +/-(0.0571)U	0.158 +/-(0.0996)J	-0.119 +/-(0.107)UJ
Radium-228	pCi/L	n/v	n/v	n/v	-0.0545 +/-(0.216)UJ	0.354 +/-(0.259)UJ	0.0517 +/-(0.244)UJ	0.0303 +/-(0.233)UJ	0.0608 +/-(0.238)U	0.0328 +/-(0.234)U	0.0710 +/-(0.240)U	-0.0432 +/-(0.252)U	0.322 +/-(0.269)UJ	-0.0973 +/-(0.261)U	-0.152 +/-(0.211)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	0.0413 +/-(0.223)UJ	0.401 +/-(0.267)UJ	0.114 +/-(0.254)UJ	0.100 +/-(0.245)UJ	0.211 +/-(0.278)UJ	0.0328 +/-(0.267)UJ	0.0710 +/-(0.248)UJ	0.000 +/-(0.277)UJ	0.347 +/-(0.275)UJ	0.158 +/-(0.279)J	0.000 +/-(0.237)UJ
Anions															
Chloride	mg/L	250[A]	230[B]	860[C]	1.58	1.56	3.21	1.56	1.16	1.14	1.01	1.26	1.96	1.19	1.22
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0499 J	0.0456 J	0.0589 J	0.0481 J	0.0637 J	0.0674 J	0.0606 J	0.0648 J	0.0554 J	0.0629 J	0.0632 J
Sulfate	mg/L	250[A]	n/v	n/v	12.6	12.5	18.6	12.4	6.16	6.03	4.66	6.04	15.8	6.10	5.96
General Chemistry															
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	104	101	131	109	134	135	130	136	116	133	128
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	137	139	163	137	165	153	150	154	115	132	167
Total Suspended Solids	mg/L	n/v	n/v	n/v	3.60	3.40	3.30	3.60	2.90	3.00	9.50	4.70	2.60	5.50	4.40

See last page for notes.

Table J.1-2: Surface Stream Analytical Results - Polly Branch
John Sevier Fossil Plant
February and July 2019

Sample Location					JSF-PB06		JSF-PB07		JSF-PB08		JSF-PB09	
Sample Date					4-Feb-19	18-Jul-19	4-Feb-19	18-Jul-19	4-Feb-19	18-Jul-19	4-Feb-19	18-Jul-19
Sample ID					JSF-STR-PB06-CC-SUR-20190204	JSF-STR-PB06-CC-SUR-20190718	JSF-STR-PB07-CC-SUR-20190204	JSF-STR-PB07-CC-SUR-20190718	JSF-STR-PB08-CC-SUR-20190204	JSF-STR-PB08-CC-SUR-20190718	JSF-STR-PB09-CC-SUR-20190204	JSF-STR-PB09-CC-SUR-20190718
Parent Sample ID		Human Health Surface Water Screening Levels	Ecological Surface Water Screening Levels									
Sample Depth					0.1 m	0.1 m	0.1 m	0.1 m	0.1 m	0.05 m	0.1 m	0.03 m
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	Units		Polly Branch (Hardness = 100 mg/L)		Final-Verified	Validated	Final-Verified	Validated	Final-Verified	Validated	Final-Verified	Validated
			Chronic	Acute								
Total Metals												
Antimony	ug/L	6[A]	190[B]	900[C]	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[B]	340[C]	0.449 J	2.48	0.493 J	3.75	0.628 J	3.10	0.823 J	3.44
Barium	ug/L	2,000[A]	220[B]	2,000[C]	23.3	24.7	23.0	30.8	21.6	18.7	36.3	42.0
Beryllium	ug/L	4[A]	11[B]	93[C]	<0.155	<0.182	<0.155	<0.182	<0.155	<0.182	<0.155	<0.182
Boron	ug/L	4,000[A]	7,200[B]	34,000[C]	<30.3	43.8 J	34.1 J	50.5 J	38.0 J	49.5 J	79.2 J	132
Cadmium	ug/L	5[A]	0.790[B]	1.91[C]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	116,000[B]	n/v	42,200	48,700	43,100	46,300	44,200	49,700	58,000	58,400
Chromium	ug/L	100[A]	86.2[B]	1,803[C]	<1.53	<1.53	<1.53	<1.53	1.55 J	<1.53	<1.53	<1.53
Cobalt	ug/L	6[A]	19[B]	120[C]	0.233 J	0.271 U*	0.209 J	0.350 U*	0.158 J	0.109 J	0.141 J	0.326 J
Copper	ug/L	1,300[A]	9.33[B]	14.0[C]	1.61 J	<0.627	0.649 J	<0.627	0.804 J	<0.627	1.01 J	1.21 J
Iron	ug/L	n/v	n/v	n/v	174	301	155	261	138	52.3	128	549
Lead	ug/L	5[A]	3.18[B]	81.6[C]	<0.128	0.210 J	<0.128	0.195 J	<0.128	<0.128	0.192 J	0.441 J
Lithium	ug/L	40[A]	440[B]	910[C]	<3.14	<3.39	<3.14	<3.39	<3.14	<3.39	3.32 J	3.59 J
Magnesium	ug/L	n/v	n/v	n/v	4,310	5,470	4,480	6,020	4,690	7,180	6,630	7,050
Manganese	ug/L	n/v	n/v	n/v	174	529	129	1,230	74.2	145	32.9	78.5
Mercury	ug/L	2[A]	0.77[B]	1.4[C]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	800[B]	7,200[C]	<0.610	<0.610	<0.610	1.74 J	0.680 J	2.95 U*	1.89 J	5.28 U*
Nickel	ug/L	100[A]	52.2[B]	469[C]	3.05	0.761 J	0.431 J	0.749 J	0.434 J	0.515 J	0.696 J	0.697 J
Selenium	ug/L	50[A]	3.1[B]	20[C]	<2.62	<1.51	<2.62	<1.51	<2.62	<1.51	<2.62	<1.51
Silver	ug/L	100[A]	n/v	3.78[C]	<0.121	<0.177	<0.121	<0.177	<0.121	<0.177	<0.121	<0.177
Thallium	ug/L	2[A]	6[B]	54[C]	<0.128	<0.148	<0.128	<0.148	<0.128	<0.148	<0.128	<0.148
Vanadium	ug/L	86[A]	27[B]	79[C]	<0.899	<0.991	<0.899	<0.991	1.20 U*	<0.991	1.06 U*	<0.991
Zinc	ug/L	2,000[A]	120[B]	120[C]	<3.22	3.80 U*	<3.22	4.66 U*	<3.22	<3.22	13.1	4.81 U*
Dissolved Metals												
Antimony	ug/L	6[A]	n/v	n/v	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	10[A]	150[D]	340[E]	0.551 J	2.16	0.498 J	3.28	0.516 J	3.21	0.986 J	2.74
Barium	ug/L	2,000[A]	n/v	n/v	26.6	22.3	21.1	30.0	19.5	18.7	34.9	36.2
Beryllium	ug/L	4[A]	n/v	n/v	<0.155	<0.182	<0.155	<0.182	<0.155	<0.182	<0.155	<0.182
Boron	ug/L	4,000[A]	n/v	n/v	33.4 J	44.8 J	35.0 J	51.7 J	34.9 J	55.2 J	86.8	126
Cadmium	ug/L	5[A]	0.718[D]	1.80[E]	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	n/v	n/v	n/v	42,800	46,900	44,000	46,400	42,200	51,400	59,000	57,700
Chromium	ug/L	100[A]	74.1[D]	570[E]	2.08	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	6[A]	n/v	n/v	0.195 J	0.140 U*	0.161 J	0.185 U*	0.118 J	0.110 J	0.105 J	0.0780 J
Copper	ug/L	1,300[A]	8.96[D]	13.4[E]	0.830 J	<0.627	0.635 J	<0.627	0.642 J	<0.627	<0.627	0.810 J
Iron	ug/L	n/v	n/v	n/v	88.8	21.4 J	84.1	71.9	69.5	<19.5	49.3 J	43.7 J
Lead	ug/L	5[A]	2.52[D]	64.6[E]	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	40[A]	n/v	n/v	<3.14	<3.39	<3.14	<3.39	<3.14	<3.39	3.49 J	<3.39
Magnesium	ug/L	n/v	n/v	n/v	4,440	5,260	4,560	6,090	4,520	7,460	6,710	6,930
Manganese	ug/L	n/v	n/v	n/v	131	391	96.5	1,070	38.8	106	24.5	22.2
Mercury	ug/L	2[A]	0.77[D]	1.4[E]	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	100[A]	n/v	n/v	<0.610	<0.610	<0.610	1.65 J	0.637 J	3.05 U*	2.99 J	5.40 U*
Nickel	ug/L	100[A]	52.0[D]	468[E]	0.429 U*	0.475 J	0.416 U*	0.509 J	0.385 U*	0.547 J	0.361 U*	0.520 J
Selenium	ug/L	50[A]	n/v	n/v	<2.62	<1.51	<2.62	<1.51	<2.62	<1.51	<2.62	<1.51
Silver	ug/L	100[A]	n/v	3.22[E]	<0.121	<0.177	<0.121	<0.177	<0.121	<0.177	<0.121	<0.177
Thallium	ug/L	2[A]	n/v	n/v	<0.128	<0.148	<0.128	<0.148	<0.128	<0.148	<0.128	<0.148
Vanadium	ug/L	86[A]	n/v	n/v	1.35 U*	<0.991	0.935 U*	<0.991	0.970 U*	<0.991	1.01 U*	<0.991
Zinc	ug/L	2,000[A]	118[D]	117[E]	5.07 U*	<3.22	<3.22	<3.22	4.59 U*	<3.22	<3.22	<3.22
Radiological Parameters												
Radium-226	pCi/L	n/v	n/v	n/v	0.0798 +/-(0.130)U	-0.0112 +/-(0.0652)U	0.112 +/-(0.149)U	-0.122 +/-(0.158)U	0.0474 +/-(0.0532)U	-0.0419 +/-(0.0564)U	0.0134 +/-(0.0483)U	0.160 +/-(0.184)U
Radium-228	pCi/L	n/v	n/v	n/v	0.306 +/-(0.255)U	0.0653 +/-(0.274)U	0.115 +/-(0.252)U	0.224 +/-(0.383)U	0.172 +/-(0.284)U	0.310 +/-(0.273)U	0.227 +/-(0.240)U	0.217 +/-(0.327)U
Radium-226+228	pCi/L	5[A]	3[B]	3[C]	0.386 +/-(0.286)U	0.0653 +/-(0.282)U	0.227 +/-(0.293)U	0.224 +/-(0.414)U	0.220 +/-(0.289)U	0.310 +/-(0.279)U	0.240 +/-(0.245)U	0.376 +/-(0.375)U
Anions												
Chloride	mg/L	250[A]	230[B]	860[C]	1.97	1.58	2.18	1.43	2.21	1.30	5.24	4.05
Fluoride	mg/L	4.0[A]	2.7[B]	9.8[C]	0.0687 J	0.0779 J	0.0748 J	0.0784 J	0.0736 J	0.0859 J	0.0771 J	0.0900 J
Sulfate	mg/L	250[A]	n/v	n/v	20.4	9.44	21.9	11.8	22.8	30.4	34.9	24.7
General Chemistry												
Hardness (as CaCO3)	mg/L	n/v	n/v	n/v	123 J	144	126 J	140	130 J	154	172 J	175
Total Dissolved Solids	mg/L	500[A]	n/v	n/v	144	177	158	169	146	183	203	216
Total Suspended Solids	mg/L	n/v	n/v	n/v	1.90	4.70	1.20	8.60	1.00	0.900	2.00	36.4

Notes:
Please note that units have been converted automatically in this table, and significant figures may not have been maintained.

[A] Human Health Surface Water Screening Levels
[B] Ecological Surface Water Screening Levels - Polly Branch (Hardness = 100 mg/L) Total Chronic
[C] Ecological Surface Water Screening Levels - Polly Branch (Hardness = 100 mg/L) Total Acute
[D] Ecological Surface Water Screening Levels - Polly Branch (Hardness = 100 mg/L) Dissolved Chronic
[E] Ecological Surface Water Screening Levels - Polly Branch (Hardness = 100 mg/L) Dissolved Acute

15.2 Measured concentration did not exceed the indicated standard.
<0.03 Analyte was not detected at a concentration greater than the laboratory reporting limit.
m meters
ID identification
mg/L milligrams per Liter
n/v No standard/guideline value.
J quantitation is approximate due to limitations identified during data validation
pCi/L picocuries per Liter
U* 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.
ug/L micrograms per Liter

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

Stantec

EXHIBITS

Exhibit No.
J.1-1

Title

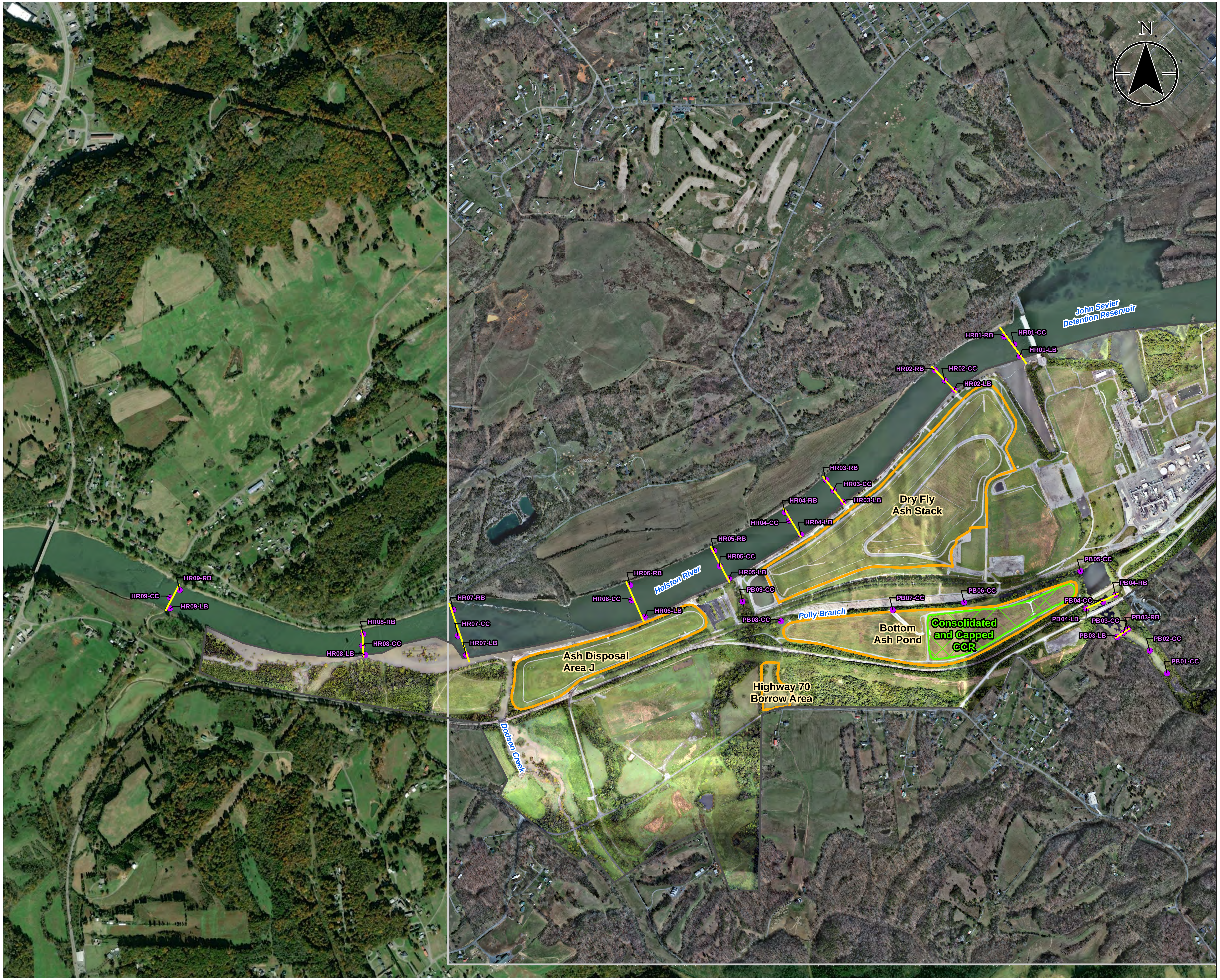
Surface Stream Sampling Locations - February 2019

Client/Project

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

Project Location | 175568225
Rogersville, Tennessee
Prepared by DMB on 2022-05-31
Technical Review by BE on 2022-05-31

0 650 1,300 1,950 2,600 Feet
1:7,800 (At original document size of 22x34)

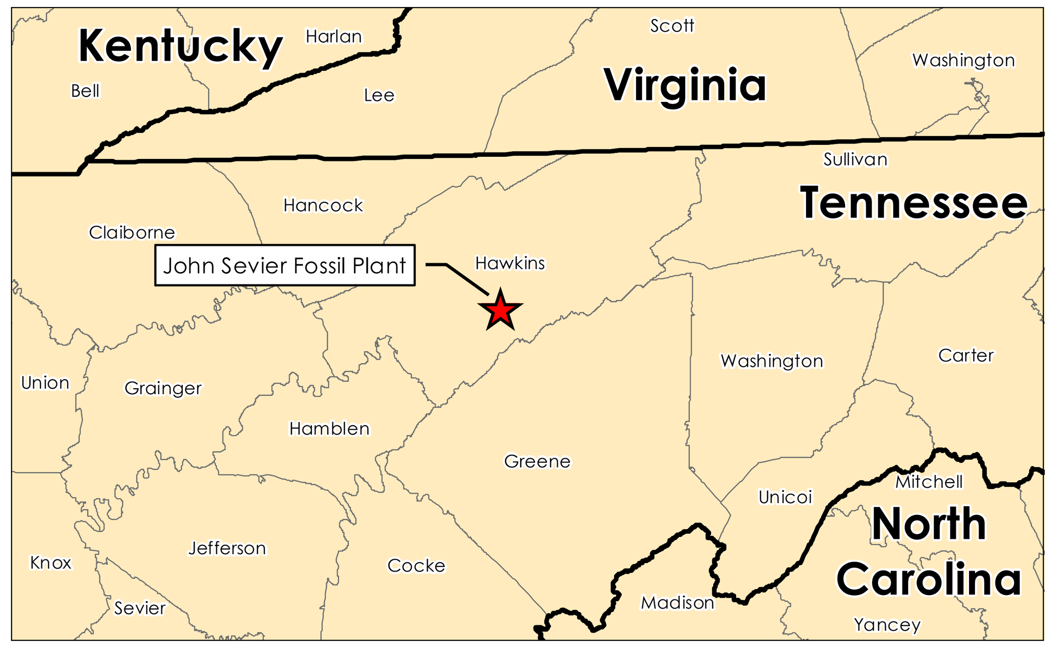


Legend

- Surface Stream Sampling Locations
- Surface Stream Sampling Locations – Transect
- 2017 Imagery Boundary
- 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), TVA (2018-09-11), and Esri World Imagery



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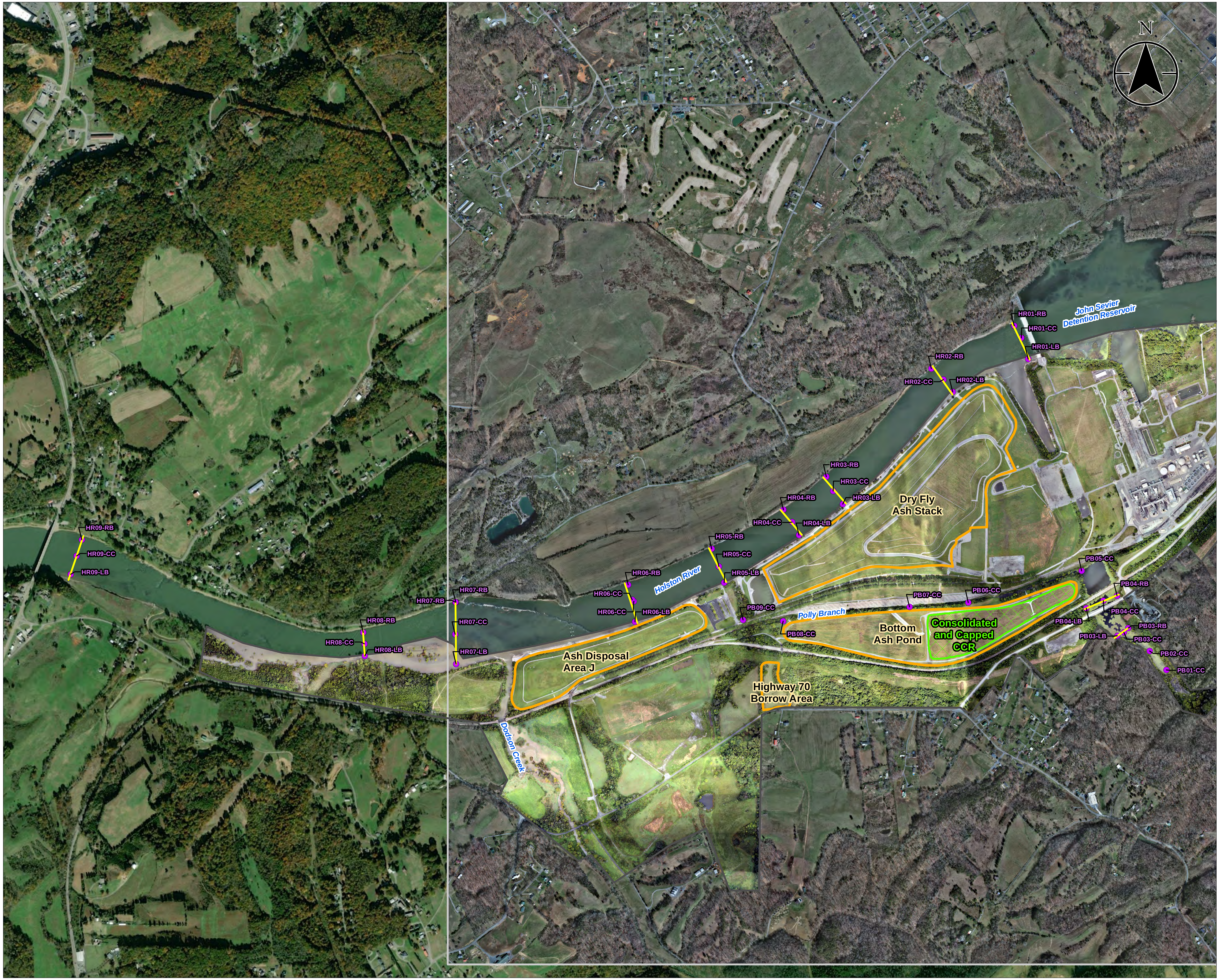

Exhibit No.

J.1-2

Title

Surface Stream Sampling Locations - July 2019

Client/Project

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

Project Location

Rogersville, Tennessee

175568225
Prepared by DMB on 2022-05-31
Technical Review by BE on 2022-05-31

0 650 1,300 1,950 2,600 Feet

1:7,800 (At original document size of 22x34)

Legend

- Surface Stream Sampling Locations
- Surface Stream Sampling Locations – Transect
- 2017 Imagery Boundary
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Notes

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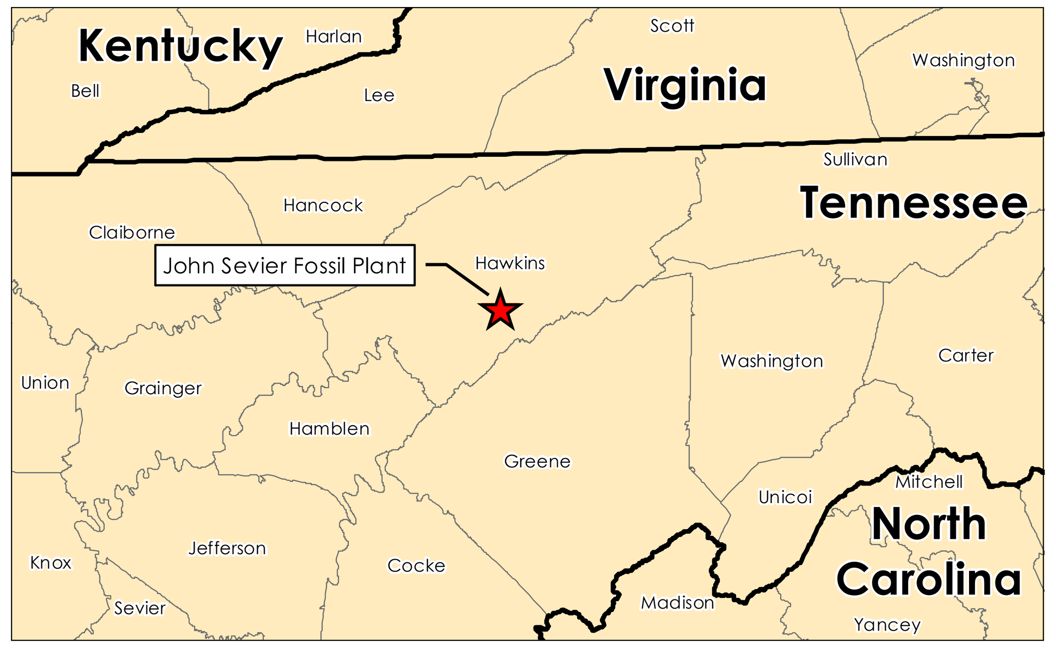

Stantec TVA

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APPENDIX J.2

SURFACE STREAM SAMPLING AND ANALYSIS REPORT

John Sevier Fossil Plant - Surface Stream Sampling and Analysis Report

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

January 4, 2022

Prepared by:

Tennessee Valley Authority

TVA TENNESSEE VALLEY AUTHORITY

Revision Record

Revision	Description	Date
0	Submittal to TDEC	January 4, 2022

Table of Contents

LIST OF APPENDICES

APPENDIX A - EXHIBITS

APPENDIX B - TABLES

Abbreviations

CCR	Coal Combustion Residuals
CCR Parameters	Constituents listed in Appendices III and IV of 40 CFR 257 and five inorganic constituents included in Appendix I of Tennessee Rule 0400-11-01-.04
CEC	Civil and Environmental Consultants, Inc.
CFR	Code of Federal Regulations
COC	Chain-of-Custody
EAR	Environmental Assessment Report
EIP	Environmental Investigation Plan
EnvStds	Environmental Standards, Inc.
GPS	Global Positioning System
ID	Identification
IDW	Investigation Derived Waste
JSF Plant	John Sevier Fossil Plant
ORP	Oxidation-Reduction Potential
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
QC	Quality Control
SAP	Sampling and Analysis Plan
SAR	Sampling and Analysis Report
Stantec	Stantec Consulting Services Inc.
TDEC	Tennessee Department of Environment and Conservation
TDEC Order	Commissioner’s Order No. OGC15-0177
TestAmerica	Eurofins TestAmerica Inc.
TI	Technical Instruction
TVA	Tennessee Valley Authority

1.0 INTRODUCTION

The Tennessee Valley Authority (TVA) has prepared this sampling and analysis report (SAR) to document the completion of activities related to the surface stream investigation at TVA's John Sevier Fossil Plant (JSF Plant) in Rogersville, Tennessee.

The purpose of the surface stream investigation is to collect stream samples to characterize surface stream water quality conditions in the vicinity of 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 performed and to present the information and data collected during the execution of the Surface Stream Sampling and Analysis Plan (SAP) (Stantec 2018a). This SAR is not intended to provide conclusions or evaluate results. The scope of the surface stream 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 residuals (CCR) programs, and will be presented in the Environmental Assessment Report (EAR).

Surface stream investigation activities were performed in general accordance with the following documents developed by TVA to satisfy the requirements of the TDEC Order at the JSF Plant:

- *Surface Stream SAP* (Stantec 2018a)
- *Benthic SAP* (Stantec 2018b)
- *Environmental Investigation Plan (EIP)* (Stantec 2018c)
- *Quality Assurance Project Plan (QAPP)* (Environmental Standards, Inc. 2018).

The surface stream investigation was implemented in accordance with TVA- and TDEC-approved Programmatic and Project-specific changes. Variations in scope and procedures from those outlined in the Surface Stream SAP and occurring during field activities due to field conditions and programmatic updates are referenced in Section 3.6.

Surface stream investigation field activities were completed in two field mobilizations: the week of February 4, 2019, and the week of July 15, 2019. TVA personnel performed the field work activities. Laboratory analysis of constituents was performed by Eurofins TestAmerica, Inc. (TestAmerica) in Pittsburgh, Pennsylvania, and St. Louis, Missouri (radium samples only). 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.

2.0 OBJECTIVE AND SCOPE

The primary objective of the investigation conducted pursuant to the Surface Stream SAP is to characterize surface stream water quality on or adjacent to the JSF Plant property in response to the TDEC Order. The investigation included samples collected from locations upstream of, adjacent to, and downstream of the JSF Plant CCR units. The phased approach for the surface stream investigation was to:

- Phase 1: Collect field measurements of water quality parameters and surface stream samples for chemical analyses at SAP-specified locations during two seasonal sampling events to evaluate the potential presence of constituents related to CCR in surface streams.
- Phase 2: Collect additional surface stream samples where ash content exceeded 20 percent in one or more of the sediment samples collected in accordance with the JSF Plant Benthic SAP.

The scope of work for Phase 1 of the surface stream investigation consisted of sampling at 11 transects and seven single-point locations (40 individual stations) during two different seasonal periods (one during winter pool, and one during summer pool). This SAR describes the activities related to sampling events performed in February and July 2019 to complete Phase 1, the scope of which included:

- Verifying and documenting sampling locations using global positioning system (GPS) coordinates
- Collecting in-situ field measurements of surface water quality parameters
- Collecting surface water grab samples and associated quality control (QC) samples for laboratory analysis.

Phase 2 was not implemented since ash content was less than 20 percent in the sediment samples collected in the JSF Plant study area. Details of the sediment sampling activities are provided in the JSF Plant Benthic SAR.

3.0 FIELD ACTIVITIES

Surface stream investigation field activities were conducted during the weeks of February 4, 2019 and July 15, 2019. TVA performed sample collection activities based on guidance and specifications listed in TVA's Technical Instructions (TIs), the SAP, and the QAPP, except as noted in the Variations section of this report (Section 3.6). As part of TVA's commitment to generate representative and reliable data, data validation and/or verification of laboratory analytical results were performed by EnvStds under contract with TVA. EnvStds also conducted audits of field activities and provided quality reviews of field documentation. In addition, Civil and Environmental Consultants, Inc. (CEC), on behalf of TDEC, accompanied TVA during surface stream sampling on February 5, 2019. CEC obtained split samples from station STR-PB05-CC and from each station along transect STR-HR06.

During the surface stream investigation, TVA:

- Verified that stream conditions met the flow requirements specified in the SAP
- Verified and documented sampling locations using the GPS
- Collected surface stream analytical samples from the 40 stations specified in the SAP during a winter and a summer sampling event
- Recorded field measurements of surface stream water quality parameters at the 40 stations during both sampling events
- Collected QC samples including six matrix spike/matrix spike duplicate/lab duplicates, seven field duplicates, five field banks, four equipment blanks, and five filter blanks
- Shipped the collected surface stream samples via commercial courier service to TestAmerica for analysis.

Details on each activity are presented in the sections below.

3.1 SAMPLING LOCATIONS

Surface stream sampling was conducted at 11 transects and seven single-point locations under the surface stream investigation scope of work. The TDEC Order CCR units at the JSF Plant (Dry Fly Ash Stack, Bottom Ash Pond, Ash Disposal Area J, and Highway 70 Borrow Area) as well as the winter and summer surface stream sampling locations are shown on Exhibits A.1 and A.2, respectively, in Appendix A. Table B.1 provides a summary of the sampling locations. Table B.2 summarizes the corresponding sampling locations for the surface stream, benthic, and fish tissue investigations, as identified in their respective SAPs.

Sampling locations consisted of nine transects on the Holston River, and two transects and seven single-point sample locations on Polly Branch. These locations were selected to generally coincide with the sediment sampling locations (Stantec 2018b). Transects extended across the width of the stream perpendicular to the direction of flow. Along each transect, samples were collected at center channel or thalweg (deepest point), left bank, and right bank stations. “Left bank” and “right bank” were determined with a downstream-facing orientation. At single-point locations, samples were collected from the approximate center of the channel. In total, surface stream samples were collected at 40 stations. Depending on water depth at a station, surface, mid-depth, and/or epibenthic (within 0.5 meters of the streambed) samples were collected. Surface stream samples collected during this investigation are summarized in Table B.3 in Appendix B.

3.2 DOCUMENTATION

TVA maintained field documentation in accordance with TVA TI ENV-TI-05.80.03, *Field Record Keeping* and the QAPP. Field activities were recorded in field logbooks. Health and safety forms were completed in accordance with TVA health and safety requirements. Additional information regarding field documentation is provided below.

3.2.1 Field Forms

TVA used program-specific field forms and field logbooks to record field observations and data for specific activities. Field forms used during the surface stream investigation included:

- *Field Standardization of Instruments Form*
- *Water Quality Data Field Sheet*
- *Chain-of-Custody (COC).*

3.2.1.1 Field Logbook

TVA field sampling personnel recorded field activities, observations, and supporting information (e.g., GPS coordinates, sample collection depths) in field logbooks to chronologically document the activities and progress of the field program. Deviations from the SAP, TIs, or QAPP were documented in the field logbooks.

3.2.1.2 Field Standardization of Instruments Form

TVA field sampling personnel performed daily calibrations of multi-parameter sondes and documented the results on TVA Form 30035, *Field Standardization of Instruments*. The form documents temperature verification and calibration results for dissolved oxygen, pH, specific conductance, turbidity, and oxidation-reduction potential (ORP), and verifies that the field instrument used was operating within acceptance criteria. Additional information on equipment calibration is provided in Section 3.2.2.

3.2.1.3 Water Quality Data Field Sheet

TVA field sampling personnel electronically logged the field parameters measured by the multi-parameter sondes using Hydrolab™ Surveyor 4a data loggers. Field measurement also were recorded on the *Water Quality Data Field Sheet*.

3.2.1.4 Chain-of-Custody Forms

TVA field sampling personnel completed *COCs*, listing each surface stream sample. The sample identification (ID), sample location, sample depth, type of sample, sample date and time, analyses requested, and sample custody record were recorded on the *COCs*. The Field Team Leader or designee reviewed the *COCs* for completeness and correctness, and a QC check was performed for samples in each cooler comparing sample IDs to those on the corresponding *COC*. *COCs* were completed in accordance with ENV-TI-05.80.02, *Sample Labeling and Custody*.

3.2.2 Equipment Calibration

Field instruments used to measure water quality parameters were calibrated each day prior to use as specified by the SAP, QAPP, and TVA Technical Instruction ENV-TI-05.80.46, *Field Measurement Using a Multi-Parameter Sonde*. Post-sampling verifications of field instrument calibrations were performed to evaluate whether instruments remained within acceptance criteria throughout the event. Temperature readings were verified using a calibrated National Institute of Standards and Technology-traceable thermometer. Barometric pressures were determined using a portable barometer calibrated using National Weather Service barometric pressure readings at Lovell Field (KCHA) in Chattanooga, Tennessee. Additional details regarding equipment calibration were recorded on a *Field Standardization of Instruments Form*, as described in Section 3.2.1.2.

3.3 SAMPLING METHODS

The following sections present data collection and sampling procedures used in the surface stream investigation.

3.3.1 Streamflow

Streamflow during sampling events on the Holston River was within the seasonal (winter and summer) interquartile range (25^{th} to 75^{th} percentile) based on analysis of the mean daily flows for the Holston River at John Sevier Dam during the period between 2004 through 2018. This period was selected based on TVA's implementation of new reservoir operations policies in 1990 and 2004 (TVA 1990 and TVA 2004, respectively).

3.3.2 Thermal Stratification

The water column in the Holston River was determined to be unstratified (mixed) during the February and July 2019 sampling events using temperature measurements on a depth gradient at each location, as described in the Surface Streams SAP. Most sampling stations on Polly Branch were shallow (less than 1 meter). Greater depths (up to 2.7 meters) were observed at stations STR-PB03, STR-PB04, and STR-PB05, which are located in an impounded section of Polly Branch. The quiescent conditions within this area, as well as the large areas colonized by waterlily (*Nymphaea* sp.), resulted in thermal and dissolved oxygen gradients.

3.3.3 Surface Stream Field Measurements

A Hydrolab™ DS5X multi-parameter sonde was used to record a water column profile of conventional water quality parameters at approximately one-meter depth intervals at each sample station in accordance with the SAP and ENV-TI-05.80.46, *Field Measurement Using A Multi-Parameter Sonde*. These parameters included:

- Temperature (degrees Celsius)
- Dissolved Oxygen (milligrams per liter)
- Specific Conductance (microsiemens per centimeter)
- ORP (millivolts)
- pH (Standard Units)
- Turbidity (Nephelometric Turbidity Units).

3.3.4 Surface Stream Analytical Samples

Surface stream samples were collected using peristaltic pumps equipped with dedicated, certified clean tubing for each sample. Discrete samples were collected in accordance with ENV-TI-05.80.40, *Surface Water Sampling*. Analytical samples, including field duplicates, were collected from surface stream stations as shown in Table B.3 in Appendix B. Split samples collected by CEC during this investigation are also identified in Table B.3.

Laboratory-provided, pre-preserved sample containers were filled directly from the pump discharge line. Field sampling personnel wore new, clean nitrile gloves when handling sample containers and did not touch the interior of containers or container caps. New gloves were used when collecting and handling samples at each station. When filling sample bottles, care was taken to avoid overfilling and diluting preservatives. Sample containers were filled in thirds. Sample containers for radium analysis were filled and capped first, before filling additional bottles. Next, sample containers for total suspended solids, total dissolved solids, and anions were filled and capped, then sample containers for total metals and dissolved metals were filled and capped individually. Dissolved metals samples were filtered during sample collection at each location by attaching a new, certified clean high-capacity inline 0.45-micron filter to the pump discharge line. These filters were treated as single-use filters and were discarded after each sample collection.

Samples were labeled and handled in accordance with ENV-TI-05.80.02, *Sample Labeling and Custody.* Field sampling personnel secured caps on each sample container, attached a signed and dated custody seal across each cap, and placed the samples in a cooler on ice within 15 minutes of collection. QC samples were collected in accordance with TVA ENV-TI-05.80.04, *Field Sampling Quality Control.*

Surface stream samples were analyzed for the 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, in order to maintain continuity with other TDEC environmental programs, five inorganic constituents (copper, nickel, silver, vanadium, and zinc) listed in Appendix I of Tennessee Rule 0400-11-01-.04 and not included in the 40 CFR 257 Appendices III and IV also were analyzed. The combined federal CCR Appendices III and IV constituents and TDEC Appendix I inorganic constituents are hereafter referred to collectively as “CCR Parameters” for the surface stream investigation. For geochemical evaluation, additional cations were included supplemental to the CCR Parameters. The additional geochemical parameters included magnesium, manganese, and iron.

3.4 INVESTIGATION DERIVED WASTE

Investigation derived waste (IDW) generated during the surface stream investigation included:

- Used calibration solutions
- Decontamination fluids
- Disposable personal protective equipment (PPE)
- General trash.

IDW was handled in accordance with ENV-TI-05.80.05, *Field Sampling Equipment Cleaning and Decontamination*; the JSF Plant-specific waste management plan; and local, state, and federal regulations. Calibration solutions used onsite were containerized and stored for disposal as directed by the JSF Plant facility management. Used disposable PPE (e.g., nitrile gloves) and general trash generated throughout the day were placed in garbage bags and disposed of in a general trash dumpster onsite or at another TVA facility.

3.5 SAMPLE SHIPMENT

Samples were packed, transported, and shipped under *COC* procedures specified in ENV-TI-05.80.06, *Handling and Shipping of Samples*. Samples were shipped via a commercial courier to the TestAmerica facility in Pittsburgh, Pennsylvania, for official sample login. Once samples were logged, the radium samples were shipped under internal lab protocols to the TestAmerica St. Louis, Missouri, laboratory. TestAmerica submitted sample receipt confirmation forms to EnvStds for review and confirmation.

3.6 VARIATIONS

The proposed scope and procedures for the surface stream investigation were outlined in the SAP, QAPP, and applicable TVA TIs 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 SAP are described in the following sections. As discussed below, these variations do not impact the overall usability and representativeness of the dataset provided in this SAR for the surface stream investigation at the JSF Plant.

3.6.1 Variations in Scope

Variations is scope are provided below.

- The Surface Stream SAP was written such that velocity of the streamflow would be measured at each surface water sampling station. As approved by TDEC, velocity was not measured.

3.6.2 Variations in Procedures

Variations in procedures occurring in the field are provided below.

- The number of matrix spike and matrix spike duplicate samples collected in the field did not meet requirements of the Surface Stream SAP for all analytes. However, the laboratory analyzed all analytes per the SAP/QAPP and met the data quality objective.

- The Surface Stream SAP for Phase 1 was written such that sediment and surface stream sampling were anticipated to be conducted during the same sampling event. However, concurrent sampling was not desirable due to the differing logistics for the two sampling methodologies, the difficulty of obtaining depositional sediments in a riverine environment (i.e., mainstream of the Holston River within the JSF Plant study area), the amount of equipment required to sample both matrices concurrently, and the increased potential for cross-contamination. In addition, the goal of surface stream sampling includes collecting samples from a waterbody within as short a timeframe as possible in order to limit potential differences in water quality conditions resulting from day-to-day variances in reservoir operations, runoff, and other climatic conditions. Based on these considerations, TDEC approved sediment and surface stream sampling to be performed at different times.

- For safety, during the February (winter pool) sampling event, transect STR-HR09 was moved approximately 1500 feet upstream of the SAP-designated location due to the presence of a shallow shoal. During the July (summer pool) sampling event, the higher pool elevations in Cherokee Reservoir allowed sampling at the SAP-designated location.

4.0 SUMMARY

The data presented in this report are from the surface stream investigation sampling at the JSF Plant. The scope of work during this investigation included Phase 1 surface stream sampling at 11 transects and seven single-point locations (40 individual stations) during two seasonal sampling events. A total of 127 surface stream samples, including seven field duplicates, were collected during the implementation of Phase 1 sampling the weeks of February 4, 2019 (winter pool) and July 15, 2019 (summer pool). Based on the results from the sediment sampling conducted pursuant to the Benthic SAP, Phase 2 surface stream sampling was determined unnecessary and was not performed.

A summary of samples collected, along with field duplicates, is presented in Table B.3. Surface stream field measurements are presented in Table B.4. Analytical data for CCR Parameters and geochemical parameters are presented in Table B.5. Analytical data were reported by TestAmerica and data verification or validation was performed by EnvStds.

TVA has completed the surface stream investigation at the JSF Plant in Rogersville, Tennessee, in accordance with the Surface Stream SAP and TDEC-approved SAP modifications, as documented herein. The data collected during this 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.

5.0 REFERENCES

Environmental Standards, Inc. 2018. *Quality Assurance Project Plan for the Tennessee Valley Authority John Sevier Fossil Plant Environmental Investigation*. Prepared for Tennessee Valley Authority. Revision 2. October 2018.

Stantec Consulting Services Inc. (Stantec). 2018a. *Surface Stream Sampling and Analysis Plan (SAP), John Sevier Fossil Plant.* Revision 3. Prepared for Tennessee Valley Authority. October 19, 2018.

Stantec. 2018b. *Benthic Sampling and Analysis Plan (SAP), John Sevier Fossil Plant.* Revision 3. Prepared for Tennessee Valley Authority. October 19, 2018.

Stantec. 2018c. *Environmental Investigation Plan, John Sevier Fossil Plant.* Revision 3. Prepared for Tennessee Valley Authority. October 19, 2018.

Tennessee Department of Environment and Conservation (TDEC). 2015. *Commissioner's Order No. OGC15-0177.* August 6, 2015.

Tennessee Valley Authority (TVA). 1990. *Lake Improvement Plan, Tennessee River and Reservoir System Operation and Planning Review. Final Environmental Impact Statement*. (TVA/RDG/EQS-91/1.). December 1990.

TVA. 2004. *Reservoir Operations Study - Final Programmatic Environmental Impact Statement.* February 2004.

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-05.80.40, *Surface Water Sampling*.

TVA, ENV-TI-05.80.46, *Field Measurement Using a Multi-Parameter Sonde*.

APPENDIX A - EXHIBITS

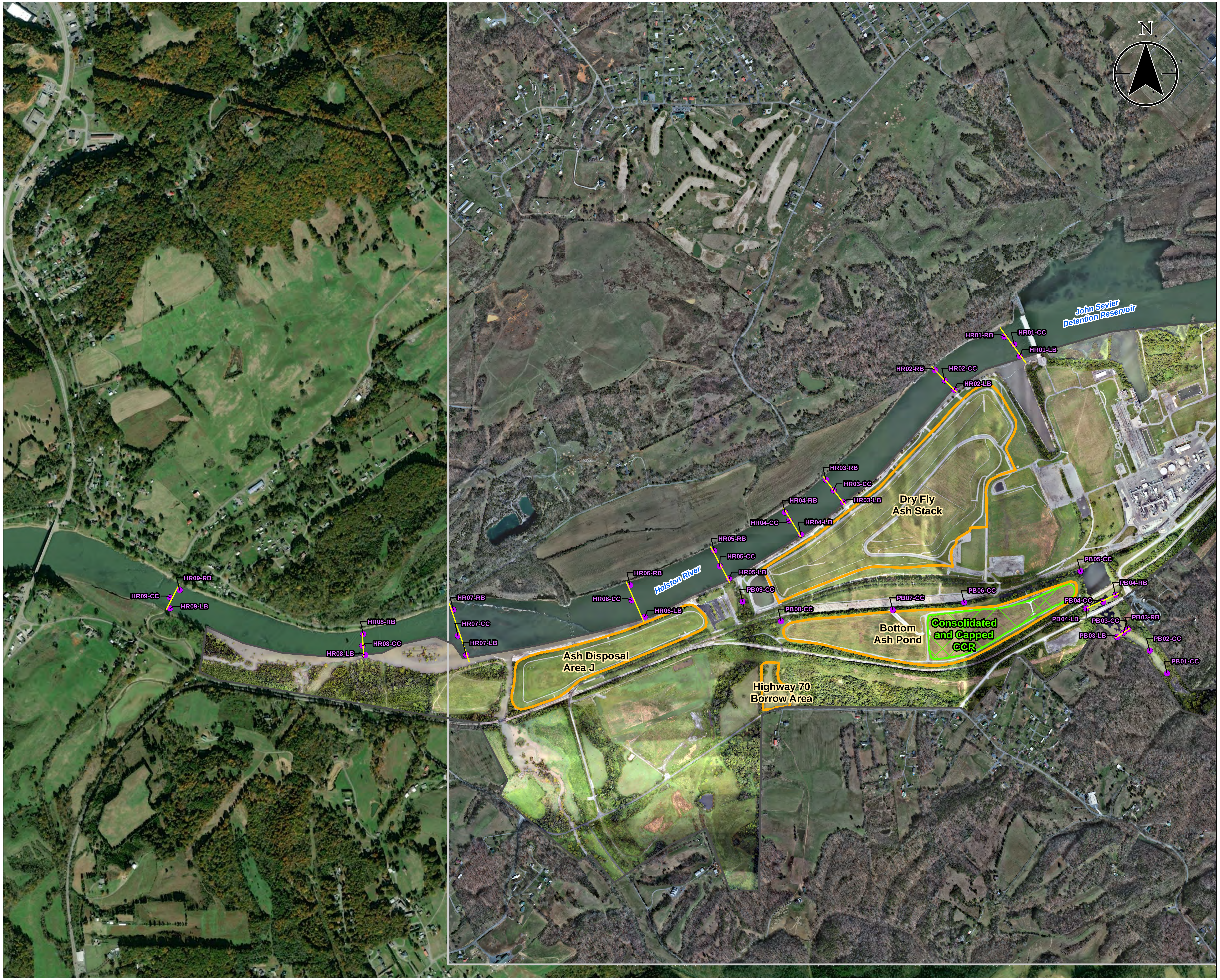

Exhibit No.

A.1

Title

Surface Stream Sampling Locations - February 2019

Client/Project

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

Project Location

Rogersville, Tennessee

175568225

Prepared by DMB on 2021-09-09
Technical Review by BE on 2021-09-09

0 650 1,300 1,950 2,600 Feet

1:7,800 (At original document size of 22x34)

Legend

- Surface Stream Sampling Locations
- Surface Stream Sampling Locations – Transect
- 2017 Imagery Boundary
- 2018 Imagery Boundary
- CCR Unit Area (Approximate)
- Consolidated & Capped CCR Area (Approximate)

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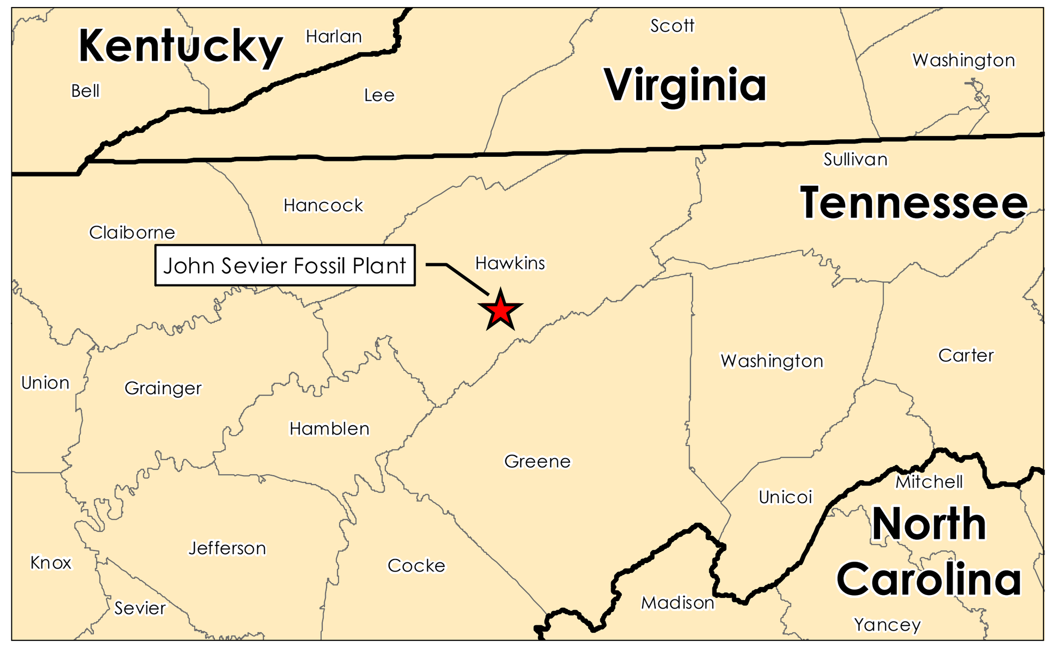

Stantec TVA

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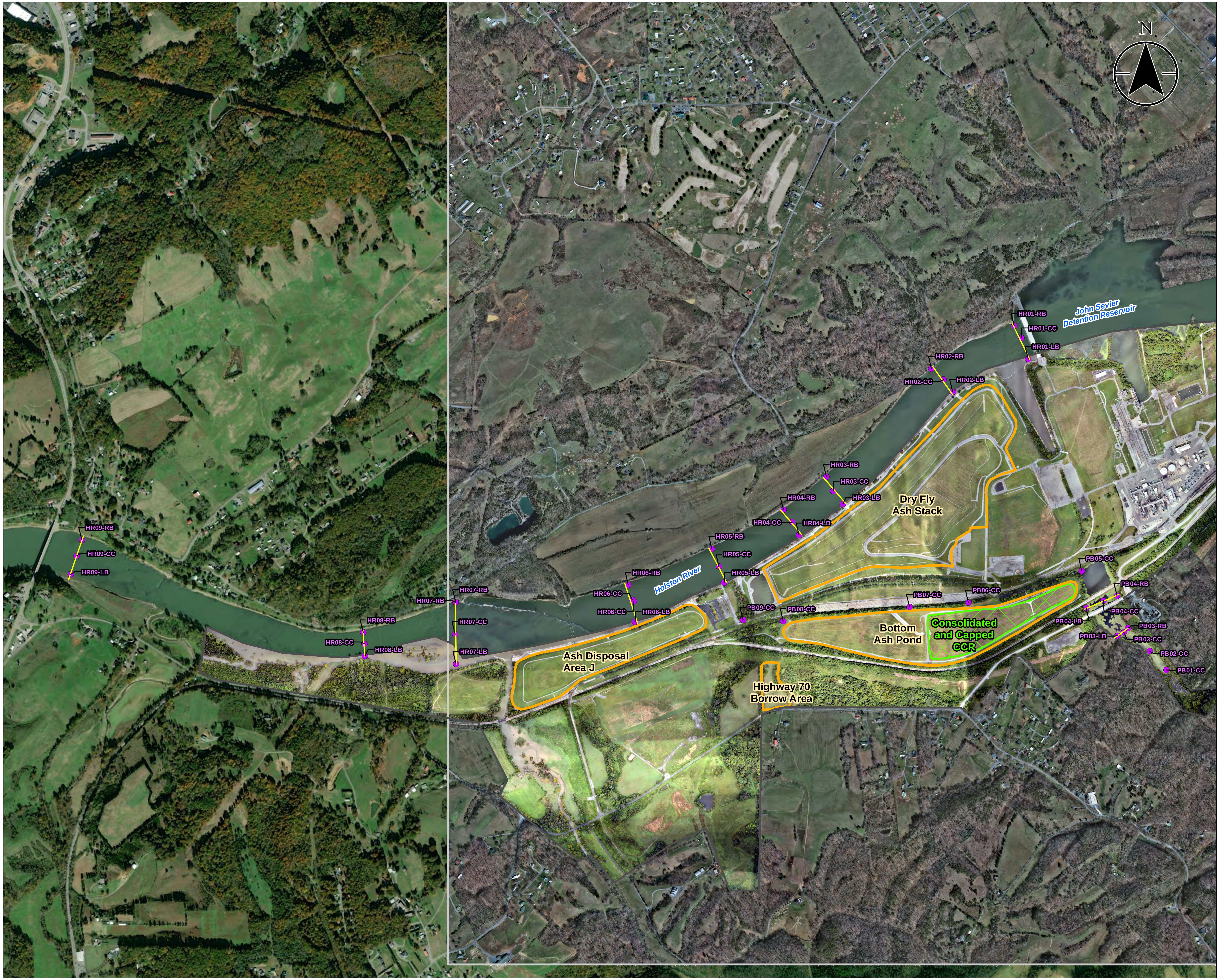

Exhibit No.

A.2

Title

Surface Stream Sampling Locations - July 2019

Client/Project

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

Project Location

Rogersville, Tennessee

175568225
Prepared by DMB on 2021-09-09
Technical Review by BE on 2021-09-09

0 | 650 | 1,300 | 1,950 | 2,600 Feet

1:7,800 (At original document size of 22x34)

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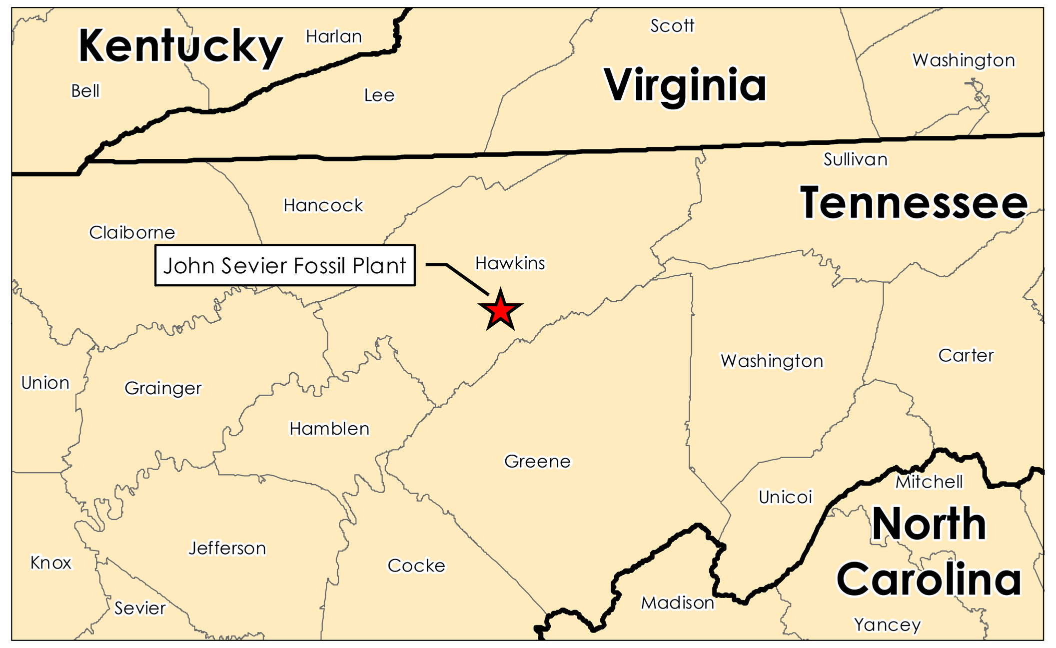

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APPENDIX B - TABLES

TABLE B.1 – Surface Stream Sampling Locations
John Sevier Fossil Plant

Transect Location ID	Description
STR-HR01	Holston River just downstream of the John Sevier Detention Dam
STR-HR02	Holston River Adjacent to Dry Fly Ash Stack
STR-HR03	Holston River Adjacent to Dry Fly Ash Stack at Location of 1973 Dike Failure
STR-HR04	Holston River Adjacent to Dry Fly Ash Stack
STR-HR05	Holston River just downstream of Polly Branch
STR-HR06	Holston River Adjacent to Ash Disposal Area J
STR-HR07	Holston River Downstream of JSF Plant
STR-HR08	Holston River Downstream of JSF Plant
STR-HR09	Holston River Downstream of JSF Plant
STR-PB01*	Polly Branch Upstream of JSF Plant (Background)
STR-PB02*	Polly Branch Upstream of JSF Plant (Background)
STR-PB03	Polly Branch Upstream of JSF Plant (Background)
STR-PB04	Polly Branch Upstream of JSF Plant (Background)
STR-PB05*	Polly Branch at the upstream end of Bottom Ash Pond
STR-PB06*	Polly Branch Adjacent to Bottom Ash Pond
STR-PB07*	Polly Branch Adjacent to Bottom Ash Pond
STR-PB08*	Polly Branch at the downstream end of Bottom Ash Pond
STR-PB09*	Polly Branch just upstream of confluence with the Holston River

Notes:

ID Identification

*Surface stream sample point (versus transect)

TABLE B.2 – Corresponding Environmental Sampling Locations
John Sevier Fossil Plant

Corresponding Sampling Locations				
Surface Stream	**Sediment**	**Benthic Community**	**Mayfly**	**Fish Tissue**
–	–	MAC-HR01	HRU	HRU
–	–	MAC-HR02	–	–
STR-HR01	SED-HR01	–	–	–
STR-HR02	SED-HR02	MAC-HR03	HRA1	HRA1
STR-HR03	SED-HR03	MAC-HR04		
STR-HR04	SED-HR04	MAC-HR05		
STR-HR05	SED-HR05	MAC-HR06		
STR-HR06	SED-HR06	MAC-HR07		
STR-HR07	SED-HR07	MAC-HR08	–	–
STR-HR08	SED-HR08	MAC-HR09	HRA2	HRA2
STR-HR09	SED-HR09	MAC-HR10		
STR-PB01	SED-PB01	–	–	–
STR-PB02	SED-PB02	–	–	–
STR-PB03	SED-PB03	–	–	–
STR-PB04	SED-PB04	–	–	–
STR-PB05	SED-PB05	–	–	–
STR-PB06	SED-PB06	–	–	–
STR-PB07	SED-PB07	–	–	–
STR-PB08	SED-PB08	–	–	–
STR-PB09	SED-PB09	–	–	–
–	–	MAC-HR11	HRD	HRD

Notes:

– Not applicable

TABLE B.3 – Summary of Surface Stream Samples
John Sevier Fossil Plant
February 2019 and July 2019

				Field Measurements						Analysis										
Transect Location ID	Sample Date	Sample ID	Sample Type[1]	Temp	pH	Sp. Cond.	DO	ORP	Turbidity	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Anions	Radium-226	Radium-228	Radium-226+228	Hardness	Total Dissolved Solids	Total Suspended Solids
STR-HR01	05-Feb-2019	JSF-STR-HR01-LB-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR01-CC-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR01-RB-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	17-Jul-2019	JSF-STR-HR01-LB-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR01-CC-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-DUP02-20190717	Field Duplicate Sample							X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR01-RB-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-HR02	05-Feb-2019	JSF-STR-HR02-LB-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR02-CC-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-DUP02-20190205	Field Duplicate Sample							X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR02-RB-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	17-Jul-2019	JSF-STR-HR02-LB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR02-LB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR02-CC-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR02-CC-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR02-RB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR02-RB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-HR03	05-Feb-2019	JSF-STR-HR03-LB-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR03-CC-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR03-RB-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	17-Jul-2019	JSF-STR-HR03-LB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR03-LB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR03-CC-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR03-CC-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR03-CC-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR03-RB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR03-RB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-HR04	05-Feb-2019	JSF-STR-HR04-LB-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR04-CC-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR04-RB-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	17-Jul-2019	JSF-STR-HR04-LB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR04-LB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR04-CC-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR04-CC-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR04-CC-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR04-RB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR04-RB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-DUP01-20190717	Field Duplicate Sample							X	X	X	X	X	X	X	X	X	X	X
STR-HR05	05-Feb-2019	JSF-STR-HR05-LB-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-DUP01-20190205	Field Duplicate Sample							X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR05-CC-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR05-RB-SUR-20190205	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	17-Jul-2019	JSF-STR-HR05-LB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR05-LB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR05-CC-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR05-CC-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR05-CC-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR05-RB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR05-RB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

See notes on last page.

TABLE B.3 – Summary of Surface Stream Samples
John Sevier Fossil Plant
February 2019 and July 2019

				Field Measurements						Analysis										
Transect Location ID	Sample Date	Sample ID	Sample Type[1]	Temp	pH	Sp. Cond.	DO	ORP	Turbidity	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Anions	Radium-226	Radium-228	Radium-226+228	Hardness	Total Dissolved Solids	Total Suspended Solids
STR-HR06	05-Feb-2019	JSF-STR-HR06-LB-SUR-20190205	Normal Environmental Sample [2]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR06-CC-SUR-20190205	Normal Environmental Sample [2]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR06-RB-SUR-20190205	Normal Environmental Sample [2]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	17-Jul-2019	JSF-STR-HR06-LB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR06-LB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR06-CC-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR06-CC-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR06-CC-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR06-RB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR06-RB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	18-Jul-2019	JSF-STR-HR06-CC-MID-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-HR07	06-Feb-2019	JSF-STR-HR07-LB-SUR-20190206	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR07-CC-SUR-20190206	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR07-RB-SUR-20190206	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	17-Jul-2019	JSF-STR-HR07-RB-MID-20190717	Normal Environmental Sample							X	X	X	X	X	X	X	X	X	X	X
	18-Jul-2019	JSF-STR-HR07-LB-SUR-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR07-LB-BOT-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR07-CC-SUR-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR07-CC-MID-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR07-CC-BOT-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR07-RB-MID-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-HR08	06-Feb-2019	JSF-STR-HR08-LB-SUR-20190206	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR08-CC-SUR-20190206	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR08-RB-SUR-20190206	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	17-Jul-2019	JSF-STR-HR08-LB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR08-LB-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR08-LB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR08-CC-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-DUP03-20190717	Field Duplicate Sample							X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR08-CC-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR08-CC-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR08-RB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR08-RB-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR08-RB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-HR09	06-Feb-2019	JSF-STR-HR09-LB-SUR-20190206	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR09-CC-SUR-20190206	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-DUP01-20190206	Field Duplicate Sample							X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR09-RB-SUR-20190206	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	17-Jul-2019	JSF-STR-HR09-LB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR09-LB-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR09-LB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR09-CC-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR09-CC-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR09-CC-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR09-RB-SUR-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR09-RB-MID-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-HR09-RB-BOT-20190717	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-PB01	04-Feb-2019	JSF-STR-PB01-CC-SUR-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	18-Jul-2019	JSF-STR-PB01-CC-SUR-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-PB02	04-Feb-2019	JSF-STR-PB02-CC-SUR-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	18-Jul-2019	JSF-STR-PB02-CC-SUR-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-DUP01-20190718	Field Duplicate Sample							X	X	X	X	X	X	X	X	X	X	X

See notes on last page.

TABLE B.3 – Summary of Surface Stream Samples
John Sevier Fossil Plant
February 2019 and July 2019

				Field Measurements						Analysis										
Transect Location ID	Sample Date	Sample ID	Sample Type[1]	Temp	pH	Sp. Cond.	DO	ORP	Turbidity	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Anions	Radium-226	Radium-228	Radium-226+228	Hardness	Total Dissolved Solids	Total Suspended Solids
STR-PB03	04-Feb-2019	JSF-STR-PB03-LB-SUR-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-PB03-CC-SUR-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-PB03-RB-SUR-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	18-Jul-2019	JSF-STR-PB03-LB-MID-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-PB03-CC-SUR-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-PB03-CC-BOT-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-PB03-RB-MID-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-PB04	04-Feb-2019	JSF-STR-PB04-LB-SUR-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-PB04-CC-SUR-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-PB04-CC-BOT-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-PB04-RB-SUR-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	18-Jul-2019	JSF-STR-PB04-LB-MID-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-PB04-CC-SUR-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-PB04-CC-BOT-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-PB04-RB-MID-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-PB05	05-Feb-2019	JSF-STR-PB05-CC-SUR-20190205	Normal Environmental Sample [2]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	18-Jul-2019	JSF-STR-PB05-CC-SUR-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		JSF-STR-PB05-CC-BOT-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-PB06	04-Feb-2019	JSF-STR-PB06-CC-SUR-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	18-Jul-2019	JSF-STR-PB06-CC-SUR-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-PB07	04-Feb-2019	JSF-STR-PB07-CC-SUR-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	18-Jul-2019	JSF-STR-PB07-CC-SUR-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-PB08	04-Feb-2019	JSF-STR-PB08-CC-SUR-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	18-Jul-2019	JSF-STR-PB08-CC-SUR-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STR-PB09	04-Feb-2019	JSF-STR-PB09-CC-SUR-20190204	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	18-Jul-2019	JSF-STR-PB09-CC-SUR-20190718	Normal Environmental Sample	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Notes:

Temp	Water Temperature
Sp. Cond.	Specific Conductance
DO	Dissolved Oxygen
ORP	Oxidation Reduction Potential

Total and Dissolved Metals	SW-846 6020A
Total and Dissolved Mercury	SW-846 7470A
Anions	SW-846 9056A
Radium-226	EPA 903.0
Radium-228	EPA 904.0
Radium-226+228	CALC
Hardness	SM 2340B
Total Dissolved Solids	SM2540C
Total Suspended Solids	SM2540D
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. Civil and Environmental Consultants, Inc. (CEC) collected a split sample.

TABLE B.4 – Surface Stream Field Measurement Results
John Sevier Fossil Plant
February 2019 and July 2019

Sampling Event	Station ID	Sample Date	Temperature	Specific Conductance	pH	DO	DO Saturation	Turbidity	ORP	Depth	Maximum Depth	Analytical Sample Depth (m)		
			°C	µS/cm	SU	mg/l	%	NTU	mV	m	m	SUR	MID	BOT
Holston River February 2019	STR-HR01-LB	2/5/2019	9.00	236.4	7.89	11.56	103.7	7.0	153	0.3	0.9	0.3	–	–
	STR-HR01-LB	2/5/2019	9.00	236.4	7.90	11.52	103.3	6.9	153	0.9				
	STR-HR01-CC	2/5/2019	9.09	237.3	7.89	11.66	104.8	5.2	152	0.3	0.75	0.2	–	–
	STR-HR01-CC	2/5/2019	9.09	237.4	7.90	11.63	104.6	5.2	152	0.75				
	STR-HR01-RB	2/5/2019	9.06	238.1	7.89	11.61	104.3	6.1	153	0.3	1.3	0.3	–	–
	STR-HR01-RB	2/5/2019	9.08	238.3	7.91	11.57	104.0	7.2	152	1.3				
	STR-HR02-LB	2/5/2019	9.19	240.3	7.95	11.53	104.1	10.1	148	0.3	0.99	0.3	–	–
	STR-HR02-LB	2/5/2019	9.19	240.1	7.93	11.55	103.9	10.3	149	0.99				
	STR-HR02-CC	2/5/2019	9.08	237.1	7.92	11.65	104.7	4.8	147	0.3	1.6	0.3	–	–
	STR-HR02-CC	2/5/2019	9.05	236.0	7.92	11.67	104.8	4.8	147	1.6				
	STR-HR02-RB	2/5/2019	9.33	241.3	7.96	11.60	104.9	7.3	147	0.3	1.2	0.3	–	–
	STR-HR02-RB	2/5/2019	9.32	240.3	7.96	11.62	105.0	7.3	147	1.2				
	STR-HR03-LB	2/5/2019	9.21	238.9	8.01	11.76	106.0	8.4	144	0.3	0.75	0.3	–	–
	STR-HR03-LB	2/5/2019	9.20	238.6	8.01	11.75	105.9	8.6	144	0.75				
	STR-HR03-CC	2/5/2019	9.07	236.5	7.92	11.77	105.8	5.0	144	0.3	2.0	1	–	–
	STR-HR03-CC	2/5/2019	9.04	235.9	7.93	11.74	105.4	5.0	144	1.5				
	STR-HR03-CC	2/5/2019	9.03	235.8	7.92	11.75	105.4	5.1	144	2				
	STR-HR03-RB	2/5/2019	9.36	241.9	7.99	11.78	106.6	8.2	142	0.3	1.1	0.3	–	–
	STR-HR03-RB	2/5/2019	9.37	241.6	8.00	11.78	106.6	8.4	142	1.1				
	STR-HR04-LB	2/5/2019	9.09	237.3	7.98	11.75	105.6	7.2	135	0.3	1.0	0.3	–	–
	STR-HR04-LB	2/5/2019	9.09	237.8	8.00	11.78	105.9	7.3	135	1				
	STR-HR04-CC	2/5/2019	9.02	235.7	7.94	11.77	105.7	3.2	136	0.3	2.1	1	–	–
	STR-HR04-CC	2/5/2019	9.00	234.8	7.94	11.84	106.2	3.0	136	1.5				
	STR-HR04-CC	2/5/2019	8.99	234.8	7.95	11.79	105.7	2.4	136	2.1				
	STR-HR04-RB	2/5/2019	9.36	240.8	7.99	11.83	107.0	9.2	138	0.3	1.1	0.3	–	–
	STR-HR04-RB	2/5/2019	9.36	241.4	8.01	11.86	107.3	9.5	137	1.1				
	STR-HR05-LB	2/5/2019	9.04	236.5	8.03	11.98	107.6	1.6	142	0.3	0.6	0.3	–	–
	STR-HR05-LB	2/5/2019	9.03	236.9	8.06	12.02	107.9	0.8	142	0.6				
	STR-HR05-CC	2/5/2019	8.93	234.4	7.95	11.82	105.9	1.9	138	0.3	1.4	0.3	–	–
	STR-HR05-CC	2/5/2019	8.93	234.9	7.94	11.84	106.0	1.6	138	1.4				
	STR-HR05-RB	2/5/2019	9.27	240.5	7.99	11.87	107.2	7.6	133	0.3	0.9	0.3	–	–
	STR-HR05-RB	2/5/2019	9.27	240.5	7.99	11.89	107.3	7.6	133	0.9				
	STR-HR06-LB	2/5/2019	8.88	235.8	7.97	11.95	106.9	6.9	134	0.3	0.8	0.3	–	–
	STR-HR06-LB	2/5/2019	8.87	235.7	7.97	11.96	106.9	6.3	135	0.8				
	STR-HR06-CC	2/5/2019	8.76	235.2	7.78	11.82	105.4	5.8	134	0.3	1.2	0.4	–	–
	STR-HR06-CC	2/5/2019	8.76	234.6	7.74	11.85	105.7	5.7	139	1.19				
	STR-HR06-RB	2/5/2019	8.88	239.9	7.92	11.91	106.6	7.7	138	0.3	0.9	0.3	–	–
	STR-HR06-RB	2/5/2019	8.88	240.4	7.93	11.89	106.3	7.9	139	0.9				

See notes on last page.

TABLE B.4 – Surface Stream Field Measurement Results
John Sevier Fossil Plant
February 2019 and July 2019

Sampling Event	Station ID	Sample Date	Temperature	Specific Conductance	pH	DO	DO Saturation	Turbidity	ORP	Depth	Maximum Depth	Analytical Sample Depth (m)		
			°C	µS/cm	SU	mg/l	%	NTU	mV	m	m	SUR	MID	BOT
Holston River February 2019	STR-HR07-LB	2/6/2019	9.57	263.4	7.88	11.53	105.7	8.5	124	0.3	0.3	0.1	–	–
	STR-HR07-CC	2/6/2019	9.58	264.4	7.67	11.61	106.5	6.6	130	0.3	0.55	0.3	–	–
	STR-HR07-CC	2/6/2019	9.58	263.8	7.67	11.58	106.2	6.6	133	0.55				
	STR-HR07-RB	2/6/2019	9.73	269.9	7.89	11.55	106.3	9.7	131	0.3	0.8	0.3	–	–
	STR-HR07-RB	2/6/2019	9.74	270.2	7.85	11.54	106.3	9.7	132	0.8				
	STR-HR08-LB	2/6/2019	9.69	266.6	7.94	11.77	108.2	8.9	140	0.3	0.8	0.3	–	–
	STR-HR08-LB	2/6/2019	9.70	266.7	7.95	11.77	108.3	8.8	139	0.8				
	STR-HR08-CC	2/6/2019	9.56	257.7	7.90	11.67	107.0	7.3	136	0.3	2.1	1	–	–
	STR-HR08-CC	2/6/2019	9.57	257.3	7.89	11.66	106.9	7.3	136	1.5				
	STR-HR08-CC	2/6/2019	9.57	257.9	7.88	11.65	106.9	7.2	136	2				
	STR-HR08-RB	2/6/2019	9.72	266.3	7.87	11.46	105.5	9.8	146	0.3	1.4	0.4	–	–
	STR-HR08-RB	2/6/2019	9.71	266.1	7.87	11.50	105.8	9.9	146	1.4				
	STR-HR09-LB	2/6/2019	9.58	256.9	7.97	11.63	106.7	8.2	156	0.3	1.0	0.3	–	–
	STR-HR09-LB	2/6/2019	9.58	256.6	7.98	11.66	106.9	8.1	157	1				
	STR-HR09-CC	2/6/2019	9.46	254.8	7.91	11.54	105.6	6.6	154	0.3	1.97	0.5	–	–
	STR-HR09-CC	2/6/2019	9.46	254.8	7.92	11.56	105.8	6.6	154	1.5				
	STR-HR09-CC	2/6/2019	9.46	254.3	7.93	11.57	105.8	6.6	154	1.97				
	STR-HR09-RB	2/6/2019	9.67	261.6	7.90	11.52	105.9	9.3	156	0.3	1.96	1	–	–
	STR-HR09-RB	2/6/2019	9.71	262.8	7.90	11.50	105.8	9.5	156	1.5				
	STR-HR09-RB	2/6/2019	9.71	263.3	7.91	11.51	105.9	9.8	156	1.96				
Holston River July 2019	STR-HR01-LB	7/17/2019	28.91	335.4	8.20	7.67	104.3	7.8	190	0.3	2.3	–	1.2	–
	STR-HR01-LB	7/17/2019	28.91	335.7	8.19	7.71	104.9	7.6	191	1.5				
	STR-HR01-LB	7/17/2019	28.91	335.5	8.18	7.67	104.3	7.8	193	2				
	STR-HR01-CC	7/17/2019	28.93	336.9	8.25	7.89	107.4	7.6	190	0.5	2.8	–	1.5	–
	STR-HR01-CC	7/17/2019	28.93	337.3	8.24	7.86	107.0	7.7	191	1.5				
	STR-HR01-CC	7/17/2019	28.90	336.9	8.24	7.86	106.9	7.8	192	2.5				
	STR-HR01-RB	7/17/2019	28.99	336.9	8.28	7.91	107.8	7.8	182	0.5	2.9	–	1.5	–
	STR-HR01-RB	7/17/2019	29.00	337.3	8.27	7.90	107.6	7.7	183	1.5				
	STR-HR01-RB	7/17/2019	28.99	333.7	8.27	7.88	107.3	7.7	185	2.5				
	STR-HR02-LB	7/17/2019	28.90	335.3	8.23	7.79	106.0	9.0	168	0.5	2.7	0.5	–	2.3
	STR-HR02-LB	7/17/2019	28.86	334.5	8.23	7.78	105.7	9.3	169	1.5				
	STR-HR02-LB	7/17/2019	28.85	334.7	8.22	7.78	105.7	9.4	170	2.4				
	STR-HR02-CC	7/17/2019	28.90	334.5	8.24	7.91	107.6	8.3	177	0.5	3.4	0.5	–	2.9
	STR-HR02-CC	7/17/2019	28.90	334.7	8.24	7.89	107.3	8.5	178	1.5				
	STR-HR02-CC	7/17/2019	28.87	335.3	8.24	7.90	107.4	8.7	179	3				
	STR-HR02-RB	7/17/2019	28.90	333.6	8.24	7.89	107.3	8.4	182	0.5	3.2	0.5	–	2.7
	STR-HR02-RB	7/17/2019	28.90	334.6	8.24	7.91	107.6	9.3	183	1.5				
	STR-HR02-RB	7/17/2019	28.90	333.6	8.24	7.93	107.9	10.6	184	2.9				

See notes on last page.

TABLE B.4 – Surface Stream Field Measurement Results
John Sevier Fossil Plant
February 2019 and July 2019

Sampling Event	Station ID	Sample Date	Temperature	Specific Conductance	pH	DO	DO Saturation	Turbidity	ORP	Depth	Maximum Depth	Analytical Sample Depth (m)		
			°C	µS/cm	SU	mg/l	%	NTU	mV	m	m	SUR	MID	BOT
Holston River July 2019	STR-HR03-LB	7/17/2019	28.74	333.2	8.24	7.71	104.6	9.4	195	0.5	2.9	0.5	–	2.5
	STR-HR03-LB	7/17/2019	28.73	333.1	8.24	7.72	104.7	10.0	196	1.5				
	STR-HR03-LB	7/17/2019	28.73	333.2	8.24	7.71	104.5	9.8	198	2.5				
	STR-HR03-CC	7/17/2019	28.69	333.0	8.23	7.75	105.0	9.6	194	0.5	4.1	0.5	2	3.7
	STR-HR03-CC	7/17/2019	28.70	333.2	8.23	7.76	105.2	10.0	195	1.5				
	STR-HR03-CC	7/17/2019	28.70	333.1	8.21	7.73	104.8	10.2	196	3				
	STR-HR03-CC	7/17/2019	28.70	333.5	8.22	7.71	104.5	10.0	199	3.7				
	STR-HR03-RB	7/17/2019	28.70	332.9	8.22	7.72	104.6	9.7	186	0.5	3.2	0.5	–	2.7
	STR-HR03-RB	7/17/2019	28.68	332.7	8.21	7.71	104.5	9.7	188	1.5				
	STR-HR03-RB	7/17/2019	28.67	332.6	8.21	7.68	104.0	10.7	190	2.7				
	STR-HR04-LB	7/17/2019	28.59	332.8	8.23	7.62	103.1	8.9	176	0.5	3.3	0.5	–	2.8
	STR-HR04-LB	7/17/2019	28.60	332.8	8.22	7.63	103.2	9.4	178	1.5				
	STR-HR04-LB	7/17/2019	28.56	332.2	8.21	7.59	102.7	10.5	180	2.8				
	STR-HR04-CC	7/17/2019	28.59	332.0	8.23	7.68	103.9	8.3	176	0.5	4.2	0.5	2	3.8
	STR-HR04-CC	7/17/2019	28.61	332.8	8.23	7.68	103.9	8.8	177	1.5				
	STR-HR04-CC	7/17/2019	28.60	333.1	8.22	7.66	103.6	9.2	178	3				
	STR-HR04-CC	7/17/2019	28.60	333.0	8.22	7.64	103.4	9.3	179	3.7				
	STR-HR04-RB	7/17/2019	28.60	331.7	8.21	7.64	103.4	10.1	188	0.5	3.1	0.5	–	2.6
	STR-HR04-RB	7/17/2019	28.58	331.3	8.20	7.64	103.3	11.1	190	1.5				
	STR-HR04-RB	7/17/2019	28.56	331.9	8.19	7.63	103.2	11.4	192	2.7				
	STR-HR05-LB	7/17/2019	28.52	329.5	8.22	7.58	102.4	10.3	162	0.5	2.9	0.5	–	2.5
	STR-HR05-LB	7/17/2019	28.53	329.5	8.22	7.55	102.0	9.2	162	1.5				
	STR-HR05-LB	7/17/2019	28.49	328.8	8.21	7.55	101.9	9.9	164	2.4				
	STR-HR05-CC	7/17/2019	28.54	329.7	8.23	7.64	103.3	8.0	147	0.5	3.5	0.5	2	3
	STR-HR05-CC	7/17/2019	28.54	329.7	8.22	7.63	103.1	8.2	149	1.5				
	STR-HR05-CC	7/17/2019	28.54	330.1	8.22	7.66	103.5	8.2	149	3				
	STR-HR05-RB	7/17/2019	28.44	321.9	8.21	7.72	104.1	9.9	144	0.5	3.0	0.5	–	2.5
	STR-HR05-RB	7/17/2019	28.40	321.1	8.21	7.72	104.1	7.7	145	1.5				
	STR-HR05-RB	7/17/2019	28.44	320.8	8.21	7.69	103.7	8.2	147	2.8				
	STR-HR06-LB	7/17/2019	28.54	320.2	8.13	7.58	102.4	8.2	102	0.5	3.1	0.5	–	2.8
	STR-HR06-LB	7/17/2019	28.54	320.7	8.11	7.58	102.4	7.5	102	1.5				
	STR-HR06-LB	7/17/2019	28.51	318.8	8.10	7.54	101.8	8.7	103	2.9				
	STR-HR06-CC	7/17/2019	28.58	321.2	8.24	7.70	104.1	7.2	118	0.5	3.5	0.5	1.5	3.1
	STR-HR06-CC	7/17/2019	28.57	321.5	8.23	7.67	103.7	7.3	120	1.5				
	STR-HR06-CC	7/17/2019	28.56	321.4	8.21	7.69	104.0	7.6	122	3				
	STR-HR06-RB	7/17/2019	28.45	318.9	8.24	7.72	104.2	8.7	133	0.5	3.1	0.5	–	2.7
	STR-HR06-RB	7/17/2019	28.45	318.7	8.23	7.72	104.2	9.0	134	1.5				
	STR-HR06-RB	7/17/2019	28.45	319.5	8.22	7.70	103.9	9.6	135	2.9				

See notes on last page.

TABLE B.4 – Surface Stream Field Measurement Results
John Sevier Fossil Plant
February 2019 and July 2019

Sampling Event	Station ID	Sample Date	Temperature	Specific Conductance	pH	DO	DO Saturation	Turbidity	ORP	Depth	Maximum Depth	Analytical Sample Depth (m)		
			°C	µS/cm	SU	mg/l	%	NTU	mV	m	m	SUR	MID	BOT
Holston River July 2019	STR-HR06-CC	7/18/2019	27.70	320.3	7.90	7.61	100.5	9.2	153	0.5	3.2	–	1.5	–
	STR-HR06-CC	7/18/2019	27.40	321.8	7.87	7.56	99.3	10.3	155	1.5				
	STR-HR06-CC	7/18/2019	27.40	320.3	7.85	7.56	99.3	10.4	156	2.8				
	STR-HR07-RB	7/17/2019	–	–	–	–	–	–	–	–	1.8	–	0.9	–
	STR-HR07-LB	7/18/2019	28.10	314.4	8.02	7.33	97.5	8.6	169	0.5	3.25	0.5	–	2.8
	STR-HR07-LB	7/18/2019	27.64	314.4	7.96	7.19	94.9	11.7	171	1.5				
	STR-HR07-LB	7/18/2019	27.58	314.7	7.91	7.05	92.9	12.7	171	2.8				
	STR-HR07-CC	7/18/2019	28.14	315.4	8.03	7.45	99.2	6.6	170	0.5	3.7	0.5	1.8	3.3
	STR-HR07-CC	7/18/2019	27.86	313.9	8.02	7.50	99.3	7.6	161	1.5				
	STR-HR07-CC	7/18/2019	27.65	312.8	8.00	7.52	99.2	8.5	174	3				
	STR-HR07-CC	7/18/2019	27.66	313.1	8.01	7.57	99.9	8.1	174	3.4				
	STR-HR07-RB	7/18/2019	27.99	314.8	7.89	7.21	95.7	9.0	137	0.5	2.9	–	1.5	–
	STR-HR07-RB	7/18/2019	27.98	314.8	7.86	7.20	95.6	8.5	138	1.5				
	STR-HR07-RB	7/18/2019	27.95	313.3	7.83	7.25	96.2	7.6	137	2.5				
	STR-HR08-LB	7/17/2019	28.86	332.3	8.24	7.85	106.7	7.9	190	0.5	4.1	0.5	2	3.7
	STR-HR08-LB	7/17/2019	28.85	332.7	8.24	7.83	106.4	7.8	191	1.5				
	STR-HR08-LB	7/17/2019	28.84	332.2	8.23	7.79	105.8	8.3	193	3				
	STR-HR08-LB	7/17/2019	28.77	332.2	8.20	7.64	103.7	9.9	194	3.7				
	STR-HR08-CC	7/17/2019	28.88	332.7	8.26	7.87	107.0	7.0	193	0.5	5.9	0.5	2.9	5.5
	STR-HR08-CC	7/17/2019	28.87	333.1	8.25	7.82	106.3	7.5	194	1.5				
	STR-HR08-CC	7/17/2019	28.84	331.9	8.23	7.79	105.8	8.0	195	3				
	STR-HR08-CC	7/17/2019	28.83	331.8	8.23	7.78	105.7	8.4	196	4				
	STR-HR08-CC	7/17/2019	28.78	331.3	8.22	7.69	104.4	10.5	198	5				
	STR-HR08-CC	7/17/2019	28.79	330.6	8.20	7.68	104.3	9.9	199	5.5				
	STR-HR08-RB	7/17/2019	28.86	331.5	8.27	7.79	105.9	4.9	216	0.5	4.1	0.5	2	3.7
	STR-HR08-RB	7/17/2019	28.86	331.3	8.26	7.76	105.5	4.7	218	1.5				
	STR-HR08-RB	7/17/2019	28.85	331.7	8.26	7.72	104.9	5.3	220	3				
	STR-HR08-RB	7/17/2019	28.84	331.7	8.26	7.76	105.4	5.0	221	3.8				
	STR-HR09-LB	7/17/2019	28.75	320.3	8.25	7.86	106.6	7.7	162	0.5	5.1	0.5	2.5	4.6
	STR-HR09-LB	7/17/2019	28.51	325.4	8.20	7.60	102.7	8.5	163	1.5				
	STR-HR09-LB	7/17/2019	28.49	325.2	8.19	7.57	102.2	9.9	162	3				
	STR-HR09-LB	7/17/2019	28.48	324.4	8.19	7.56	102.1	9.3	161	4				
	STR-HR09-LB	7/17/2019	28.46	324.4	8.20	7.47	100.8	10.1	159	4.8				
	STR-HR09-CC	7/17/2019	28.90	328.7	8.28	8.00	108.8	6.2	203	0.5	5.2	0.5	2.5	4.8
	STR-HR09-CC	7/17/2019	28.77	329.9	8.24	7.84	106.4	6.5	206	1.5				
	STR-HR09-CC	7/17/2019	28.70	328.9	8.22	7.79	105.6	7.4	209	3				
	STR-HR09-CC	7/17/2019	28.50	325.9	8.20	7.64	103.2	8.6	211	4				
	STR-HR09-CC	7/17/2019	28.47	326.3	8.17	7.60	102.6	9.3	213	4.8				

See notes on last page.

TABLE B.4 – Surface Stream Field Measurement Results
John Sevier Fossil Plant
February 2019 and July 2019

Sampling Event	Station ID	Sample Date	Temperature	Specific Conductance	pH	DO	DO Saturation	Turbidity	ORP	Depth	Maximum Depth	Analytical Sample Depth (m)		
			°C	µS/cm	SU	mg/l	%	NTU	mV	m	m	SUR	MID	BOT
Holston River July 2019	STR-HR09-RB	7/17/2019	28.91	329.0	8.29	8.08	109.9	5.7	179	0.5	5.1	0.5	2.5	4.7
	STR-HR09-RB	7/17/2019	28.86	330.4	8.28	8.00	108.7	6.2	181	1.5				
	STR-HR09-RB	7/17/2019	28.56	327.4	8.21	7.71	104.2	7.3	181	3				
	STR-HR09-RB	7/17/2019	28.55	326.5	8.21	7.65	103.4	8.3	181	4				
	STR-HR09-RB	7/17/2019	28.50	325.8	8.20	7.59	102.5	8.8	181	4.6				
Polly Branch February 2019	STR-PB01-CC	2/4/2019	9.60	318.0	7.39	11.37	102.0	3.4	105	0.3	0.3	0.1	–	–
	STR-PB02-CC	2/4/2019	7.25	227.5	7.30	12.16	103.0	7.7	177	0.3	0.5	0.2	–	–
	STR-PB02-CC	2/4/2019	7.23	227.7	7.33	12.18	103.1	8.8	177	0.5				
	STR-PB03-LB	2/4/2019	6.46	215.6	6.87	11.34	94.2	8.5	129	0.3	1.1	0.5	–	–
	STR-PB03-LB	2/4/2019	5.94	215.7	6.83	11.54	94.6	8.2	109	1.1				
	STR-PB03-CC	2/4/2019	6.70	215.1	7.14	11.32	94.6	9.3	138	0.3	1.4	0.6	–	–
	STR-PB03-CC	2/4/2019	5.28	252.0	7.13	11.84	95.5	7.6	132	1.4				
	STR-PB03-RB	2/4/2019	6.30	216.9	7.21	11.50	95.1	7.9	138	0.3	1.2	0.6	–	–
	STR-PB03-RB	2/4/2019	6.06	216.7	7.22	11.51	94.6	8.1	132	1.2				
	STR-PB04-LB	2/4/2019	5.84	215.7	7.29	11.06	90.4	3.2	90	0.3	1.3	0.6	–	–
	STR-PB04-LB	2/4/2019	5.20	221.3	7.23	10.39	83.6	3.7	64	1.3				
	STR-PB04-CC	2/4/2019	7.17	217.0	7.30	11.43	96.6	4.3	140	0.3	2.5	0.5	–	2
	STR-PB04-CC	2/4/2019	5.17	243.0	7.18	8.24	66.2	3.1	141	1.5				
	STR-PB04-CC	2/4/2019	5.26	297.8	7.20	8.19	66.0	1.9	132	2.5				
	STR-PB04-RB	2/4/2019	6.90	217.3	7.30	11.1	93.2	4.1	146	0.3	0.9	0.5	–	–
	STR-PB04-RB	2/4/2019	5.61	247.5	7.23	8.90	72.4	5.2	150	0.9				
	STR-PB05-CC	2/5/2019	6.26	225.7	7.10	10.20	84.3	4.9	103	0.3	1.9	1	–	–
	STR-PB05-CC	2/5/2019	5.50	225.8	7.10	10.01	81.2	5.6	102	1.5				
	STR-PB05-CC	2/5/2019	5.36	226.9	7.00	9.70	78.4	6.8	101	1.9				
	STR-PB06-CC	2/4/2019	6.93	236.0	7.11	11.72	98.5	0.2	186	0.1*	0.1*	0.1*	–	–
	STR-PB07-CC	2/4/2019	7.07	243.0	7.22	12.22	103.1	1.4	172	0.3*	0.3*	0.1*	–	–
	STR-PB08-CC	2/4/2019	6.78	243.2	7.40	13.30	111.4	0	140	0.1*	0.1*	0.1*	–	–
	STR-PB09-CC	2/4/2019	6.92	324.1	7.43	12.30	103.4	0	133	0.1*	0.1*	0.1*	–	–
Polly Branch July 2019	STR-PB01-CC	7/18/2019	29.81	258.0	6.92	1.37	18.8	8.6	66	0.1	0.3	0.1	–	–
	STR-PB02-CC	7/18/2019	25.56	243.2	6.70	0.30	3.8	9.0	-122	0.3	0.65	0.3	–	–
	STR-PB03-LB	7/18/2019	26.20	244.1	6.73	0.23	3.0	3.5	-128	0.3	0.9	–	0.4	–
	STR-PB03-LB	7/18/2019	25.40	245.5	6.67	0.30	3.8	7.5	-151	0.6				
	STR-PB03-CC	7/18/2019	25.45	247.8	6.66	0.30	3.8	3.7	-160	0.5	1.4	0.3	–	1
	STR-PB03-CC	7/18/2019	23.43	257.1	6.42	0.30	3.7	5.1	-157	1				
	STR-PB03-RB	7/18/2019	25.50	247.7	6.63	0.30	3.8	3.7	-167	0.5	1.2	–	0.5	–
	STR-PB03-RB	7/18/2019	23.67	257.3	6.50	0.30	3.7	17.6	-155	1				

See notes on last page.

TABLE B.4 – Surface Stream Field Measurement Results
John Sevier Fossil Plant
February 2019 and July 2019

Sampling Event	Station ID	Sample Date	Temperature	Specific Conductance	pH	DO	DO Saturation	Turbidity	ORP	Depth	Maximum Depth	Analytical Sample Depth (m)		
			°C	µS/cm	SU	mg/l	%	NTU	mV	m	m	SUR	MID	BOT
Polly Branch July 2019	STR-PB04-LB	7/18/2019	27.51	254.8	6.89	0.70	9.2	2.5	-77	0.5	1.1	–	0.3	–
	STR-PB04-LB	7/18/2019	27.22	257.4	6.85	0.30	3.9	3.7	-98	1.0				
	STR-PB04-CC	7/18/2019	27.40	254.4	6.80	1.60	21.0	4.7	-7	0.5	2.7	0.5	–	2.2
	STR-PB04-CC	7/18/2019	26.10	250.8	6.60	0.50	6.4	8.1	-18	1.5				
	STR-PB04-CC	7/18/2019	23.30	281.8	6.30	0.30	3.7	15.1	-27	2.2				
	STR-PB04-RB	7/18/2019	27.53	257.8	6.71	1.68	22.1	4.9	-42	0.5	0.67	–	0.3	–
	STR-PB05-CC	7/18/2019	28.60	256.9	7.60	9.50	127.5	5.1	99	0.5	2.1	0.3	–	1.3
	STR-PB05-CC	7/18/2019	28.50	258.4	6.70	2.60	34.8	5.5	109	1.5				
	STR-PB05-CC	7/18/2019	27.10	259.0	6.67	1.20	15.7	5.3	102	1.8				
	STR-PB06-CC	7/18/2019	23.89	307.7	6.69	0.81	10.0	28	-56	0.1*	0.2*	0.1*	–	–
	STR-PB07-CC	7/18/2019	23.92	308.8	6.73	1.81	22.3	2.1	92	0.1*	0.24*	0.1*	–	–
	STR-PB08-CC	7/18/2019	25.01	304.3	6.86	3.44	43.3	0	118	0.1*	0.1*	0.05*	–	–
	STR-PB09-CC	7/18/2019	23.15	350.3	7.15	7.52	91.4	4.5	110	0.1*	0.06*	0.03*	–	–

Notes:

°C	degrees Celsius
%	percent
ID	Identification
m	meter
mg/L	milligrams per Liter
µS/cm	microsiemens per centimeter
mV	millivolts
NTU	Nephelometric Turbidity Units
SU	Standard Units

* Depths are approximate due to shallow water.

1. During the February 2019 sampling event, winter drawdown elevations on Cherokee Reservoir resulted in shallow conditions and appreciable flow velocities in the Holston River sampling reach.

2. During the July 2019 sampling event, Cherokee Reservoir was at a summer pool elevation and water levels across the Holston River sampling reach were about 2-4m higher (varying by proximity to John Sevier Dam) than those observed during the February 2019 sampling event.

3. On July 17, 2019, in-situ measurements were not obtained at STR-HR07-RB due to a data logger malfunction. On July 18, 2019, field sampling was performed at each station on transect STR-HR07 and at station STR-HR06-CC for comparison.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transect Location ID		STR-HR01						
Sample Date		5-Feb-19	5-Feb-19	5-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID		JSF-STR-HR01-LB-SUR-20190205	JSF-STR-HR01-CC-SUR-20190205	JSF-STR-HR01-RB-SUR-20190205	JSF-STR-HR01-LB-MID-20190717	JSF-STR-HR01-CC-MID-20190717	JSF-STR-DUP02-20190717	JSF-STR-HR01-RB-MID-20190717
Parent Sample ID							JSF-STR-HR01-CC-MID-20190717	
Sample Depth		0.3 m	0.2 m	0.3 m	1.2 m	1.5 m	1.5 m	1.5 m
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Field Duplicate Sample	Normal Environmental Sample
Level of Review[1]	Units	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
Total Metals								
Antimony	ug/L	<0.378	0.646 J	<0.378	<0.378	<0.378	0.486 J	<0.378
Arsenic	ug/L	0.406 J	0.533 J	0.648 J	0.945 J	0.951 J	0.993 J	0.929 J
Barium	ug/L	25.0	23.8	24.2	39.7	39.0	41.6	40.3
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	27,600	27,100	28,200	31,900	31,900	34,300	32,500
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	<1.53	2.22	<1.53
Cobalt	ug/L	0.454 J	0.459 J	0.435 J	1.36	1.34	1.44	1.45
Copper	ug/L	0.793 J	0.697 J	0.756 J	2.64	2.70	2.61	2.99
Iron	ug/L	182	174	145	279	158 J	290 J	289
Lead	ug/L	0.203 J	0.213 J	0.160 J	0.355 J	0.353 J	0.367 J	0.403 J
Lithium	ug/L	<3.14	<3.14	<3.14	3.66 J	5.11	<3.39	3.90 J
Magnesium	ug/L	6,730	6,560	7,090	9,540	9,590	10,100	9,690
Manganese	ug/L	23.1	22.9	20.6	56.8	51.8	55.5	62.1
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	2.15 U*	0.834 U*	0.786 J	0.708 J	0.775 J	0.770 J
Nickel	ug/L	0.329 J	0.443 J	<0.312	0.841 J	0.703 J	0.833 J	0.780 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.41 U*	1.79 U*	1.72 U*	1.19	1.38	1.70	1.31
Zinc	ug/L	<3.22	<3.22	<3.22	5.43 U*	5.27 U*	6.30 U*	5.72 U*
Dissolved Metals								
Antimony	ug/L	<0.378	<0.378	<0.378	0.415 J	0.392 J	0.381 J	0.379 J
Arsenic	ug/L	0.465 J	0.442 J	0.481 J	0.960 J	0.948 J	0.953 J	0.945 J
Barium	ug/L	24.5	24.5	24.3	39.0	39.3	40.2	38.0
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	27,200	27,400	26,500	32,400	32,800	33,100	32,600
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	0.280 J	0.263 J	0.252 J	1.07	1.11	1.10	1.09
Copper	ug/L	1.12 J	<0.627	0.731 J	1.89 J	1.93 J	2.04	2.01
Iron	ug/L	22.7 J	<14.1	18.4 J	32.7 J	51.5	29.5 J	32.8 J
Lead	ug/L	<0.128	<0.128	<0.128	<0.128	<0.128	0.156 J	<0.128
Lithium	ug/L	<3.14	<3.14	<3.14	3.77 J	<3.39	<3.39	<3.39
Magnesium	ug/L	6,600	6,920	6,970	9,860	9,960	9,930	9,850
Manganese	ug/L	12.9	11.1	10.3	19.4	18.6	18.8	22.1
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	0.650 U*	1.17 U*	0.740 U*	0.857 J	0.805 J	0.859 J	0.822 J
Nickel	ug/L	<0.312	<0.312	0.359 U*	0.586 J	0.611 J	0.675 J	0.541 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.42 U*	1.31 U*	1.24 U*	1.34	1.23	1.07	1.25
Zinc	ug/L	5.22 U*	<3.22	3.92 U*	3.70 U*	3.39 U*	7.42 U*	5.03 U*
Anions								
Chloride	mg/L	10.7	11.2	11.4	15.0	15.2	15.2	15.4
Fluoride	mg/L	0.0763 J	0.0856 J	0.0762 J	0.0888 J	0.0910 J	0.0870 J	0.0909 J
Sulfate	mg/L	12.2	11.9	11.9	28.6	28.9	29.5	29.5
Radiological								
Radium-226	pCi/L	0.0233 +/-(0.0536) U	0.0696 +/-(0.0676) U	0.0560 +/-(0.0559) U	-0.0127 +/-(0.111) U	0.0474 +/-(0.118) U	0.0763 +/-(0.156) U	0.0201 +/-(0.0909) U
Radium-228	pCi/L	-0.0448 +/-(0.228) U	0.235 +/-(0.261) U	-0.0492 +/-(0.188) U	-0.304 +/-(0.288) U	0.402 +/-(0.333) U	-0.0142 +/-(0.315) U	0.120 +/-(0.333) U
Radium-226+228	pCi/L	0.0233 +/-(0.234) U	0.305 +/-(0.270) U	0.0560 +/-(0.196) U	0.000 +/-(0.309) U	0.450 +/-(0.353) U	0.0763 +/-(0.352) U	0.140 +/-(0.345) U
General Chemistry								
Hardness (as CaCO3)	mg/L	96.6	94.7	99.6	119	119	127	121
Total Dissolved Solids	mg/L	129	118	138	167	184	182	224
Total Suspended Solids	mg/L	8.30	5.40	6.60	8.80	7.70	6.40	8.40

See last page for notes.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transect Location ID		STR-HR02									
Sample Date		5-Feb-19	5-Feb-19	5-Feb-19	5-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID		JSF-STR-HR02-LB-SUR-20190205	JSF-STR-HR02-CC-SUR-20190205	JSF-STR-DUP02-20190205	JSF-STR-HR02-RB-SUR-20190205	JSF-STR-HR02-LB-SUR-20190717	JSF-STR-HR02-LB-BOT-20190717	JSF-STR-HR02-CC-SUR-20190717	JSF-STR-HR02-CC-BOT-20190717	JSF-STR-HR02-RB-SUR-20190717	JSF-STR-HR02-RB-BOT-20190717
Parent Sample ID				JSF-STR-HR02-CC-SUR-20190205							
Sample Depth		0.3 m	0.3 m	0.3 m	0.3 m	0.5 m	2.3 m	0.5 m	2.9 m	0.5 m	2.7 m
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	Normal Environmental Sample
Level of Review[1]	Units	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
Total Metals											
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	<0.378	0.411 J	0.417 J	0.493 J	<0.378	0.456 J
Arsenic	ug/L	0.694 J	0.632 J	0.390 J	0.557 J	1.08	1.10	1.05	1.09	1.03	1.10
Barium	ug/L	24.8	25.5	25.4	24.4	40.5	40.1	42.4	42.1	41.0	40.2
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	27,800	28,000	25,900	27,600	32,400	32,200	33,000	32,500	32,100	32,700
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	<1.53	1.63 J	1.61 J	<1.53	<1.53	2.16
Cobalt	ug/L	0.564	0.449 J	0.537	0.571	1.53	1.47	1.50	1.40	1.42	1.46
Copper	ug/L	0.973 J	0.784 J	0.960 J	1.11 J	2.78	3.01	2.91	2.84	2.96	3.18
Iron	ug/L	298	184	193 J	269	298	345	326	309	311	352
Lead	ug/L	0.357 J	0.218 J	0.213 J	0.346 J	0.437 J	0.425 J	0.411 J	0.428 J	0.391 J	0.446 J
Lithium	ug/L	<3.14	<3.14	<3.14	<3.14	6.34	6.64	5.86	3.59 J	5.01	6.51
Magnesium	ug/L	6,460	6,710	6,820	6,940	9,680	9,750	10,000	9,850	9,800	9,820
Manganese	ug/L	33.0	23.2	20.9	29.8	62.6	63.0	62.3	60.6	60.4	62.0
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	<0.610	0.667 J	<0.610	0.818 J	0.795 J	0.842 J	0.840 J	0.833 J	0.801 J
Nickel	ug/L	0.433 J	<0.312	0.312 J	0.460 J	0.880 J	0.872 J	0.916 J	0.831 J	0.842 J	0.971 J
Selenium	ug/L	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.128	0.155 J	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	2.26 U*	2.26 U*	1.47 U*	2.27 U*	1.46	1.73	1.55	1.41	1.42	1.74
Zinc	ug/L	<3.22	<3.22	<3.22	<3.22	5.65 U*	6.24 U*	6.33 U*	6.21 U*	6.48 U*	6.40 U*
Dissolved Metals											
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	0.476 J	0.488 J	<0.378	0.393 J	0.417 J	0.503 J
Arsenic	ug/L	0.523 J	0.497 J	0.504 J	0.532 J	1.02	1.01	0.897 J	0.949 J	0.959 J	0.988 J
Barium	ug/L	23.7	23.2	23.7	22.5	40.1	39.9	38.2	38.4	39.2	39.3
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	28,600	25,300	26,600	27,500	32,800	32,900	32,300	32,700	32,900	32,800
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	1.76 J
Cobalt	ug/L	0.266 J	0.240 J	0.276 J	0.238 J	1.12	1.11	1.05	1.07	1.09	1.13
Copper	ug/L	<0.627	<0.627	<0.627	<0.627	2.14	2.11	1.89 J	2.07	2.27	2.10
Iron	ug/L	23.1 J	15.7 J	15.5 U*	18.1 J	57.6	36.1 J	29.9 J	36.3 J	30.8 J	31.9 J
Lead	ug/L	<0.128	<0.128	<0.128	<0.128	0.189 J	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	<3.14	<3.14	<3.14	<3.14	4.62 J	4.25 J	<3.39	3.40 J	<3.39	4.26 J
Magnesium	ug/L	6,670	6,170	6,600	6,630	9,860	9,960	9,740	9,880	9,970	9,980
Manganese	ug/L	15.5	9.20	9.47	13.4	27.0	22.5	24.7	25.0	22.7	23.6
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	<0.610	<0.610	<0.610	0.820 J	0.826 J	0.838 J	0.836 J	0.819 J	0.824 J
Nickel	ug/L	<0.312	<0.312	<0.312	<0.312	0.646 J	0.623 J	0.580 J	0.611 J	0.605 J	0.604 J
Selenium	ug/L	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.62 U*	2.00 U*	1.55 U*	1.99 U*	1.29	1.46	1.09	1.21	1.30	1.54
Zinc	ug/L	<3.22	<3.22	<3.22	<3.22	5.56 U*	3.95 U*	3.63 U*	5.24 U*	4.83 U*	3.84 U*
Anions											
Chloride	mg/L	11.5	11.3	11.2	11.2	14.8	14.7	15.1	15.0	14.8	14.6
Fluoride	mg/L	0.0763 J	0.0802 J	0.0847 J	0.0777 J	0.0927 J	0.0921 J	0.0890 J	0.0901 J	0.0911 J	0.0859 J
Sulfate	mg/L	14.5	11.9	12.4	11.7	28.1	28.0	28.6	28.5	28.1	27.5
Radiological											
Radium-226	pCi/L	0.129 +/-(0.0698)	0.0397 +/-(0.0557) U	0.0333 +/-(0.0585) U	0.00648 +/-(0.0543) U	-0.108 +/-(0.140) U	0.154 +/-(0.149) U	0.0946 +/-(0.109) U	0.0539 +/-(0.111) U	-0.0808 +/-(0.0626) U	-0.0140 +/-(0.135) U
Radium-228	pCi/L	0.141 +/-(0.237) U	0.115 +/-(0.260) U	0.0197 +/-(0.207) U	-0.0678 +/-(0.246) U	0.526 +/-(0.448) U	0.0701 +/-(0.294) U	0.341 +/-(0.378) U	-0.424 +/-(0.264) U	-0.0734 +/-(0.255) U	-0.0127 +/-(0.322) U
Radium-226+228	pCi/L	0.270 +/-(0.247)J	0.155 +/-(0.266) U	0.0530 +/-(0.215) U	0.00648 +/-(0.252) U	0.526 +/-(0.469) U	0.224 +/-(0.330) U	0.436 +/-(0.393) U	0.0539 +/-(0.286) U	0.000 +/-(0.263) U	0.000 +/-(0.349) U
General Chemistry											
Hardness (as CaCO3)	mg/L	96.0	97.5	92.8	97.5	121	121	124	122	120	122
Total Dissolved Solids	mg/L	141	136	135	135	190	206	188	176	191	185
Total Suspended Solids	mg/L	11.7	5.70	5.30	9.60	9.90	10.2	8.60	8.60	9.50	9.20

See last page for notes.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transect Location ID		STR-HR03									
Sample Date		5-Feb-19	5-Feb-19	5-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID		JSF-STR-HR03-LB-SUR-20190205	JSF-STR-HR03-CC-SUR-20190205	JSF-STR-HR03-RB-SUR-20190205	JSF-STR-HR03-LB-SUR-20190717	JSF-STR-HR03-LB-BOT-20190717	JSF-STR-HR03-CC-SUR-20190717	JSF-STR-HR03-CC-MID-20190717	JSF-STR-HR03-CC-BOT-20190717	JSF-STR-HR03-RB-SUR-20190717	JSF-STR-HR03-RB-BOT-20190717
Parent Sample ID											
Sample Depth		0.3 m	1 m	0.3 m	0.5 m	2.5 m	0.5 m	2 m	3.7 m	0.5 m	2.7 m
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	Normal Environmental Sample
Level of Review[1]	Units	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
Total Metals											
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	0.417 J	<0.378	<0.378	<0.378	0.419 J	0.400 J
Arsenic	ug/L	0.573 J	0.906 J	0.597 J	0.910 J	1.03	0.987 J	1.03	1.03	1.12	1.01
Barium	ug/L	27.0	24.9	23.9	39.6	39.5	41.4	39.7	39.2	39.9	39.5
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	28,100	26,200	27,800	33,000	32,800	34,300	33,000	32,900	32,900	32,600
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	1.63 J	<1.53	<1.53	<1.53	1.68 J	1.60 J
Cobalt	ug/L	0.560	0.388 J	0.475 J	1.74	1.80	1.82	1.81	1.84	1.79	1.82
Copper	ug/L	3.16	0.892 J	0.995 J	2.74 U*	2.88 U*	2.94 U*	2.94 U*	2.84 U*	2.92 U*	3.05 U*
Iron	ug/L	278	196	289	329	406	356	388	387	408	456
Lead	ug/L	0.343 J	0.237 J	0.349 J	0.481 J	0.532 J	0.479 J	0.497 J	0.522 J	0.536 J	0.524 J
Lithium	ug/L	<3.14	<3.14	<3.14	4.11 J	4.02 J	<3.39	<3.39	<3.39	3.82 J	3.71 J
Magnesium	ug/L	6,700	6,320	6,800	9,780	9,840	10,300	9,850	9,880	9,780	9,720
Manganese	ug/L	31.3	21.7	30.8	66.4	69.9	69.7	68.4	70.0	71.0	70.2
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	<0.610	0.643 U*	0.712 J	0.725 J	0.730 J	0.764 J	0.702 J	0.693 J	0.707 J
Nickel	ug/L	0.323 J	0.342 J	0.338 J	0.919 J	1.01 J	0.948 J	1.00	1.08	0.976 J	1.05 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.97 U*	1.99 U*	2.18 U*	1.62	1.86	1.59	1.51	1.53	1.73	1.77
Zinc	ug/L	<3.22	<3.22	<3.22	7.25 U*	7.80 U*	6.86 U*	6.67 U*	13.4 U*	6.97 U*	7.37 U*
Dissolved Metals											
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	0.418 J	<0.378
Arsenic	ug/L	0.526 J	0.352 J	0.591 J	0.861 J	0.819 J	1.00	0.924 J	0.847 J	0.893 J	0.897 J
Barium	ug/L	24.3	24.0	22.8	35.9	36.3	36.4	35.5	36.7	36.8	35.5
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	25,300	24,000	27,800	32,300	32,800	32,500	31,900	32,300	32,500	31,500
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	0.278 J	0.274 J	0.256 J	1.22	1.24	1.28	1.20	1.29	1.27	1.20
Copper	ug/L	<0.627	<0.627	<0.627	1.87 J	1.71 J	2.10	1.77 J	1.82 J	1.92 J	1.68 J
Iron	ug/L	16.5 J	<14.1	24.9 J	27.9 J	25.2 J	27.6 J	26.1 J	27.9 J	29.3 J	25.1 J
Lead	ug/L	<0.128	<0.128	<0.128	<0.128	<0.128	0.184 J	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	<3.14	<3.14	<3.14	<3.39	<3.39	3.59 J	<3.39	<3.39	3.40 J	<3.39
Magnesium	ug/L	5,980	6,280	6,850	9,640	9,720	9,650	9,630	9,740	9,690	9,370
Manganese	ug/L	12.4	7.57	15.0	19.1	19.6	17.9	17.3	16.8	17.1	16.6
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	<0.610	0.623 U*	0.671 J	0.741 J	0.705 J	0.669 J	0.704 J	0.700 J	0.677 J
Nickel	ug/L	<0.312	<0.312	<0.312	1.72	2.22 J	2.57 J	1.61	2.08	1.55	2.77 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.78 U*	1.14 U*	2.05 U*	1.21	<0.991	1.10	1.18	1.25	1.32	1.19
Zinc	ug/L	<3.22	<3.22	<3.22	4.34 U*	3.87 U*	9.15 U*	3.90 U*	4.32 U*	4.66 U*	3.98 U*
Anions											
Chloride	mg/L	11.1	11.0	11.3	14.4	14.6	14.7	14.6	14.7	14.8	14.7
Fluoride	mg/L	0.0832 J	0.0763 J	0.0799 J	0.0916 J	0.0916 J	0.0909 J	0.0894 J	0.0924 J	0.0949 J	0.0909 J
Sulfate	mg/L	13.6	11.6	11.9	27.0	27.5	27.5	27.3	27.4	27.0	26.9
Radiological											
Radium-226	pCi/L	0.0223 +/-(0.0586) U	0.0414 +/-(0.0592) U	0.0694 +/-(0.0665) U	0.0567 +/-(0.152) U	-0.00211 +/-(0.0990) U	0.0606 +/-(0.0876) U	0.117 +/-(0.140) U	-0.0156 +/-(0.137) U	0.303 +/-(0.183)J	-0.0548 +/-(0.155) U
Radium-228	pCi/L	0.265 +/-(0.230) UJ	0.0389 +/-(0.216) UJ	0.145 +/-(0.223) UJ	-0.0505 +/-(0.265) U	-0.101 +/-(0.298) U	-0.00558 +/-(0.258) U	0.102 +/-(0.255) U	0.418 +/-(0.319) U	0.0940 +/-(0.293) U	-0.113 +/-(0.308) U
Radium-226+228	pCi/L	0.287 +/-(0.237) UJ	0.0803 +/-(0.224) UJ	0.214 +/-(0.233) UJ	0.0567 +/-(0.305) U	0.000 +/-(0.314) U	0.0606 +/-(0.272) U	0.219 +/-(0.291) U	0.418 +/-(0.347) U	0.397 +/-(0.345)J	0.000 +/-(0.345) U
General Chemistry											
Hardness (as CaCO3)	mg/L	97.8	91.4	97.4	123	122	128	123	123	123	121
Total Dissolved Solids	mg/L	144	136	128	182	159	164	171	217 J	231	202
Total Suspended Solids	mg/L	10.6	5.30	10.6	9.00	12.0	10.3	11.5	11.4	11.5	12.5

See last page for notes.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transcect Location ID		STR-HR04										
Sample Date		5-Feb-19	5-Feb-19	5-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID		JSF-STR-HR04-LB-SUR-20190205	JSF-STR-HR04-CC-SUR-20190205	JSF-STR-HR04-RB-SUR-20190205	JSF-STR-HR04-LB-SUR-20190717	JSF-STR-HR04-LB-BOT-20190717	JSF-STR-HR04-CC-SUR-20190717	JSF-STR-HR04-CC-MID-20190717	JSF-STR-HR04-CC-BOT-20190717	JSF-STR-HR04-RB-SUR-20190717	JSF-STR-HR04-RB-BOT-20190717	JSF-STR-DUP01-20190717
Parent Sample ID												JSF-STR-HR04-RB-BOT-20190717
Sample Depth		0.3 m	1 m	0.3 m	0.5 m	2.8 m	0.5 m	2 m	3.8 m	0.5 m	2.6 m	2.6 m
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	Normal Environmental Sample	Field Duplicate Sample
Level of Review[1]	Units	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
Total Metals												
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	0.622 J	0.522 J	<0.378
Arsenic	ug/L	0.325 J	0.341 J	0.698 J	0.781 J	0.845 J	0.804 J	0.799 J	0.748 J	0.956 J	1.14	0.980 J
Barium	ug/L	32.6	30.9	26.1	41.6	42.1	39.8	41.3	41.5	39.0	40.3	43.2
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	0.250 J	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	45.5 J	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	29,000	27,400	28,100	32,500	33,100	31,700	32,900	32,500	32,000	32,500	33,000
Chromium	ug/L	<1.53	<1.53	<1.53	1.57 J	2.06	1.70 J	<1.53	<1.53	1.61 J	1.83 J	1.54 J
Cobalt	ug/L	0.614	0.553	0.531	1.67	1.76	1.66	1.69	1.63	1.77	1.89	1.74
Copper	ug/L	1.14 J	0.997 J	1.01 J	2.67	2.77	2.53	2.52	2.33	2.81 U*	3.45 U*	3.44
Iron	ug/L	326	240	296	354	400	334	221	206	268	591 J	480 J
Lead	ug/L	0.340 U*	0.357 U*	0.365 J	0.413 J	0.443 J	0.374 J	0.402 J	0.381 J	0.523 J	0.765 J	0.591 J
Lithium	ug/L	3.22 U*	3.24 U*	<3.14	3.49 J	3.70 J	<3.39	<3.39	3.43 J	4.99 J	4.43 J	4.67 J
Magnesium	ug/L	7,210	7,110	6,960	9,520	9,650	9,300	9,720	9,460	9,620	9,760	9,860
Manganese	ug/L	27.2	20.7	30.0	62.2	65.4	62.5	64.7	64.7	69.0	78.4	74.8
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	<0.610	1.14 U*	0.676 J	0.700 J	0.674 J	<0.610	<0.610	0.652 J	0.772 J	0.761 J
Nickel	ug/L	0.464 J	0.470 J	0.563 J	0.813 J	0.850 J	0.771 J	0.662 J	0.733 J	0.842 J	1.24 J	0.975 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.17 U*	1.26 U*	2.32 U*	1.65	1.83	1.63	1.40	1.36	1.62	1.86	1.61
Zinc	ug/L	3.30 J	<3.22	<3.22	6.03 U*	6.04 U*	7.15 U*	5.52 U*	5.20 U*	6.10 U*	27.6 U*	8.80 U*
Dissolved Metals												
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	0.429 J	<0.378	<0.378
Arsenic	ug/L	<0.323	<0.323	0.525 J	0.700 J	0.773 J	0.770 J	0.678 J	0.747 J	0.904 J	0.808 J	0.955 J
Barium	ug/L	31.5	30.5	22.4	39.8	43.1	41.3	39.3	39.7	36.4	36.2	39.4
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	0.277 J	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	42.2 J	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	29,400	28,700	27,800	32,900	33,000	34,000	32,300	33,100	32,100	32,100	32,400
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	1.87 J	2.43	<1.53	<1.53	<1.53	<1.53	1.63 J
Cobalt	ug/L	0.338 J	0.328 J	0.257 J	1.27	1.21	1.28	1.22	1.26	1.30	1.28	1.18
Copper	ug/L	0.648 J	<0.627	<0.627	3.09	1.91 J	1.97 J	1.82 J	1.65 J	1.91 J	1.84 J	1.87 J
Iron	ug/L	172	17.1 J	19.7 J	227	27.2 J	27.4 J	27.1 J	24.8 J	26.0 J	27.5 J	32.4 J
Lead	ug/L	<0.128	<0.128	<0.128	<0.128	0.316 J	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	3.17 U*	<3.14	<3.14	<3.39	<3.39	3.42 J	<3.39	<3.39	3.53 J	<3.39	3.68 J
Magnesium	ug/L	7,360	7,380	6,680	9,670	9,750	10,200	9,680	9,790	9,500	9,560	9,890
Manganese	ug/L	12.5	7.78	14.6	16.9	15.5	15.8	15.5	14.9	16.9	18.3	17.6
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	<0.610	0.765 U*	0.808 J	0.681 J	0.703 J	0.691 J	0.656 J	0.722 J	0.704 J	0.766 J
Nickel	ug/L	<0.312	<0.312	<0.312	0.988 J	0.535 J	0.564 J	0.561 J	0.511 J	1.11	2.40 J	0.570 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	0.922 U*	0.934 U*	2.13 U*	1.57	1.57	1.89	1.37	1.26	1.17	1.16	1.43
Zinc	ug/L	<3.22	<3.22	<3.22	3.85 U*	4.40 U*	4.38 U*	3.66 U*	4.67 U*	3.98 U*	3.67 U*	3.29 U*
Anions												
Chloride	mg/L	11.5	11.3	11.8	15.4	14.9	14.8	14.8	14.9	14.8	14.9	14.7
Fluoride	mg/L	0.0691 J	0.0658 J	0.0968 J	0.0920 J	0.0891 J	0.0909 J	0.0897 J	0.0907 J	0.0933 J	0.0943 J	0.0891 J
Sulfate	mg/L	14.1	12.3	13.2	28.0	27.0	27.0	27.2	27.5	26.8	26.8	26.4
Radiological												
Radium-226	pCi/L	0.0773 +/-(0.0702) U	-0.0144 +/-(0.0429) U	0.0601 +/-(0.0619) U	0.160 +/-(0.150) U	-0.0248 +/-(0.127) U	-0.113 +/-(0.102) U	0.0116 +/-(0.146) U	0.172 +/-(0.167) U	0.0630 +/-(0.169) U	0.0366 +/-(0.0861) U	0.0165 +/-(0.146) U
Radium-228	pCi/L	0.133 +/-(0.263) UJ	0.125 +/-(0.210) UJ	0.257 +/-(0.267) UJ	0.288 +/-(0.263) U	0.216 +/-(0.255) U	0.241 +/-(0.271) U	0.282 +/-(0.263) U	0.160 +/-(0.292) U	0.294 +/-(0.425) U	-0.152 +/-(0.333) U	0.451 +/-(0.373) U
Radium-226+228	pCi/L	0.210 +/-(0.272) UJ	0.125 +/-(0.214) UJ	0.318 +/-(0.274) UJ	0.448 +/-(0.303) U	0.216 +/-(0.285) U	0.241 +/-(0.290) U	0.294 +/-(0.301) U	0.332 +/-(0.336) U	0.357 +/-(0.457) U	0.0366 +/-(0.344) U	0.468 +/-(0.401) U
General Chemistry												
Hardness (as CaCO3)	mg/L	102	97.7	98.8	120	122	117	122	120	120	121	123
Total Dissolved Solids	mg/L	132	124	142	159	213	179	186	145	179	132	158
Total Suspended Solids	mg/L	9.90	5.00	9.90	7.80	12.1	9.60	10.7	10.7	11.6	13.4	13.8

See last page for notes.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transect Location ID							STR-HR05					
Sample Date		5-Feb-19	5-Feb-19	5-Feb-19	5-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID		JSF-STR-HR05-LB-SUR-20190205	JSF-STR-DUP01-20190205	JSF-STR-HR05-CC-SUR-20190205	JSF-STR-HR05-RB-SUR-20190205	JSF-STR-HR05-LB-SUR-20190717	JSF-STR-HR05-LB-BOT-20190717	JSF-STR-HR05-CC-SUR-20190717	JSF-STR-HR05-CC-MID-20190717	JSF-STR-HR05-CC-BOT-20190717	JSF-STR-HR05-RB-SUR-20190717	JSF-STR-HR05-RB-BOT-20190717
Parent Sample ID			JSF-STR-HR05-LB-SUR-20190205									
Sample Depth		0.3 m	0.3 m	0.3 m	0.3 m	0.5 m	2.5 m	0.5 m	2 m	3 m	0.5 m	2.5 m
Sample Type		Normal Environmental Sample	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	Normal Environmental Sample
Level of Review[1]	Units	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
Total Metals												
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	0.324 J	0.448 J	<0.323	0.370 J	0.809 J	0.893 J	0.880 J	0.891 J	1.03	0.918 J	0.911 J
Barium	ug/L	32.6	25.9	30.5	31.7	40.8	39.1	38.8	38.5	38.6	38.9	40.0
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	28,600	27,400	27,200	28,700	32,500	32,700	31,500	32,000	32,700	32,600	32,200
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	1.76 J	1.53 J	1.91 J	1.78 J	1.75 J
Cobalt	ug/L	0.664	0.622	0.526	0.641	1.56	1.75	1.67	1.70	1.71	1.65	1.84
Copper	ug/L	1.26 J	0.928 J	0.955 J	1.13 J	2.58	2.95 U*	3.11 U*	2.82 U*	2.95 U*	3.20 U*	3.27 U*
Iron	ug/L	364 J	287 J	239	406	314	381	317	317	333	362	466
Lead	ug/L	0.410 U*	0.325 J	0.285 U*	0.370 U*	0.384 J	0.491 J	0.760 J	0.412 J	0.472 J	0.494 J	0.617 J
Lithium	ug/L	4.50 U*	<3.14	3.71 U*	3.80 U*	<3.39	<3.39	3.88 J	3.65 J	4.15 J	4.45 J	3.97 J
Magnesium	ug/L	7,240	7,180	6,930	7,540	9,450	9,550	9,280	9,470	9,550	9,670	9,510
Manganese	ug/L	27.4	28.0	20.6	27.7	59.0	64.0	57.4	59.2	62.5	63.1	71.4
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	1.54 J	<0.610	<0.610	0.720 J	0.763 J	0.678 J	0.671 J	0.641 J	0.635 J	0.633 J
Nickel	ug/L	0.549 J	0.345 J	0.337 J	0.573 J	0.751 J	0.931 J	0.843 J	0.813 J	0.881 J	0.962 J	1.01
Selenium	ug/L	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	0.156 J	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.27 U*	1.16 U*	1.04 U*	1.44 U*	1.40	1.61	1.80	1.68	1.83	1.90	1.84
Zinc	ug/L	<3.22	<3.22	<3.22	<3.22	7.06 U*	6.44 U*	8.10 U*	6.42 U*	7.00 U*	7.32 U*	7.65 U*
Dissolved Metals												
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	0.523 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	<0.323	0.390 J	<0.323	<0.323	0.705 J	0.870 J	0.808 J	0.894 J	0.803 J	0.772 J	0.792 J
Barium	ug/L	29.5	24.0	27.6	28.4	38.8	37.8	36.6	37.0	37.7	36.1	35.8
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	28,400	26,500	26,100	27,700	32,100	33,500	32,500	33,100	33,000	32,200	31,800
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	1.65 J	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	0.323 J	0.292 J	0.303 J	0.318 J	1.21	1.33	1.25	1.28	1.31	1.17	1.18
Copper	ug/L	0.658 J	<0.627	<0.627	<0.627	1.72 J	1.87 J	1.74 J	1.72 J	1.72 J	1.67 J	1.74 J
Iron	ug/L	18.6 J	30.8 U*	<14.1	<14.1	27.2 J	28.9 J	24.6 J	25.1 J	24.7 J	25.0 J	22.7 J
Lead	ug/L	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	4.33 U*	<3.14	3.54 U*	3.20 U*	<3.39	3.93 J	<3.39	<3.39	<3.39	<3.39	<3.39
Magnesium	ug/L	7,140	6,750	6,720	7,320	9,510	10,000	9,700	9,860	9,650	9,500	9,440
Manganese	ug/L	10.6	10.9	6.69	12.5	11.9	13.0	9.81	9.80	10.3	9.56	11.9
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	0.836 J	<0.610	<0.610	0.737 J	0.826 J	0.711 J	0.658 J	0.656 J	0.668 J	<0.610
Nickel	ug/L	<0.312	<0.312	<0.312	<0.312	0.521 J	0.778 J	1.56	1.23	0.962 J	0.642 J	0.653 J
Selenium	ug/L	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.03 U*	1.20 U*	<0.899	0.956 U*	1.46	1.34	1.24	1.36	<0.991	1.18	1.13
Zinc	ug/L	<3.22	4.18 U*	<3.22	<3.22	4.36 U*	3.35 U*	4.28 U*	4.15 U*	4.63 U*	4.12 U*	4.43 U*
Anions												
Chloride	mg/L	11.8	12.0	10.9	11.3	14.8	14.6	14.7	14.6	14.6	14.6	14.4
Fluoride	mg/L	0.0748 J	0.0901 J	0.0656 J	0.0703 J	0.0897 J	0.0894 J	0.0930 J	0.0898 J	0.0880 J	0.0905 J	0.0903 J
Sulfate	mg/L	14.8	14.8	12.1	12.1	26.0	25.7	25.7	25.7	25.7	24.0	24.0
Radiological												
Radium-226	pCi/L	0.104 +/-(0.0842) U	0.0328 +/-(0.0548) U	0.0675 +/-(0.0755) U	-0.00764 +/-(0.0778) U	0.0516 +/-(0.114) U	-0.0746 +/-(0.100) U	0.0560 +/-(0.151) U	0.0374 +/-(0.125) U	-0.105 +/-(0.0903) U	-0.0131 +/-(0.103) U	-0.0842 +/-(0.0959) U
Radium-228	pCi/L	-0.118 +/-(0.226) UJ	0.223 +/-(0.216) U	0.432 +/-(0.308) UJ	0.0602 +/-(0.234) UJ	0.165 +/-(0.242) U	0.111 +/-(0.248) U	-0.0416 +/-(0.250) U	0.379 +/-(0.276) U	0.348 +/-(0.267) U	-0.0664 +/-(0.229) U	0.0490 +/-(0.282) U
Radium-226+228	pCi/L	0.104 +/-(0.241) UJ	0.256 +/-(0.223) U	0.500 +/-(0.317) UJ	0.0602 +/-(0.247) UJ	0.217 +/-(0.268) U	0.111 +/-(0.267) U	0.0560 +/-(0.292) U	0.416 +/-(0.303) U	0.348 +/-(0.282) U	0.000 +/-(0.251) U	0.0490 +/-(0.298) U
General Chemistry												
Hardness (as CaCO3)	mg/L	101	98.0	96.5	103	120	121	117	119	121	121	119
Total Dissolved Solids	mg/L	126	141	124	125	158	183	188	193	177	162	161
Total Suspended Solids	mg/L	10.1	9.70	5.90	9.70	10.9	12.0	8.40	9.50	9.70	10.7	15.1

See last page for notes.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transect Location ID		STR-HR06										
Sample Date		5-Feb-19	5-Feb-19	5-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	18-Jul-19
Sample ID		JSF-STR-HR06-LB-SUR-20190205	JSF-STR-HR06-CC-SUR-20190205	JSF-STR-HR06-RB-SUR-20190205	JSF-STR-HR06-LB-SUR-20190717	JSF-STR-HR06-LB-BOT-20190717	JSF-STR-HR06-CC-SUR-20190717	JSF-STR-HR06-CC-MID-20190717	JSF-STR-HR06-CC-BOT-20190717	JSF-STR-HR06-RB-SUR-20190717	JSF-STR-HR06-RB-BOT-20190717	JSF-STR-HR06-CC-MID-20190718
Parent Sample ID												
Sample Depth		0.3 m	0.4 m	0.3 m	0.5 m	2.8 m	0.5 m	1.5 m	3.1 m	0.5 m	2.7 m	1.5 m
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	Normal Environmental Sample	Normal Environmental Sample
Level of Review[1]	Units	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
Total Metals												
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	0.347 J	0.522 J	0.609 J	0.731 J	0.774 J	0.913 J	0.935 J	0.964 J	0.916 J	0.836 J	0.836 J
Barium	ug/L	34.3	25.1	24.8	40.2	39.7	38.1	38.0	39.7	38.7	38.3	41.7
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<38.6	<38.6	39.8 J	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	28,400	25,700	27,100	32,600	31,800	31,700	32,300	32,700	32,100	32,200	33,900
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	1.68 J	1.62 J	<1.53	1.59 J	1.72 J	<1.53	1.86 J
Cobalt	ug/L	0.632	0.613	0.433 J	1.57	1.63	1.60	1.60	1.71	1.73	1.68	1.31
Copper	ug/L	1.21 J	0.948 J	0.946 J	2.44	2.61	3.85 U*	6.79	3.51 U*	3.14 U*	2.89 U*	2.48
Iron	ug/L	314	231	247	261	368	284	257	324	351	195	401
Lead	ug/L	0.372 U*	0.316 J	0.316 J	0.318 J	0.404 J	0.519 J	0.541 J	0.494 J	0.492 J	0.515 J	0.492 J
Lithium	ug/L	6.00 U*	<3.14	<3.14	<3.39	3.55 J	5.23	3.86 J	5.60	4.34 J	<3.39	<3.39
Magnesium	ug/L	7,220	6,490	6,830	9,340	9,190	9,450	9,500	9,560	9,520	9,450	9,650
Manganese	ug/L	25.6	23.4	27.1	50.6	54.9	53.7	53.8	59.5	62.4	67.2	59.2
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	<0.610	<0.610	0.658 J	0.666 J	0.659 J	0.615 J	0.672 J	<0.610	<0.610	0.625 J
Nickel	ug/L	0.470 J	0.418 J	0.481 J	0.737 J	0.779 J	0.778 J	0.849 J	0.923 J	0.918 J	0.774 J	0.860 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.35 U*	1.47 U*	2.07 U*	1.19	1.62	1.98	1.58	1.69	1.81	1.26	1.49
Zinc	ug/L	<3.22	3.62 J	<3.22	5.63 U*	5.67 U*	7.40 U*	8.57 U*	7.66 U*	7.28 U*	6.68 U*	7.76 U*
Dissolved Metals												
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	0.440 J
Arsenic	ug/L	<0.323	0.459 J	0.574 J	0.785 J	0.640 J	0.893 J	0.787 J	0.846 J	0.837 J	0.770 J	0.874 J
Barium	ug/L	30.3	24.7	23.4	37.6	37.6	36.4	36.1	36.3	35.4	35.3	39.0
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.182	<0.182	0.194 J	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	28,300	25,500	27,600	31,800	31,600	32,900	32,200	32,200	32,400	32,100	31,900
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	1.60 J	<1.53	<1.53	<1.53	<1.53	<1.53	1.68 J
Cobalt	ug/L	0.327 J	0.263 J	0.298 J	1.14	1.17	1.23	1.18	1.17	1.21	1.18	0.790
Copper	ug/L	0.696 J	<0.627	<0.627	1.64 J	1.73 J	2.24	1.66 J	1.81 J	1.72 J	1.58 J	1.71 J
Iron	ug/L	32.8 J	14.8 J	67.2	20.8 J	20.0 J	23.9 J	22.8 J	24.9 J	23.1 J	22.4 J	33.9 J
Lead	ug/L	<0.128	<0.128	<0.128	0.265 J	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	5.72 U*	<3.14	<3.14	<3.39	<3.39	4.70 J	3.60 J	3.57 J	3.42 J	<3.39	3.43 J
Magnesium	ug/L	7,080	6,390	7,000	9,320	9,300	9,740	9,490	9,490	9,590	9,470	9,470
Manganese	ug/L	10.0	6.44	16.6	5.65	7.33	5.25	5.25	5.12	7.69	8.76	8.40
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	<0.610	<0.610	0.686 J	0.675 J	0.666 J	0.645 J	0.639 J	0.621 J	0.632 J	0.700 J
Nickel	ug/L	<0.312	<0.312	<0.312	0.492 J	0.433 J	0.613 J	0.641 J	0.704 J	0.612 J	0.577 J	0.527 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.03 U*	1.72 U*	1.99 U*	1.35	1.37	1.37	1.25	1.35	1.38	1.19	1.36
Zinc	ug/L	<3.22	<3.22	<3.22	3.77 U*	4.13 U*	5.11 U*	3.84 U*	4.07 U*	4.11 U*	3.70 U*	3.80 U*
Anions												
Chloride	mg/L	11.5	11.7	11.9	14.4	14.6	14.4	14.5	14.4	14.2	14.1	14.5
Fluoride	mg/L	0.0719 J	0.0703 J	0.0725 J	0.0890 J	0.0911 J	0.0914 J	0.0888 J	0.0920 J	0.0886 J	0.0884 J	0.0861 J
Sulfate	mg/L	13.7	12.8	13.2	23.8	24.0	23.9	24.3	24.0	23.2	23.1	24.8
Radiological												
Radium-226	pCi/L	-0.0436 +/-(0.0645) U	0.0435 +/-(0.0634) U	-0.00758 +/-(0.0771) U	0.00745 +/-(0.117) U	0.00307 +/-(0.121) U	-0.00675 +/-(0.0897) U	0.0450 +/-(0.121) U	0.00898 +/-(0.0990) U	0.00442 +/-(0.135) U	0.00260 +/-(0.116) U	0.00476 +/-(0.180) U
Radium-228	pCi/L	0.236 +/-(0.278) UJ	-0.183 +/-(0.236) UJ	0.268 +/-(0.276) UJ	0.0742 +/-(0.297) U	0.0505 +/-(0.328) U	0.423 +/-(0.283) U	-0.0347 +/-(0.252) U	-0.0742 +/-(0.247) U	0.268 +/-(0.282) U	0.185 +/-(0.225) U	0.0838 +/-(0.275) U
Radium-226+228	pCi/L	0.236 +/-(0.285) UJ	0.0435 +/-(0.244) UJ	0.268 +/-(0.287) UJ	0.0817 +/-(0.319) U	0.0536 +/-(0.350) U	0.423 +/-(0.297) U	0.0450 +/-(0.280) U	0.00898 +/-(0.266) U	0.273 +/-(0.313) U	0.188 +/-(0.253) U	0.0886 +/-(0.329) U
General Chemistry												
Hardness (as CaCO3)	mg/L	101	90.9	95.8	120	117	118	120	121	119	119	124
Total Dissolved Solids	mg/L	128	117	125	154	184	164	175	178	174	152	185
Total Suspended Solids	mg/L	8.60	7.80	9.50	9.80	11.9	7.40	8.40	10.2	9.60	13.5	11.0

See last page for notes.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transect Location ID		STR-HR07									
Sample Date		6-Feb-19	6-Feb-19	6-Feb-19	17-Jul-19	18-Jul-19	18-Jul-19	18-Jul-19	18-Jul-19	18-Jul-19	18-Jul-19
Sample ID		JSF-STR-HR07-LB-SUR-20190206	JSF-STR-HR07-CC-SUR-20190206	JSF-STR-HR07-RB-SUR-20190206	JSF-STR-HR07-RB-MID-20190717	JSF-STR-HR07-LB-SUR-20190718	JSF-STR-HR07-LB-BOT-20190718	JSF-STR-HR07-CC-SUR-20190718	JSF-STR-HR07-CC-MID-20190718	JSF-STR-HR07-CC-BOT-20190718	JSF-STR-HR07-RB-MID-20190718
Parent Sample ID											
Sample Depth		0.1 m	0.3 m	0.3 m	0.9 m	0.5 m	2.8 m	0.5 m	1.8 m	3.3 m	1.5 m
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	Normal Environmental Sample
Level of Review[1]	Units	Validated	Validated	Validated	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
Total Metals											
Antimony	ug/L	<0.378	<0.378	<0.378	0.404 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	0.648 J	0.614 J	0.489 J	0.962 J	1.01	0.871 J	0.834 J	0.891 J	0.832 J	0.930 J
Barium	ug/L	27.0	26.6	25.6	42.7	40.8	41.7	40.5	40.9	40.9	40.2
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	29,300 J	28,300 J	26,600 J	34,700	33,800	34,800	33,600	33,800	33,600	33,300
Chromium	ug/L	<1.53	<1.53	<1.53	1.98 J	<1.53	1.94 J	<1.53	2.12	1.53 J	1.97 J
Cobalt	ug/L	0.769	0.779	0.757	1.47	1.12	1.45	1.14	1.19	1.25	1.39
Copper	ug/L	1.05 J	0.956 J	0.926 J	2.48	2.13	2.53	2.49	2.33	2.35	2.61
Iron	ug/L	229 J	362 J	221 J	279	274	586	254	288	325	475
Lead	ug/L	0.297 J	0.288 J	0.333 J	0.377 J	0.407 J	0.607 J	0.350 J	0.363 J	0.435 J	0.566 J
Lithium	ug/L	<3.14	<3.14	<3.14	<3.39	<3.39	<3.39	<3.39	<3.39	<3.39	<3.39
Magnesium	ug/L	7,270 J	7,310 J	7,070 J	10,100	9,480	9,430	9,630	9,580	9,620	9,520
Manganese	ug/L	28.3	28.4	29.1	57.0	49.9	80.6	48.5	49.1	55.3	69.9
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	0.610 UJ	0.632 J	0.610 UJ	0.735 J	0.721 J	<0.610	0.630 J	<0.610	0.642 J	0.610 J
Nickel	ug/L	<0.312	0.392 J	0.385 J	0.796 J	0.739 J	0.917 J	0.713 J	0.808 J	0.779 J	0.880 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	0.121 UJ	<0.121	0.121 UJ	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	2.22 U*	1.72 U*	1.66 U*	1.61	1.25	1.65	1.30	1.67	1.38	1.66
Zinc	ug/L	<3.22	3.52 J	4.49 J	5.85 U*	5.18 U*	6.40 U*	5.16 U*	7.52 U*	5.64 U*	8.36 U*
Dissolved Metals											
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	0.534 J	0.612 J	0.424 J	0.892 J	0.858 J	0.859 J	0.830 J	0.843 J	0.855 J	0.871 J
Barium	ug/L	24.4	25.5	23.0	39.3	37.0	37.6	38.8	38.7	38.0	37.6
Beryllium	ug/L	0.155 UJ	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	30.3 UJ	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	28,600 J	27,100 J	29,000 J	32,600	31,800	32,800	32,200	32,000	31,900	31,400
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	0.544	0.486 J	0.916	1.06	0.755	0.733	0.809	0.768	0.763	0.787
Copper	ug/L	<0.627	<0.627	0.664 J	2.24	1.73 J	1.58 J	1.76 J	1.92 J	1.83 J	1.72 J
Iron	ug/L	19.0 U*	19.9 U*	18.3 U*	31.2 J	31.4 J	39.2 J	32.2 J	31.1 J	39.5 J	37.1 J
Lead	ug/L	<0.128	<0.128	<0.128	<0.128	<0.128	0.128 J	<0.128	<0.128	0.128 J	<0.128
Lithium	ug/L	3.14 UJ	<3.14	<3.14	<3.39	<3.39	<3.39	<3.39	<3.39	<3.39	<3.39
Magnesium	ug/L	7,180 J	6,780 J	8,000 J	9,870	9,290	9,150	9,520	9,360	9,420	9,300
Manganese	ug/L	11.4	8.76	15.3	6.66	7.06	16.8	6.19	6.05	6.71	12.7
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	0.610 UJ	0.610 UJ	<0.610	0.762 J	0.697 J	0.670 J	0.719 J	0.698 J	0.688 J	0.676 J
Nickel	ug/L	<0.312	<0.312	<0.312	0.606 J	0.502 J	0.473 J	0.537 J	0.467 J	0.521 J	0.533 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	0.121 UJ	0.121 UJ	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.61 U*	1.67 U*	1.14 U*	1.03	1.21	1.25	<0.991	1.18	1.18	1.06
Zinc	ug/L	<3.22	<3.22	<3.22	4.08 U*	4.47 U*	5.49 U*	4.01 U*	3.52 U*	5.89 U*	3.64 U*
Anions											
Chloride	mg/L	13.7	12.9	13.2	14.6	13.6	13.1	13.6	13.6	13.8	13.2
Fluoride	mg/L	0.0862 J	0.0826 J	0.0825 J	0.0906 J	0.0842 J	0.0846 J	0.0866 J	0.0881 J	0.0820 J	0.0872 J
Sulfate	mg/L	16.6	15.4	15.2	26.7	24.8	23.0	24.4	23.4	23.6	24.0
Radiological											
Radium-226	pCi/L	0.0337 +/-(0.0579) U	-0.00145 +/-(0.0374) U	0.00501 +/-(0.0496) U	-0.109 +/-(0.0889) U	-0.0234 +/-(0.197) U	-0.0125 +/-(0.211) U	-0.105 +/-(0.172) U	-0.0469 +/-(0.192) U	-0.0562 +/-(0.178) U	-0.125 +/-(0.143) U
Radium-228	pCi/L	0.236 +/-(0.284) U	0.0376 +/-(0.227) U	-0.0984 +/-(0.214) U	-0.124 +/-(0.278) U	0.0469 +/-(0.277) U	0.0300 +/-(0.267) U	0.0829 +/-(0.281) U	0.202 +/-(0.294) U	0.289 +/-(0.326) U	0.289 +/-(0.238) U
Radium-226+228	pCi/L	0.270 +/-(0.290) U	0.0376 +/-(0.230) U	0.00501 +/-(0.220) U	0.000 +/-(0.292) U	0.0469 +/-(0.340) U	0.0300 +/-(0.340) U	0.0829 +/-(0.329) U	0.202 +/-(0.351) U	0.289 +/-(0.371) U	0.289 +/-(0.278) U
General Chemistry											
Hardness (as CaCO3)	mg/L	103	101	95.5	128	123	126	124	124	124	122
Total Dissolved Solids	mg/L	138	125	134	175	171	170	169	160	173	173
Total Suspended Solids	mg/L	8.80	7.70	10.6	6.60	7.90	17.7	6.80	7.50	11.0	13.7

See last page for notes.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transect Location ID	Units	STR-HR08									
Sample Date		6-Feb-19	6-Feb-19	6-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID		JSF-STR-HR08-LB-SUR-20190206	JSF-STR-HR08-CC-SUR-20190206	JSF-STR-HR08-RB-SUR-20190206	JSF-STR-HR08-LB-SUR-20190717	JSF-STR-HR08-LB-MID-20190717	JSF-STR-HR08-LB-BOT-20190717	JSF-STR-HR08-CC-SUR-20190717	JSF-STR-DUP03-20190717	JSF-STR-HR08-CC-MID-20190717	JSF-STR-HR08-CC-BOT-20190717
Parent Sample ID									JSF-STR-HR08-CC-SUR-20190717		
Sample Depth		0.3 m	1 m	0.4 m	0.5 m	2 m	3.7 m	0.5 m	0.5 m	2.9 m	5.5 m
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Field Duplicate Sample	Normal Environmental Sample	Normal Environmental Sample
Level of Review[1]		Validated	Validated	Validated	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
Total Metals											
Antimony	ug/L	<0.378	<0.378	<0.378	0.480 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	0.664 J	0.583 J	0.630 J	1.11	1.02	0.929 J	0.933 J	0.879 J	0.842 J	0.908 J
Barium	ug/L	88.0	24.4	28.4	40.1	42.5	42.6	41.6	41.8	41.6	42.6
Beryllium	ug/L	<0.155	<0.155	<0.155	0.188 J	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	<30.3	40.5 J	<38.6	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	0.159 J	<0.125	<0.125
Calcium	ug/L	29,000 J	26,300 J	29,400	32,200	35,200	35,100	34,900	34,500	33,800	34,800
Chromium	ug/L	<1.53	<1.53	<1.53	1.65 J	1.55 J	1.66 J	1.62 J	1.57 J	<1.53	2.06
Cobalt	ug/L	0.734	0.607	0.776	1.50	1.55	1.49	1.47	1.46	1.49	1.59
Copper	ug/L	1.05 J	0.797 J	1.02 J	2.85	2.60	2.58	2.80	2.39	2.46	2.64
Iron	ug/L	300 J	162 J	238 J	295	316	324	282	291	287	383
Lead	ug/L	0.323 J	0.243 J	0.327 J	0.448 J	0.462 J	0.442 J	0.376 J	0.387 J	0.399 J	0.439 J
Lithium	ug/L	<3.14	<3.14	<3.14	4.12 J	<3.39	<3.39	<3.39	<3.39	<3.39	<3.39
Magnesium	ug/L	7,390 J	6,750 J	8,380	9,710	10,200	10,200	10,300	10,100	9,830	10,100
Manganese	ug/L	28.3	22.1	30.9	55.7	60.9	62.6	59.9	58.0	61.7	73.0
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	0.610 UJ	0.610 UJ	<0.610	0.897 J	0.816 J	0.724 J	0.712 J	0.699 J	0.697 J	0.717 J
Nickel	ug/L	0.485 J	0.418 J	0.465 J	0.889 J	0.852 J	0.839 J	0.906 J	0.835 J	0.799 J	0.900 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	0.121 UJ	0.121 UJ	<0.121	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	0.165 J	<0.148	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.77 U*	1.85 U*	1.80 U*	1.53	1.57	1.67	1.50	1.40	1.35	1.76
Zinc	ug/L	3.57 J	<3.22	<3.22	6.80 U*	6.34 U*	6.87 U*	5.63 U*	5.42 U*	6.25 U*	7.00 U*
Dissolved Metals											
Antimony	ug/L	<0.378	<0.378	0.740 J	0.460 J	0.409 J	<0.378	0.406 J	0.403 J	<0.378	0.382 J
Arsenic	ug/L	0.438 J	0.531 J	0.565 J	0.967 J	1.16	0.999 J	0.985 J	0.867 J	0.995 J	0.988 J
Barium	ug/L	24.2	25.5	25.1	38.8	39.1	39.0	38.3	39.1	39.5	39.4
Beryllium	ug/L	<0.155	<0.155	0.155 UJ	<0.182	0.226 J	<0.182	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<30.3	<30.3	30.3 UJ	<38.6	44.6 J	<38.6	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	0.215 U*	<0.125	<0.125	<0.125	0.207 U*	<0.125
Calcium	ug/L	30,300 J	28,200 J	29,900 J	33,000	32,700	32,700	32,300	32,600	32,400	32,500
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	0.399 J	0.482 J	0.529	1.08	1.14	1.09	1.09	1.04	1.13	1.10
Copper	ug/L	<0.627	<0.627	<0.627	2.01	1.90 J	1.96 J	2.00	1.83 J	2.12	1.79 J
Iron	ug/L	17.5 U*	15.0 U*	169 J	28.9 J	29.9 J	33.7 J	29.4 J	29.5 J	36.0 J	28.7 J
Lead	ug/L	<0.128	<0.128	<0.128	<0.128	0.147 J	<0.128	<0.128	<0.128	0.299 J	<0.128
Lithium	ug/L	<3.14	<3.14	3.14 UJ	3.55 J	<3.39	<3.39	<3.39	<3.39	<3.39	3.41 J
Magnesium	ug/L	7,290 J	7,600 J	7,920 J	9,910	9,700	9,820	9,800	9,850	9,780	9,700
Manganese	ug/L	11.3	8.10	15.3	9.08	9.08	9.74	8.90	8.52	9.80	12.4
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	0.610 UJ	<0.610	2.48 U*	0.859 J	0.900 J	0.811 J	0.792 J	0.783 J	0.783 J	0.779 J
Nickel	ug/L	<0.312	<0.312	<0.312	0.551 J	0.650 J	0.637 J	0.608 J	0.525 J	0.682 J	0.547 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	0.121 UJ	<0.121	0.121 UJ	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	0.206 J	<0.148	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.65 U*	1.38 U*	1.73 U*	1.32	1.19	<0.991	1.27	1.20	1.17	1.12
Zinc	ug/L	<3.22	<3.22	<3.22	6.20 U*	9.97 U*	11.8 U*	5.07 U*	4.57 U*	5.15 U*	4.27 U*
Anions											
Chloride	mg/L	13.1	12.8	12.5	14.4	14.5	14.5	14.4	14.4	14.6	14.4
Fluoride	mg/L	0.0865 J	0.0853 J	0.0775 J	0.0864 J	0.0865 J	0.0916 J	0.0863 J	0.0844 J	0.0879 J	0.0880 J
Sulfate	mg/L	16.9	15.0	14.1	26.9	27.2	27.0	27.0	27.3	27.4	26.4
Radiological											
Radium-226	pCi/L	0.0747 +/-(0.0726) U	0.0770 +/-(0.0621) U	0.0584 +/-(0.0573) U	-0.0181 +/-(0.174) U	-0.0663 +/-(0.103) U	0.0654 +/-(0.162) U	0.0219 +/-(0.167) U	0.0972 +/-(0.200) U	0.0879 +/-(0.182) U	-0.00916 +/-(0.154) U
Radium-228	pCi/L	0.217 +/-(0.258) U	0.190 +/-(0.238) U	-0.153 +/-(0.194) U	-0.190 +/-(0.277) U	0.0825 +/-(0.282) U	0.119 +/-(0.335) U	-0.00294 +/-(0.279) U	0.259 +/-(0.367) U	0.199 +/-(0.335) U	0.0506 +/-(0.258) U
Radium-226+228	pCi/L	0.292 +/-(0.268) U	0.267 +/-(0.246) U	0.0584 +/-(0.202) U	0.000 +/-(0.327) U	0.0825 +/-(0.300) U	0.185 +/-(0.372) U	0.0219 +/-(0.325) U	0.356 +/-(0.418) U	0.287 +/-(0.381) U	0.0506 +/-(0.300) U
General Chemistry											
Hardness (as CaCO3)	mg/L	103	93.5	108	120	130	130	130	128	125	128
Total Dissolved Solids	mg/L	140	144	144	172	160	193	172	178	188	192
Total Suspended Solids	mg/L	9.20	6.30	10.4	8.00	8.40	9.20	6.20	6.60	8.80	11.2

See last page for notes.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transect Location ID		STR-HR08			STR-HR09							
Sample Date		17-Jul-19	17-Jul-19	17-Jul-19	6-Feb-19	6-Feb-19	6-Feb-19	6-Feb-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Sample ID		JSF-STR-HR08-RB-SUR-20190717	JSF-STR-HR08-RB-MID-20190717	JSF-STR-HR08-RB-BOT-20190717	JSF-STR-HR09-LB-SUR-20190206	JSF-STR-HR09-CC-SUR-20190206	JSF-STR-DUP01-20190206	JSF-STR-HR09-RB-SUR-20190206	JSF-STR-HR09-LB-SUR-20190717	JSF-STR-HR09-LB-MID-20190717	JSF-STR-HR09-LB-BOT-20190717	JSF-STR-HR09-CC-SUR-20190717
Parent Sample ID							JSF-STR-HR09-CC-SUR-20190206					
Sample Depth		0.5 m	2 m	3.7 m	0.3 m	0.5 m	0.5 m	1 m	0.5 m	2.5 m	4.6 m	0.5 m
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Field Duplicate Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample
Level of Review[1]	Units	Final-Verified	Final-Verified	Final-Verified	Validated	Validated	Validated	Validated	Final-Verified	Final-Verified	Final-Verified	Final-Verified
Total Metals												
Antimony	ug/L	0.556 J	0.502 J	0.394 J	0.379 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	0.995 J	0.945 J	0.886 J	0.504 J	0.440 J	0.457 J	0.543 J	0.907 J	0.931 J	0.925 J	0.936 J
Barium	ug/L	42.7	45.2	41.8	34.1	33.0	30.9	32.3	40.0	41.4	40.7	38.3
Beryllium	ug/L	<0.182	<0.182	<0.182	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	<38.6	<38.6	<38.6	33.2 U*	<30.3	<30.3	200 U*	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	35,100	34,500	34,800	30,500	31,200	27,800	29,200	32,000	33,700	32,700	31,300
Chromium	ug/L	1.77 J	1.81 J	<1.53	1.57 J	<1.53	1.56 J	2.17	1.76 J	<1.53	<1.53	<1.53
Cobalt	ug/L	1.50	1.50	1.49	0.948	0.848	0.806	0.867	1.37	1.53	1.57	1.29
Copper	ug/L	2.62	2.65	2.52	1.47 J	1.30 J	1.17 J	1.41 J	2.80	2.78	2.80	2.51
Iron	ug/L	290	307	283	327	250	252	312	179	324	456	154
Lead	ug/L	0.420 J	0.465 J	0.386 J	0.350 J	0.305 J	0.261 J	0.409 J	0.356 J	0.390 J	0.499 J	0.307 J
Lithium	ug/L	4.52 J	<3.39	<3.39	3.67 J	3.61 J	3.22 J	4.94 J	5.11	4.00 J	3.95 J	3.87 J
Magnesium	ug/L	10,300	10,200	10,200	8,460	8,380	7,920	8,290	9,570	10,000	9,590	9,320
Manganese	ug/L	57.8	59.7	58.6	26.8	23.1	21.9	32.9	54.0	64.0	79.1	46.6
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	0.748 J	0.727 J	0.692 J	<0.610	<0.610	<0.610	<0.610	0.756 J	0.732 J	0.717 J	0.712 J
Nickel	ug/L	0.857 J	0.894 J	0.771 J	0.576 J	0.515 J	0.488 J	0.562 J	0.786 J	0.841 J	0.912 J	0.653 J
Selenium	ug/L	<1.51	<1.51	<1.51	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.177	<0.177	<0.177	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	<0.148	<0.148	<0.148	<0.128	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.59	1.55	1.41	1.57 U*	1.19 U*	1.42 U*	1.85 U*	1.63	1.44	1.53	1.28
Zinc	ug/L	5.69 U*	8.82 U*	5.82 U*	<3.22	<3.22	<3.22	3.24 J	6.04 U*	5.36 U*	7.53 U*	4.91 U*
Dissolved Metals												
Antimony	ug/L	0.686 J	0.414 J	0.503 J	0.455 J	<0.378	<0.378	0.446 J	<0.378	<0.378	<0.378	0.410 J
Arsenic	ug/L	1.17	0.936 J	1.03	0.448 J	0.397 J	0.427 J	0.454 J	0.963 J	0.812 J	0.926 J	0.937 J
Barium	ug/L	40.4	39.0	40.2	32.7	32.0	30.4	31.1	39.5	39.6	39.7	38.1
Beryllium	ug/L	0.313 J	0.191 J	<0.182	<0.155	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182
Boron	ug/L	52.8 J	41.6 J	<38.6	<30.3	<30.3	<30.3	47.5 U*	<38.6	<38.6	<38.6	<38.6
Cadmium	ug/L	0.146 U*	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	32,300	32,100	32,300	29,600	30,300	28,900	29,700	33,100	32,200	32,700	32,600
Chromium	ug/L	<1.53	<1.53	<1.53	1.91 J	<1.53	<1.53	1.61 J	<1.53	<1.53	1.67 J	1.73 J
Cobalt	ug/L	1.29	1.08	1.05	0.615	0.575	0.561	0.594	1.07	1.04	1.07	1.07
Copper	ug/L	2.39	1.91 J	1.87 J	0.855 J	0.801 J	0.819 J	0.901 J	1.69 J	1.77 J	1.83 J	1.92 J
Iron	ug/L	168	65.3	25.7 J	20.2 J	18.6 J	16.4 J	18.8 J	34.1 J	26.6 J	30.3 J	25.3 J
Lead	ug/L	0.332 J	0.131 J	<0.128	0.235 U*	<0.128	<0.128	<0.128	<0.128	<0.128	0.185 J	<0.128
Lithium	ug/L	3.79 J	<3.39	<3.39	3.65 J	3.31 J	3.46 J	3.74 J	3.91 J	<3.39	3.79 J	3.64 J
Magnesium	ug/L	9,890	9,680	9,740	8,370	8,250	8,200	8,380	9,900	9,750	9,780	9,820
Manganese	ug/L	35.1	7.99	8.40	10.4	8.26	8.08	12.7	4.34 J	5.48	13.3	4.92 J
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	0.830 J	0.841 J	0.857 J	<0.610	<0.610	<0.610	<0.610	0.782 J	0.744 J	0.743 J	0.762 J
Nickel	ug/L	0.733 J	0.642 J	0.590 J	0.376 U*	0.331 U*	<0.312	0.363 U*	0.537 J	0.538 J	0.546 J	0.521 J
Selenium	ug/L	<1.51	<1.51	<1.51	<2.62	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51
Silver	ug/L	<0.177	<0.177	<0.177	<0.121	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177
Thallium	ug/L	0.250 J	0.152 J	0.161 J	<0.128	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148
Vanadium	ug/L	1.35	1.08	1.34	1.48 U*	1.03 U*	1.06 U*	1.56 U*	1.36	1.06	1.52	1.44
Zinc	ug/L	4.66 U*	4.00 U*	4.60 U*	<3.22	<3.22	<3.22	<3.22	4.11 U*	4.30 U*	6.25 U*	4.19 U*
Anions												
Chloride	mg/L	14.6	14.5	14.5	13.4	12.4	12.2	12.6	14.5	14.3	14.0	14.5
Fluoride	mg/L	0.0860 J	0.0861 J	0.0875 J	0.0653 J	0.0828 J	0.0747 J	0.0736 J	0.0932 J	0.0856 J	0.0902 J	0.0899 J
Sulfate	mg/L	27.2	27.1	27.0	15.7	14.0	13.1	13.6	25.1	24.6	23.7	25.6
Radiological												
Radium-226	pCi/L	-0.198 +/-(0.101) U	-0.00941 +/-(0.158) U	-0.142 +/-(0.147) U	0.0595 +/-(0.0592) U	0.0427 +/-(0.0611) U	0.0241 +/-(0.0463) U	0.0706 +/-(0.0585) U	1.86 +/-(0.435)	0.0312 +/-(0.174) U	-0.0212 +/-(0.204) U	0.0349 +/-(0.151) U
Radium-228	pCi/L	-0.0433 +/-(0.281) U	-0.00642 +/-(0.337) U	-0.0584 +/-(0.282) U	0.151 +/-(0.230) U	-0.0128 +/-(0.263) U	0.324 +/-(0.279) U	0.140 +/-(0.237) U	0.638 +/-(0.340)	0.218 +/-(0.332) U	-0.131 +/-(0.298) U	0.294 +/-(0.374) U
Radium-226+228	pCi/L	0.000 +/-(0.299) U	0.000 +/-(0.372) U	0.000 +/-(0.318) U	0.210 +/-(0.237) U	0.0427 +/-(0.270) U	0.348 +/-(0.283) U	0.210 +/-(0.244) U	2.50 +/-(0.552)	0.249 +/-(0.375) U	0.000 +/-(0.361) U	0.328 +/-(0.403) U
General Chemistry												
Hardness (as CaCO3)	mg/L	130	128	129	111	112	102	107	119	125	121	117
Total Dissolved Solids	mg/L	187	180	184	144	150	133	180	175	191	161	177
Total Suspended Solids	mg/L	7.30	7.50	8.20	8.20	6.60	6.30	9.60	7.80	9.90	14.6	6.20

See last page for notes.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transect Location ID		STR-HR09					STR-PB01		STR-PB02		
Sample Date		17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	4-Feb-19	18-Jul-19	4-Feb-19	18-Jul-19	18-Jul-19
Sample ID		JSF-STR-HR09-CC-MID-20190717	JSF-STR-HR09-CC-BOT-20190717	JSF-STR-HR09-RB-SUR-20190717	JSF-STR-HR09-RB-MID-20190717	JSF-STR-HR09-RB-BOT-20190717	JSF-STR-PB01-CC-SUR-20190204	JSF-STR-PB01-CC-SUR-20190718	JSF-STR-PB02-CC-SUR-20190204	JSF-STR-PB02-CC-SUR-20190718	JSF-STR-DUP01-20190718
Parent Sample ID											JSF-STR-PB02-CC-SUR-20190718
Sample Depth		2.5 m	4.8 m	0.5 m	2.5 m	4.7 m	0.1 m	0.1 m	0.2 m	0.3 m	0.3 m
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	Field Duplicate Sample
Level of Review[1]	Units	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
Total Metals											
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	0.549 J	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	0.969 J	0.875 J	0.971 J	0.904 J	1.05	0.637 J	1.55	0.384 J	0.805 J	0.987 J
Barium	ug/L	42.1	40.3	39.6	40.6	40.7	27.1	35.9	24.4	24.8	27.2
Beryllium	ug/L	<0.182	<0.182	<0.182	<0.182	0.280 J	<0.155	<0.182	<0.155	<0.182	0.209 J
Boron	ug/L	<38.6	<38.6	<38.6	<38.6	47.4 J	<30.3	<38.6	<30.3	<38.6	40.4 J
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	33,300	32,300	32,100	32,800	33,100	60,800	45,900	42,600	43,800	45,100
Chromium	ug/L	1.69 J	1.83 J	1.59 J	1.56 J	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	1.38	1.47	1.37	1.41	1.52	0.157 J	0.193 J	0.168 J	0.0910 J	0.129 J
Copper	ug/L	2.70	2.77	2.42	2.64	2.62	<0.627	<0.627	<0.627	<0.627	<0.627
Iron	ug/L	219	312	194	272	306	483	1,890	717	312	358
Lead	ug/L	0.315 J	0.383 J	0.262 J	0.377 J	0.468 J	<0.128	<0.128	0.199 J	<0.128	<0.128
Lithium	ug/L	4.42 J	4.38 J	4.57 J	3.66 J	4.23 J	<3.14	<3.39	<3.14	<3.39	11.3 U*
Magnesium	ug/L	10,000	9,720	9,590	9,860	9,900	4,320	4,340	3,310	4,050	4,170
Manganese	ug/L	54.1	61.1	47.0	54.4	62.4	164	567	114	131	142
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	0.715 J	0.695 J	0.718 J	0.737 J	0.798 J	1.55 U*	<0.610	<0.610	<0.610	<0.610
Nickel	ug/L	0.752 J	0.757 J	0.697 J	0.781 J	0.800 J	<0.312	<0.336	0.358 J	<0.336	<0.336
Selenium	ug/L	<1.51	<1.51	<1.51	<1.51	<1.51	<2.62	<1.51	<2.62	<1.51	<1.51
Silver	ug/L	<0.177	<0.177	<0.177	<0.177	<0.177	<0.121	<0.177	<0.121	<0.177	<0.177
Thallium	ug/L	<0.148	<0.148	<0.148	<0.148	0.238 J	0.131 J	<0.148	<0.128	<0.148	<0.148
Vanadium	ug/L	1.64	1.67	1.55	1.41	1.49	1.36 U*	<0.991	1.03 U*	<0.991	<0.991
Zinc	ug/L	4.68 U*	5.25 U*	4.15 U*	5.40 U*	5.94 U*	<3.22	3.87 U*	<3.22	<3.22	3.77 U*
Dissolved Metals											
Antimony	ug/L	<0.378	<0.378	<0.378	0.378 J	0.663 J	<0.378	<0.378	0.455 J	<0.378	<0.378
Arsenic	ug/L	0.872 J	0.814 J	0.833 J	0.892 J	1.10	0.694 J	1.07	<0.323	0.859 J	0.897 J
Barium	ug/L	39.3	39.5	40.8	38.6	39.4	27.9	31.8	23.4	25.4	26.2
Beryllium	ug/L	<0.182	<0.182	<0.182	<0.182	0.269 J	<0.155	<0.182	<0.155	<0.182	<0.182
Boron	ug/L	<38.6	<38.6	<38.6	<38.6	47.7 J	<30.3	<38.6	<30.3	<38.6	<38.6
Cadmium	ug/L	<0.125	<0.125	0.649 U*	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	32,900	32,900	33,800	32,700	32,600	59,500	45,300	44,800	44,600	45,000
Chromium	ug/L	<1.53	<1.53	<1.53	1.65 J	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	1.08	1.09	1.09	1.08	1.10	<0.0750	0.111 J	0.200 J	0.0860 J	0.0870 J
Copper	ug/L	1.85 J	2.02	1.85 J	2.14	1.91 J	<0.627	<0.627	<0.627	<0.627	<0.627
Iron	ug/L	31.8 J	25.0 J	27.2 J	39.5 J	25.3 J	113	156	195	41.4 J	48.1 J
Lead	ug/L	0.149 J	<0.128	<0.128	<0.128	0.132 J	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	<3.39	<3.39	<3.39	3.50 J	4.09 J	<3.14	<3.39	<3.14	<3.39	9.00 U*
Magnesium	ug/L	9,890	9,860	10,100	9,850	9,890	4,090	4,320	3,440	4,140	4,190
Manganese	ug/L	3.68 J	4.65 J	4.75 J	6.04	6.11	109	409	107	125	127
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	0.733 J	0.726 J	0.764 J	0.709 J	0.801 J	0.687 U*	<0.610	<0.610	<0.610	<0.610
Nickel	ug/L	0.615 J	0.530 J	0.546 J	0.531 J	0.561 J	<0.312	<0.336	0.323 U*	<0.336	<0.336
Selenium	ug/L	<1.51	<1.51	<1.51	<1.51	<1.51	<2.62	<1.51	<2.62	<1.51	<1.51
Silver	ug/L	<0.177	<0.177	<0.177	<0.177	<0.177	<0.121	<0.177	<0.121	<0.177	<0.177
Thallium	ug/L	<0.148	<0.148	<0.148	<0.148	0.219 J	<0.128	<0.148	<0.128	<0.148	<0.148
Vanadium	ug/L	1.30	1.11	1.23	1.51	1.41	1.58 U*	<0.991	0.901 U*	<0.991	<0.991
Zinc	ug/L	4.99 U*	3.92 U*	4.60 U*	3.99 U*	6.89 U*	<3.22	<3.22	<3.22	<3.22	<3.22
Anions											
Chloride	mg/L	14.7	14.4	14.6	14.4	14.5	1.71	1.14	1.26	1.11	1.10
Fluoride	mg/L	0.0900 J	0.0903 J	0.0890 J	0.0875 J	0.0884 J	0.0516 J	0.0586 J	0.0475 J	0.0609 J	0.0622 J
Sulfate	mg/L	26.3	25.3	26.0	25.0	25.1	19.8	3.16	13.1	5.21	5.23
Radiological											
Radium-226	pCi/L	0.0560 +/-(0.203) U	0.0909 +/-(0.201) U	0.112 +/-(0.192) U	-0.0992 +/-(0.163) U	-0.0649 +/-(0.172) U	0.0415 +/-(0.0532) U	-0.00360 +/-(0.0567) UJ	0.0690 +/-(0.0630) U	0.0355 +/-(0.138) UJ	0.0344 +/-(0.157) UJ
Radium-228	pCi/L	0.00946 +/-(0.483) U	-0.00945 +/-(0.357) U	-0.0840 +/-(0.341) U	0.201 +/-(0.352) U	0.0848 +/-(0.310) U	0.119 +/-(0.201) UJ	0.207 +/-(0.331) U	0.211 +/-(0.220) U	0.107 +/-(0.255) U	0.312 +/-(0.329) U
Radium-226+228	pCi/L	0.0655 +/-(0.524) U	0.0909 +/-(0.410) U	0.112 +/-(0.391) U	0.201 +/-(0.388) U	0.0848 +/-(0.355) U	0.161 +/-(0.208) UJ	0.207 +/-(0.336) UJ	0.280 +/-(0.229) U	0.143 +/-(0.290) UJ	0.346 +/-(0.365) UJ
General Chemistry											
Hardness (as CaCO3)	mg/L	124	121	120	123	123	170	133	120	126	130
Total Dissolved Solids	mg/L	178	169	175	195	182	188	149	150	142	144
Total Suspended Solids	mg/L	6.70	9.70	5.60	7.40	9.10	2.60	8.63	4.10	3.70	3.40

See last page for notes.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transect Location ID		STR-PB03							STR-PB04			
Sample Date		4-Feb-19	4-Feb-19	4-Feb-19	18-Jul-19	18-Jul-19	18-Jul-19	18-Jul-19	4-Feb-19	4-Feb-19	4-Feb-19	4-Feb-19
Sample ID		JSF-STR-PB03-LB-SUR-20190204	JSF-STR-PB03-CC-SUR-20190204	JSF-STR-PB03-RB-SUR-20190204	JSF-STR-PB03-LB-MID-20190718	JSF-STR-PB03-CC-SUR-20190718	JSF-STR-PB03-CC-BOT-20190718	JSF-STR-PB03-RB-MID-20190718	JSF-STR-PB04-LB-SUR-20190204	JSF-STR-PB04-CC-SUR-20190204	JSF-STR-PB04-CC-BOT-20190204	JSF-STR-PB04-RB-SUR-20190204
Parent Sample ID												
Sample Depth		0.5 m	0.6 m	0.6 m	0.4 m	0.3 m	1 m	0.5 m	0.6 m	0.5 m	2 m	0.5 m
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	Normal Environmental Sample	Normal Environmental Sample
Level of Review[1]	Units	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
Total Metals												
Antimony	ug/L	<0.378	<0.378	<0.378	0.535 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	0.326 J	0.332 J	0.387 J	0.995 J	0.950 J	1.11	0.919 J	0.596 J	0.428 J	0.437 J	0.628 J
Barium	ug/L	22.9	22.2	22.4	26.6	26.9	32.2	25.9	17.7	17.0	22.8	18.0
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.155	<0.155	<0.155	<0.155
Boron	ug/L	<30.3	<30.3	<30.3	39.7 J	<38.6	<38.6	<38.6	<30.3	<30.3	<30.3	<30.3
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	40,400	38,600	38,700	45,200	46,300	48,400	44,700	37,000	35,800	45,200 J	39,000
Chromium	ug/L	<1.53	<1.53	<1.53	2.16 U*	<1.53	<1.53	1.58 U*	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	0.190 J	0.180 J	0.159 J	0.146 J	0.100 J	0.168 J	0.160 J	0.126 J	0.113 J	0.167 J	0.136 J
Copper	ug/L	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	0.731 J	0.666 J	<0.627
Iron	ug/L	703	689	693	282	319	2,110	483	405	420	365	428
Lead	ug/L	0.180 J	0.209 J	0.226 J	<0.128	<0.128	<0.128	<0.128	0.156 J	0.178 J	<0.128	0.155 J
Lithium	ug/L	<3.14	<3.14	<3.14	<3.39	<3.39	<3.39	<3.39	<3.14	<3.14	<3.14	<3.14
Magnesium	ug/L	3,100	2,990	2,970	4,070	4,290	4,270	4,170	2,740	2,840	4,300	2,940
Manganese	ug/L	93.7	90.7	89.8	151	116	497	172	83.7	83.1	141	87.8
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610
Nickel	ug/L	0.346 J	0.355 J	0.377 J	<0.336	<0.336	<0.336	<0.336	<0.312	<0.312	<0.312	0.376 J
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<2.62	<2.62	<2.62	<2.62
Silver	ug/L	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.121	<0.121	<0.121	<0.121
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.128	<0.128	<0.128	<0.128
Vanadium	ug/L	<0.899	0.999 U*	1.46 U*	<0.991	<0.991	<0.991	<0.991	1.71 U*	1.31 U*	0.970 U*	1.41 U*
Zinc	ug/L	<3.22	<3.22	<3.22	4.38 U*	3.48 U*	<3.22	4.57 U*	<3.22	<3.22	<3.22	<3.22
Dissolved Metals												
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	<0.323	<0.323	<0.323	0.831 J	0.887 J	0.867 J	0.957 J	0.435 J	<0.323	0.495 J	<0.323
Barium	ug/L	20.8	22.4	21.0	25.6	25.0	31.2	24.9	15.6 U*	15.3 U*	21.2	16.5 U*
Beryllium	ug/L	<0.155	<0.155	<0.155	<0.182	<0.182	<0.182	<0.182	<0.155	<0.155	<0.155	<0.155
Boron	ug/L	<30.3	<30.3	<30.3	<38.6	<38.6	<38.6	<38.6	<30.3	<30.3	<30.3	<30.3
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	40,000	41,800	40,400	45,200	45,500	47,800	44,400	37,700	35,300	50,900 J	38,500
Chromium	ug/L	<1.53	<1.53	<1.53	1.59 U*	1.58 U*	<1.53	1.84 U*	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	0.0960 J	0.0960 J	0.0860 J	0.104 J	0.0900 J	0.134 J	0.141 J	0.0810 J	0.0820 J	0.124 J	0.0810 J
Copper	ug/L	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627
Iron	ug/L	181	212	180	128	196	2,090	393	154	119	113	122
Lead	ug/L	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	<3.14	<3.14	<3.14	<3.39	<3.39	<3.39	<3.39	<3.14	<3.14	<3.14	<3.14
Magnesium	ug/L	3,040	3,180	3,090	4,120	4,150	4,190	4,150	2,940	2,770	4,550	3,080
Manganese	ug/L	79.8	83.5	81.4	123	98.3	497	176	71.3	67.5	139	72.3
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610
Nickel	ug/L	<0.312	<0.312	<0.312	<0.336	<0.336	<0.336	<0.336	<0.312	<0.312	<0.312	<0.312
Selenium	ug/L	<2.62	<2.62	<2.62	<1.51	<1.51	<1.51	<1.51	<2.62	<2.62	<2.62	<2.62
Silver	ug/L	<0.121	<0.121	<0.121	<0.177	<0.177	<0.177	<0.177	<0.121	<0.121	<0.121	<0.121
Thallium	ug/L	<0.128	<0.128	<0.128	<0.148	<0.148	<0.148	<0.148	<0.128	<0.128	<0.128	<0.128
Vanadium	ug/L	<0.899	<0.899	<0.899	<0.991	<0.991	<0.991	<0.991	1.20 U*	<0.899	1.45 U*	<0.899
Zinc	ug/L	<3.22	<3.22	<3.22	3.33 U*	4.25 U*	4.42 U*	<3.22	<3.22	<3.22	<3.22	<3.22
Anions												
Chloride	mg/L	1.46	1.16	1.18	1.08	1.10	0.979 J	1.13	1.58	1.56	3.21	1.56
Fluoride	mg/L	0.0320 J	0.0465 J	0.0430 J	0.0622 J	0.0629 J	0.0649 J	0.0620 J	0.0499 J	0.0456 J	0.0589 J	0.0481 J
Sulfate	mg/L	12.4	12.1	12.3	5.42	5.53	2.56	5.31	12.6	12.5	18.6	12.4
Radiological												
Radium-226	pCi/L	0.0691 +/-(0.0672) U	-0.0123 +/-(0.0350) U	0.00875 +/-(0.0578) U	-0.0300 +/-(0.112) UJ	-0.122 +/-(0.127) UJ	0.0286 +/-(0.123) UJ	0.0787 +/-(0.151) UJ	0.0413 +/-(0.0553) U	0.0473 +/-(0.0637) U	0.0628 +/-(0.0690) U	0.0700 +/-(0.0743) U
Radium-228	pCi/L	0.159 +/-(0.314) U	0.0578 +/-(0.211) U	-0.0704 +/-(0.191) U	0.0490 +/-(0.311) U	0.146 +/-(0.308) U	0.0956 +/-(0.322) U	0.0382 +/-(0.314) U	-0.0545 +/-(0.216) UJ	0.354 +/-(0.259) UJ	0.0517 +/-(0.244) UJ	0.0303 +/-(0.233) UJ
Radium-226+228	pCi/L	0.229 +/-(0.321) U	0.0578 +/-(0.214) U	0.00875 +/-(0.200) U	0.0490 +/-(0.331) UJ	0.146 +/-(0.333) UJ	0.124 +/-(0.345) UJ	0.117 +/-(0.348) UJ	0.0413 +/-(0.223) UJ	0.401 +/-(0.267) UJ	0.114 +/-(0.254) UJ	0.100 +/-(0.245) UJ
General Chemistry												
Hardness (as CaCO3)	mg/L	114	109	109	130	133	138	129	104	101	131	109
Total Dissolved Solids	mg/L	148	146	139	162	147	147	139	137	139	163	137
Total Suspended Solids	mg/L	2.00	3.20	3.10	3.60	3.10	4.70	3.00	3.60	3.40	3.30	3.60

See last page for notes.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transect Location ID		STR-PB04				STR-PB05			STR-PB06		STR-PB07	
Sample Date		18-Jul-19	18-Jul-19	18-Jul-19	18-Jul-19	5-Feb-19	18-Jul-19	18-Jul-19	4-Feb-19	18-Jul-19	4-Feb-19	18-Jul-19
Sample ID		JSF-STR-PB04-LB-MID-20190718	JSF-STR-PB04-CC-SUR-20190718	JSF-STR-PB04-CC-BOT-20190718	JSF-STR-PB04-RB-MID-20190718	JSF-STR-PB05-CC-SUR-20190205	JSF-STR-PB05-CC-SUR-20190718	JSF-STR-PB05-CC-BOT-20190718	JSF-STR-PB06-CC-SUR-20190204	JSF-STR-PB06-CC-SUR-20190718	JSF-STR-PB07-CC-SUR-20190204	JSF-STR-PB07-CC-SUR-20190718
Parent Sample ID												
Sample Depth		0.3 m	0.5 m	2.2 m	0.3 m	1 m	0.3 m	1.3 m	0.1 m	0.1 m	0.1 m	0.1 m
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	Normal Environmental Sample	Normal Environmental Sample
Level of Review[1]	Units	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Validated	Final-Verified	Validated
Total Metals												
Antimony	ug/L	0.533 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	1.02	0.849 J	0.956 J	1.11	0.610 J	0.807 J	0.890 J	0.449 J	2.48	0.493 J	3.75
Barium	ug/L	24.5	25.0	53.2	25.3	20.7	23.2	23.7	23.3	24.7	23.0	30.8
Beryllium	ug/L	<0.182	<0.182	<0.182	<0.182	<0.155	<0.182	<0.182	<0.155	<0.182	<0.155	<0.182
Boron	ug/L	59.9 J	<38.6	<38.6	44.6 J	<30.3	<38.6	<38.6	<30.3	43.8 J	34.1 J	50.5 J
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	46,400	47,000	45,400	47,200	40,600	44,100	46,000	42,200	48,700	43,100	46,300
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	0.150 J	0.0990 J	0.131 J	0.135 J	0.123 J	<0.0750	<0.0750	0.233 J	0.271 U*	0.209 J	0.350 U*
Copper	ug/L	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	1.61 J	<0.627	0.649 J	<0.627
Iron	ug/L	447	191	760	585	182	78.6	161	174	301	155	261
Lead	ug/L	0.131 J	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	0.210 J	<0.128	0.195 J
Lithium	ug/L	<3.39	<3.39	<3.39	<3.39	<3.14	<3.39	<3.39	<3.14	<3.39	<3.14	<3.39
Magnesium	ug/L	4,330	4,340	4,110	4,470	3,470	4,340	4,480	4,310	5,470	4,480	6,020
Manganese	ug/L	56.9	132	364	122	182	57.4	177	174	529	129	1,230
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	1.74 J
Nickel	ug/L	<0.336	<0.336	<0.336	<0.336	<0.312	<0.336	<0.336	3.05	0.761 J	0.431 J	0.749 J
Selenium	ug/L	<1.51	<1.51	<1.51	<1.51	<2.62	<1.51	<1.51	<2.62	<1.51	<2.62	<1.51
Silver	ug/L	<0.177	<0.177	<0.177	<0.177	<0.121	<0.177	<0.177	<0.121	<0.177	<0.121	<0.177
Thallium	ug/L	0.238 J	<0.148	<0.148	<0.148	<0.128	<0.148	<0.148	<0.128	<0.148	<0.128	<0.148
Vanadium	ug/L	<0.991	<0.991	<0.991	<0.991	1.70 U*	<0.991	<0.991	<0.899	<0.991	<0.899	<0.991
Zinc	ug/L	<3.22	<3.22	5.30 U*	3.28 U*	<3.22	3.44 U*	3.88 U*	<3.22	3.80 U*	<3.22	4.66 U*
Dissolved Metals												
Antimony	ug/L	0.424 J	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	0.844 J	0.949 J	0.845 J	0.972 J	0.498 J	0.674 J	0.739 J	0.551 J	2.16	0.498 J	3.28
Barium	ug/L	23.6	22.9	24.8	23.0	17.1 U*	21.8	23.2	26.6	22.3	21.1	30.0
Beryllium	ug/L	<0.182	<0.182	<0.182	<0.182	<0.155	<0.182	<0.182	<0.155	<0.182	<0.155	<0.182
Boron	ug/L	44.4 J	<38.6	<38.6	<38.6	<30.3	<38.6	<38.6	33.4 J	44.8 J	35.0 J	51.7 J
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	47,600	44,800	46,100	45,000	39,900	44,600	45,300	42,800	46,900	44,000	46,400
Chromium	ug/L	1.56 U*	2.45 U*	<1.53	2.48 U*	<1.53	<1.53	<1.53	2.08	<1.53	<1.53	<1.53
Cobalt	ug/L	0.102 J	<0.0750	0.122 J	0.103 J	0.126 J	<0.0750	<0.0750	0.195 J	0.140 U*	0.161 J	0.185 U*
Copper	ug/L	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	<0.627	0.830 J	<0.627	0.635 J	<0.627
Iron	ug/L	<19.5	<19.5	125	99.8	68.6	25.4 J	22.2 J	88.8	21.4 J	84.1	71.9
Lead	ug/L	<0.128	<0.128	<0.128	<0.128	<0.128	<0.128	0.163 J	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	<3.39	<3.39	<3.39	<3.39	<3.14	<3.39	<3.39	<3.14	<3.39	<3.14	<3.39
Magnesium	ug/L	4,510	4,100	4,140	4,260	3,660	4,400	4,440	4,440	5,260	4,560	6,090
Manganese	ug/L	27.1	4.83 J	312	66.1	118	3.28 J	35.1	131	391	96.5	1,070
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	<0.610	1.65 J
Nickel	ug/L	<0.336	<0.336	<0.336	<0.336	<0.312	<0.336	0.555 J	0.429 U*	0.475 J	0.416 U*	0.509 J
Selenium	ug/L	<1.51	<1.51	<1.51	<1.51	<2.62	<1.51	<1.51	<2.62	<1.51	<2.62	<1.51
Silver	ug/L	<0.177	<0.177	<0.177	<0.177	<0.121	<0.177	<0.177	<0.121	<0.177	<0.121	<0.177
Thallium	ug/L	<0.148	<0.148	<0.148	<0.148	<0.128	<0.148	<0.148	<0.128	<0.148	<0.128	<0.148
Vanadium	ug/L	<0.991	<0.991	<0.991	<0.991	1.15 U*	<0.991	<0.991	1.35 U*	<0.991	0.935 U*	<0.991
Zinc	ug/L	<3.22	<3.22	4.86 U*	<3.22	<3.22	<3.22	<3.22	5.07 U*	<3.22	<3.22	<3.22
Anions												
Chloride	mg/L	1.16	1.14	1.01	1.26	1.96	1.22	1.19	1.97	1.58	2.18	1.43
Fluoride	mg/L	0.0637 J	0.0674 J	0.0606 J	0.0648 J	0.0554 J	0.0632 J	0.0629 J	0.0687 J	0.0779 J	0.0748 J	0.0784 J
Sulfate	mg/L	6.16	6.03	4.66	6.04	15.8	5.96	6.10	20.4	9.44	21.9	11.8
Radiological												
Radium-226	pCi/L	0.150 +/-(0.143) UJ	-0.0140 +/-(0.128) UJ	-0.0494 +/-(0.0624) UJ	-0.155 +/-(0.115) UJ	0.0248 +/-(0.0571) U	-0.119 +/-(0.107) UJ	0.158 +/-(0.0996)J	0.0798 +/-(0.130) U	-0.0112 +/-(0.0652) U	0.112 +/-(0.149) U	-0.122 +/-(0.158) U
Radium-228	pCi/L	0.0608 +/-(0.238) U	0.0328 +/-(0.234) U	0.0710 +/-(0.240) U	-0.0432 +/-(0.252) U	0.322 +/-(0.269) UJ	-0.152 +/-(0.211) U	-0.0973 +/-(0.261) U	0.306 +/-(0.255) U	0.0653 +/-(0.274) U	0.115 +/-(0.252) U	0.224 +/-(0.383) U
Radium-226+228	pCi/L	0.211 +/-(0.278) UJ	0.0328 +/-(0.267) UJ	0.0710 +/-(0.248) UJ	0.000 +/-(0.277) UJ	0.347 +/-(0.275) UJ	0.000 +/-(0.237) UJ	0.158 +/-(0.279)J	0.386 +/-(0.286) U	0.0653 +/-(0.282) U	0.227 +/-(0.293) U	0.224 +/-(0.414) U
General Chemistry												
Hardness (as CaCO3)	mg/L	134	135	130	136	116	128	133	123 J	144	126 J	140
Total Dissolved Solids	mg/L	165	153	150	154	115	167	132	144	177	158	169
Total Suspended Solids	mg/L	2.90	3.00	9.50	4.70	2.60	4.40	5.50	1.90	4.70	1.20	8.60

See last page for notes.

TABLE B.5 – Surface Stream Analytical Results
John Sevier Fossil Plant
February 2019 and July 2019

Transect Location ID		STR-PB08		STR-PB09	
Sample Date		4-Feb-19	18-Jul-19	4-Feb-19	18-Jul-19
Sample ID		JSF-STR-PB08-CC-SUR-20190204	JSF-STR-PB08-CC-SUR-20190718	JSF-STR-PB09-CC-SUR-20190204	JSF-STR-PB09-CC-SUR-20190718
Parent Sample ID					
Sample Depth		0.1 m	0.05 m	0.1 m	0.03 m
Sample Type		Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample
Level of Review[1]	Units	Final-Verified	Validated	Final-Verified	Validated
Total Metals					
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	0.628 J	3.10	0.823 J	3.44
Barium	ug/L	21.6	18.7	36.3	42.0
Beryllium	ug/L	<0.155	<0.182	<0.155	<0.182
Boron	ug/L	38.0 J	49.5 J	79.2 J	132
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	44,200	49,700	58,000	58,400
Chromium	ug/L	1.55 J	<1.53	<1.53	<1.53
Cobalt	ug/L	0.158 J	0.109 J	0.141 J	0.326 J
Copper	ug/L	0.804 J	<0.627	1.01 J	1.21 J
Iron	ug/L	138	52.3	128	549
Lead	ug/L	<0.128	<0.128	0.192 J	0.441 J
Lithium	ug/L	<3.14	<3.39	3.32 J	3.59 J
Magnesium	ug/L	4,690	7,180	6,630	7,050
Manganese	ug/L	74.2	145	32.9	78.5
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	0.680 J	2.95 U*	1.89 J	5.28 U*
Nickel	ug/L	0.434 J	0.515 J	0.696 J	0.697 J
Selenium	ug/L	<2.62	<1.51	<2.62	<1.51
Silver	ug/L	<0.121	<0.177	<0.121	<0.177
Thallium	ug/L	<0.128	<0.148	<0.128	<0.148
Vanadium	ug/L	1.20 U*	<0.991	1.06 U*	<0.991
Zinc	ug/L	<3.22	<3.22	13.1	4.81 U*
Dissolved Metals					
Antimony	ug/L	<0.378	<0.378	<0.378	<0.378
Arsenic	ug/L	0.516 J	3.21	0.986 J	2.74
Barium	ug/L	19.5	18.7	34.9	36.2
Beryllium	ug/L	<0.155	<0.182	<0.155	<0.182
Boron	ug/L	34.9 J	55.2 J	86.8	126
Cadmium	ug/L	<0.125	<0.125	<0.125	<0.125
Calcium	ug/L	42,200	51,400	59,000	57,700
Chromium	ug/L	<1.53	<1.53	<1.53	<1.53
Cobalt	ug/L	0.118 J	0.110 J	0.105 J	0.0780 J
Copper	ug/L	0.642 J	<0.627	<0.627	0.810 J
Iron	ug/L	69.5	<19.5	49.3 J	43.7 J
Lead	ug/L	<0.128	<0.128	<0.128	<0.128
Lithium	ug/L	<3.14	<3.39	3.49 J	<3.39
Magnesium	ug/L	4,520	7,460	6,710	6,930
Manganese	ug/L	38.8	106	24.5	22.2
Mercury	ug/L	<0.101	<0.101	<0.101	<0.101
Molybdenum	ug/L	0.637 J	3.05 U*	2.99 J	5.40 U*
Nickel	ug/L	0.385 U*	0.547 J	0.361 U*	0.520 J
Selenium	ug/L	<2.62	<1.51	<2.62	<1.51
Silver	ug/L	<0.121	<0.177	<0.121	<0.177
Thallium	ug/L	<0.128	<0.148	<0.128	<0.148
Vanadium	ug/L	0.970 U*	<0.991	1.01 U*	<0.991
Zinc	ug/L	4.59 U*	<3.22	<3.22	<3.22
Anions					
Chloride	mg/L	2.21	1.30	5.24	4.05
Fluoride	mg/L	0.0736 J	0.0859 J	0.0771 J	0.0900 J
Sulfate	mg/L	22.8	30.4	34.9	24.7
Radiological					
Radium-226	pCi/L	0.0474 +/-(0.0532) U	-0.0419 +/-(0.0564) U	0.0134 +/-(0.0483) U	0.160 +/-(0.184) U
Radium-228	pCi/L	0.172 +/-(0.284) U	0.310 +/-(0.273) U	0.227 +/-(0.240) U	0.217 +/-(0.327) U
Radium-226+228	pCi/L	0.220 +/-(0.289) U	0.310 +/-(0.279) U	0.240 +/-(0.245) U	0.376 +/-(0.375) U
General Chemistry					
Hardness (as CaCO3)	mg/L	130 J	154	172 J	175
Total Dissolved Solids	mg/L	146	183	203	216
Total Suspended Solids	mg/L	1.00	0.900	2.00	36.4

Notes:

<	analyte was not detected at a concentration greater than the laboratory reporting limit
ID	Identification
J	quantitation is approximate due to limitations identified during data validation
U*	result should be considered "not detected" because it was detected in an associated field or laboratory blank at a similar level
UJ	compound was not detected, but the reporting or detection limit should be considered estimated due to a bias identified during data validation.
m	meter
mg/L	milligrams per Liter
ug/L	micrograms per Liter

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

APPENDIX J.3

TECHNICAL EVALUATION OF SEDIMENT AND BENTHIC INVERTEBRATE DATA

Appendix J.3 – Technical Evaluation of Sediment and Benthic Macroinvertebrate Data

John Sevier Fossil Plant

Rogersville, Tennessee

Tennessee Valley Authority

TVA

Title and Approval Page

Title of Document: Appendix J.3 – Technical Evaluation of Sediment and Benthic Macroinvertebrate Data
John Sevier Fossil Plant
Tennessee Valley Authority
Rogersville, Tennessee

Prepared By: Tennessee Valley Authority

Effective Date: July 3, 2023 Revision: 1

Signature	Date
TVA Compliance Point of Contact	6/23/23
TVA Technical Point of Contact	6/23/23
TVA Limnologist, Fisheries & Aquatic Monitoring	6/21/23
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TVA

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Acronyms and Abbreviations

ATL	Alternate Thermal Limit
BIP	Balanced Indigenous Population
CBR	Critical Body Residue
CARA	Corrective Action/Risk Assessment
CCR	Coal Combustion Residuals
CCR Parameters	Constituents listed in Appendices III and IV of 40 CFR 257 and five inorganic constituents included in Appendix I of Tennessee Rule 0400-11-01-.04
CCR Rule	Title 40, Code of Federal Regulations, Part 257
CFR	Code of Federal Regulations
CWA	Clean Water Act
EAR	Environmental Assessment Report
EI	Environmental Investigation
EIP	Environmental Investigation Plan
EPT	Ephemeroptera, Plecoptera and Trichoptera
ESV	Ecological Screening Value
HBI	Hilsenhoff Biotic Index
JCC Plant	John Sevier Combined Cycle Plant
JSF Plant	John Sevier Fossil Plant
LOAEL	Lowest Observed Adverse Effect Level
mg/kg	Milligram per kilogram
NOAEL	No Observed Adverse Effect Level
NPDES	National Pollutant Discharge Elimination System
%	Percent
PLM	Polarized Light Microscopy
RBI	Reservoir Benthic Index
SAP	Sampling and Analysis Plan
SAR	Sampling and Analysis Report
TDEC	Tennessee Department of Environment and Conservation
TDEC Order	Commissioner’s Order No. OGC15-0177
TTR	Total Taxa Richness
TVA	Tennessee Valley Authority
USEPA	United States Environmental Protection Agency

Chapter 1 Introduction

The Tennessee Valley Authority (TVA) has prepared this technical evaluation appendix to summarize historical and recent sediment, benthic macroinvertebrate, and mayfly sampling data at TVA's John Sevier Fossil Plant (JSF Plant) in Rogersville, Tennessee. This technical appendix provides a detailed evaluation of these data to support information provided in the Environmental Assessment Report (EAR) to fulfill the requirements for the Tennessee Department of Environment and Conservation-issued Commissioner's Order No. OGC15-0177 (TDEC Order) Program (TDEC 2015).

Chapter 2 Sediment, Benthic Macroinvertebrates, and Mayfly Investigation

The purposes of the sediment and benthic macroinvertebrate investigations were to characterize concentrations of Coal Combustion Residuals (CCR)-related constituents in sediments and mayfly (*Hexagenia* spp.) tissues and to evaluate potential ecological impacts through multi-metric analysis of benthic macroinvertebrate community composition in the vicinity of the CCR management units at the JSF Plant.

Benthic macroinvertebrates are aquatic organisms that live in and on riverbed substrates, are relatively immobile, and are an important part of the local food chain. Because benthic macroinvertebrates are relatively immobile and have been shown to be sensitive to environmental stressors, they serve as indicators of changes in the environment. Therefore, sediment (i.e., benthic habitat) and benthic macroinvertebrate assessments are effective in characterizing spatial differences in potential impacts of CCR material in surface streams on or adjacent to the JSF Plant CCR management units.

For this investigation, TVA reviewed historical sediment and benthic macroinvertebrate studies in streams and rivers adjacent to the JSF Plant. In addition, the recent TDEC Order Environmental Investigation (EI) included collecting benthic macroinvertebrate samples to assess community composition and representative biological integrity, and sediment samples for laboratory chemistry analysis. Since the previous studies did not include benthic macroinvertebrate bioaccumulation analysis, TVA collected and analyzed mayfly larvae for evaluation of bioaccumulation of CCR constituents.

The following chapters summarize the previous studies and present overall sediment, benthic macroinvertebrate and mayfly investigation and evaluation findings based on data obtained during previous studies and the EI for the JSF Plant.

2.1 Historical Studies

Historically, TVA has conducted biological assessments by periodically monitoring aquatic communities (fish and benthic macroinvertebrates) near the JSF Plant to evaluate their status upstream and downstream of the plant's thermal discharge. This monitoring is conducted to support continuance of the JSF Plant (and later the John Sevier Combined Cycle Plant [JCC Plant]) Alternate Thermal Limit (ATL) for the thermal discharge established under the National Pollutant Discharge Elimination System (NPDES) permit for the facility (NPDES Permit No. TN0005436). Renewal of the permit is based on successful demonstration, in accordance with Section 316(a)[1] of the federal Clean Water Act (CWA), that a balanced indigenous population (BIP[2]) of fish and wildlife is present and being maintained in the Holston River (Cherokee Reservoir) downstream of the plant. The primary focus of the biological assessments conducted by TVA in accordance with the CWA consisted of collecting and analyzing biological data on fish (Appendix J.5) and benthic macroinvertebrate communities to characterize the compositions of those communities upstream and downstream of the JSF Plant.

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[1] Section 316(a) of the CWA authorizes ATLs for the control of the thermal component of a point source discharge so long as the NPDES permit ATLs assure the protection of a BIP of aquatic life.

[2] USEPA 40 C.F.R. § 125.71(c) (2021).

Historical sediment sampling information and benthic macroinvertebrate assessments are summarized in Chapters 2.1.1 and 2.1.2 below, respectively.

2.1.1 Historical Sediment Studies

Historical sediment sampling for CCR constituents has not been conducted in the Holston River adjacent to the JSF Plant.

2.1.2 Historical Benthic Macroinvertebrate Studies

Between 1973 and 1981, biological studies were performed to evaluate potential aquatic environmental effects of thermal discharge at the JSF Plant. These evaluations were performed to demonstrate compliance with the CWA Sections 316(a) and 316(b) and to establish ATL for the thermal discharge as part of JSF Plant NPDES permit renewals (TVA 1977, 1979a, 1979b, and 1984). These studies included measurement of water quality parameters and evaluated the impacts of the thermal discharge at the JSF Plant on phytoplankton, zooplankton, periphyton, benthic macroinvertebrates, and fish at Holston River locations upstream of, adjacent to, and downstream of the JSF Plant. TVA (1977) documented occasional near-field effects on phytoplankton, zooplankton, and periphyton communities. The specific stress mechanism(s) were not determined; however, thermal discharge or direct influence of chlorine products may have affected the periphyton community. TVA (1979a) determined that neither the thermal discharge at the JSF Plant nor the John Sevier Detention Dam affected Holston River/Cherokee Reservoir plankton. Additionally, the studies found that while control site and experimental station benthic macroinvertebrate communities were different, and downstream communities within Cherokee Reservoir (HRM 82.0, approximately 24 miles downstream) were highly stressed (low taxa richness and typically composed only of oligochaetes and chironomids), the study results did not show a direct correlation of these factors with JSF Plant thermal discharges, and it was not possible to separate possible thermal discharge effects from other variables.

Pre- and post-operational biological monitoring studies of the Holston River were performed in summer and autumn 2011 and 2012, respectively, to determine if the ATLs established for the JCC Plant's thermal discharge under the CWA Section 316(a) were protective of aquatic life BIP (TVA 2013a and 2013b). Biological monitoring was also conducted for this purpose in the direct vicinity of the JSF Plant in autumn 2011, as well (TVA 2012). Samples were collected at Holston River transects upstream and downstream from the John Sevier detention dam and JSF and JCC Plants to evaluate fish, benthic macroinvertebrate, plankton, and shoreline wildlife communities; shoreline aquatic and river bottom habitats; thermal discharge intensity and extent; and water quality parameters. The resulting aquatic community data were evaluated using community characteristics/metrics and statistical diversity comparisons. This included the use of seven benthic macroinvertebrate community metrics comprising the Reservoir Benthic Index (RBI) described in Chapter 3.2 of this Appendix. TVA indicated that comparisons between sampling sites were difficult due to differences in river flows, depths, and substrate types; the John Sevier detention dam results in more reservoir-like (lacustrine) upstream conditions while downstream conditions are more riverine (TVA 2012, 2013a, and 2013b). These studies found that downstream aquatic communities near the JSF and JCC Plants were ecologically similar to the upstream control sites. As such, TVA concluded that thermal effluent from the JSF Plant was not adversely affecting downstream biological communities, and water quality was satisfactory for supporting aquatic life.

2.1.3 Historical Mayfly Tissue Studies

Mayfly collections during previous studies were limited to samples collected as part of the overall benthic community RBI sampling. Mayflies were not historically collected for bioaccumulation analysis of CCR constituents.

2.2 TDEC Order Investigation Activities

The objectives of the TDEC Order benthic investigation were to characterize sediment chemistry, benthic macroinvertebrate community composition, and benthic macroinvertebrate bioaccumulation in surface streams in proximity to the JSF Plant CCR management units to evaluate if CCR material and/or dissolved CCR constituents have moved into surface water, potentially impacting aquatic life. TVA performed EI sample collection activities in two waterbodies proximate to the JSF Plant, the Holston River and Polly Branch. The EI activities were conducted in general accordance with the *Environmental Investigation Plan (EIP)* (TVA 2018), *Benthic Sampling and Analysis Plan (SAP)* (Stantec 2018), and *Quality Assurance Project Plan* (Environmental Standards 2018), including TVA- and TDEC-approved programmatic and project-specific changes made after approval of the EIP. Descriptions of sample location selection, collection methodologies, analyses, and Quality Assurance/Quality Control for the benthic investigation are provided in the *Benthic Sampling and Analysis Report (SAR)* (Appendix J.4).

The scope of the EI sampling activities is described below.

<u>Sediment</u>

During December 2018 and April 2019, sediment samples were collected from transects along the Holston River (HR01 through HR09) and from transects (PB03 and PB04) and center-channel single points (PB01, PB02, and PB05 through PB09) in Polly Branch. Attempts were made to collect sediment samples from the left descending bank, center channel, and the right descending bank at each transect, however sufficient sediment for sample collection was not encountered at any of the center channel locations in the Holston River. Refer to Exhibit J.3-1 for the sample locations. Surface sediment samples (depths of 0-0.5 feet) were collected from each of the sampling points, except as shown on Exhibit J.3-1. Deeper sediment intervals (up to about 2.5 feet) were sampled where more sediment accumulation was present.

Due to a documented source of mercury upstream of the JSF Plant CCR management units, sediment sample transects on the Holston River upstream from the JSF Plant detention dam were not included in the proposed sampling locations in the Benthic SAP. The Saltville Waste Disposal Ponds Superfund (Saltville) site located along the North Fork of the Holston River in Smyth County, Virginia was reported to be a source of mercury associated with the historical production of chlorine gas at the site released to surface water during routine operations and via spills (USEPA 2017). A search of the National Inventory of Dams indicated that there are no dams present between the Saltville site and the JSF Plant.

<u>Benthic Macroinvertebrates</u>

Benthic macroinvertebrate sampling was conducted within the Holston River for the TDEC Order EI, as shown on Exhibits J.3-2 and J.3-2a. The Holston River was sampled at eleven transect locations: two upstream control locations, six adjacent to the JSF Plant, and three downstream of the JSF Plant. Polly Branch was not sampled for benthic macroinvertebrates due to local habitat conditions, the small size of the channel, and the lack of upstream reaches to establish a control location.

Sampling was performed on October 1-3, 2019, along the transects, each composed of five samples/grabs, using a Ponar dredge sampling device, as described in the SAR (Appendix J.4). Results for each of the five grab samples from each transect were composited to minimize the effects of intra-transect habitat heterogeneity and to capture a comprehensive cross-section of the community (as discussed in Chapter 3.2.1).

Mayfly Tissue

For the TDEC Order EI, mayfly tissue samples were collected in September 2019 from four areas (reaches) of the Holston River: one upstream, two adjacent, and one downstream relative to the CCR management units. The sample reaches are shown on Exhibit J.3-3. Mayfly samples were not collected from the Polly Branch because of physical habitat limitations in Polly Branch that may constrain mayfly populations.

Chapter 3 Results and Discussion

Data from the EI were collected from locations along sample transects from the two waterbodies proximate to the JSF Plant. The results of the sample analyses and evaluation are discussed in the Chapters below.

TDEC-approved acute and chronic Ecological Screening Values (ESVs) for the EAR (Table 1-3 and Appendix A.2) were used to evaluate whether identified CCR constituent concentrations in sediment samples may be indicative of potential impacts to aquatic life. Acute ESVs are concentrations of CCR Parameters that are protective of aquatic organisms for short-term exposure (typically a period of days), and chronic ESVs are protective of aquatic organisms for long-term exposure (typically the duration of an entire life cycle, although this can vary by species).

The EAR screening levels are generic (not specific to an individual ecological receptor) and are protective of ecological health. Most screening levels are not regulatory standards and are conservatively based on published health studies. Concentrations above the screening level do not necessarily mean that an adverse health effect is occurring, but rather that further evaluation is required in the Corrective Action/Risk Assessment (CARA) Plan to determine if an unacceptable risk exists, and corrective action is required.

Statistical evaluation of the EI sediment and mayfly tissue data for the JSF Plant is presented in Appendices E.5 and E.6, respectively, and benthic macroinvertebrate community data are further evaluated in Attachment J.3-A of this appendix. This appendix summarizes the results of these evaluations relative to the objective of the sediment and benthic macroinvertebrate community investigations.

3.1 Sediment

A total of 31 shallow sediment samples (18 from the Holston River and 13 from Polly Branch), eight deeper sediment samples (from Polly Branch), and two duplicate samples (one from the Holston River and one from Polly Branch) were collected from the water bodies proximal to the JSF Plant, as described in Chapter 2.2. Both the shallow and deeper sediment samples collected were analyzed for percent (%) ash. The shallow sediment samples were analyzed by an accredited laboratory for the following CCR-related constituents, hereafter referred to collectively as “CCR Parameters,” and the deeper sediments were retained for later analysis if required.

- CCR Rule Appendix III Constituents including: boron, calcium, chloride, fluoride, pH, and sulfate
- CCR Rule Appendix IV Constituents including: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, selenium, thallium, and radium 226/228
- Tennessee Rule 0400-11-01-.04, Appendix 1 Inorganic Constituents including: copper, nickel, silver, vanadium, and zinc
- Strontium.

The sediment sample results compared to acute and chronic ESVs are provided in Table J.3-1. Using the methods described above and in Appendix E.5, there were no statistical outliers identified in the sediment data collected at the JSF Plant.

3.1.1 Exploratory Data Analysis

Based on the phased approach proposed in the *Benthic SAP*, the 31 shallow sediment samples, eight deeper sediment samples, and two duplicate samples were analyzed using Polarized Light Microscopy (PLM) for percent ash. The 31 sediment samples collected from the upper six inches at each location and the two duplicate samples were also analyzed for the CCR Parameters as part of Phase 1. The eight deeper sediment samples collected for the analysis of CCR Parameters were retained for possible future analysis pending the results of the PLM analysis. None of the PLM results for sediment samples collected from the Holston River and Polly Branch were above the 20 percent (%) ash threshold defined for the EAR (Table 1-3 and Appendix A.2) that would trigger additional analyses; therefore, Phase 2 sampling was not required.

The Phase 1 exploratory data analysis (Appendix E.5) showed that none of the CCR Parameters were present at concentrations above the TDEC-approved acute ESVs. Concentrations of six CCR Parameters were above the chronic ESVs for one or more locations, as discussed below. Concentrations of the remaining CCR Parameters were below their respective chronic and acute ESVs in the Phase 1 sediment samples. Refer to Table J.3-1 for a summary of the sediment analytical results and associated ESVs. Additional information regarding the procedures used for the exploratory data analysis for the CUF Plant sediment investigation is provided in Appendix E.5. Below is a summary of the sample locations and CCR Parameters that were detected at concentrations above their respective ESVs:

- One copper concentration was reported above the chronic ESV in one sample collected from a location downstream of the JSF Plant in the Holston River. Copper concentrations were below the chronic and acute ESVs in the remaining 30 shallow sediment samples and two duplicate samples analyzed for the CCR Parameters.
- Mercury concentrations were reported above the chronic ESV in one sample collected from an adjacent location and four samples collected from locations downstream of the JSF Plant in the Holston River. Mercury concentrations were below the chronic and acute ESVs in the remaining 26 shallow sediment samples and two duplicate samples analyzed for the CCR Parameters. There is a documented source of mercury contamination to the Holston River upstream of the JSF Plant (USEPA 2017).
- A zinc concentration was reported at a value equal to the chronic ESV in one sample collected from a location downstream of the JSF Plant in the Holston River. Zinc concentrations were below the chronic and acute ESVs in the remaining 30 shallow sediment samples and two duplicate samples analyzed for the CCR Parameters.
- Arsenic concentrations were reported above the chronic ESV in two samples collected from adjacent locations in Polly Branch. Arsenic concentrations were below the chronic and acute ESVs in the remaining 29 shallow sediment samples and two duplicate samples analyzed for the CCR Parameters.
- Beryllium concentrations were reported above the chronic ESV in two samples collected from adjacent locations in Polly Branch. Beryllium concentrations were below the chronic and acute ESVs in the remaining 29 shallow sediment samples and two duplicate samples analyzed for the CCR Parameters.
- One nickel concentration was reported above the chronic ESV in one sample collected from an adjacent location in Polly Branch. Nickel concentrations were below the chronic and acute ESVs in the remaining 30 shallow sediment samples and two duplicate samples analyzed for the CCR Parameters.

3.2 Benthic Macroinvertebrate Community Analysis

Benthic macroinvertebrates are aquatic organisms that live in and on riverbed substrates, are relatively immobile, and are an important part of the local food chain. Because benthic macroinvertebrates are relatively immobile and have been shown to be sensitive to environmental stressors, they serve as indicators of spatial changes in the environment. Therefore, sediment (i.e., benthic habitat) and benthic macroinvertebrate assessments are effective in characterizing potential impacts to surface streams where these communities may exist in proximity to the JSF Plant CCR management units.

A benthic macroinvertebrate community assessment uses various aspects of community structure, indicator taxa presence and relative abundance, composition, richness, and sensitivity metrics based on laboratory processed macroinvertebrate sample results (Chapter 3.2.1). The objective of community analysis is to characterize biological integrity as a reflection of the cumulative effects of water quality, habitat quality and availability, changes in flow regime and other possible stressors as they influence community composition. This community-based evaluation does not use ESVs to directly evaluate potential biological impacts above or below a set threshold. Instead, it relies on a representative cross-section of supported taxa and interpretation of comparative results where upstream communities represent control conditions, and adjacent and downstream communities are compared against those controls to evaluate apparent differences.

Multi-metric analyses are used to quantify these differences and evaluate the presence and magnitude of environmental stressors and, ultimately, to determine whether degradation has occurred. Degradation observable in community data does not necessarily indicate potential impacts from JSF Plant CCR management units. If present, the degree of degradation at adjacent and downstream sampling stations may indicate that further evaluation of potential impacts using multiple lines of evidence (i.e., results of surface stream sampling, benthic sediment sampling, and mayfly and fish tissue analyses) are necessary, as discussed in Chapter 7.0 of the EAR.

3.2.1 Metric Computations

Benthic macroinvertebrate samples were processed by a qualified laboratory to generate complete taxa lists and individual taxon counts for each sampling location. These community composition data were then used to calculate RBI and supplemental metrics for comparative analysis of conditions upstream, adjacent, and downstream of the JSF Plant within the Holston River.

Past practice has been that the multi-metric RBI was applied by treating the five Ponar grabs along each transect as individual samples, with metric values subsequently averaged to represent localized conditions. The representativeness and robustness of the RBI was improved for this investigation by compositing the laboratory results from the five Ponar grabs to generate a comprehensive taxa list for each transect prior to calculating RBI outcomes. This approach captures a more complete cross-section of the benthic community and minimizes the influence of physical habitat heterogeneity in the various zones along the transect. Habitat differences in these zones may affect metric outcomes if treated as separate samples. By minimizing localized habitat constraints, the analysis should provide a more accurate reflection of water quality conditions. Given the adjustment to methods, the results presented herein are suitable for spatial relationship comparative evaluation, but they should not be directly compared to RBI scores or descriptive rating categories from historical studies. Should that comparison be needed, the raw data are available to use with the past RBI calculation practice.

A suite of metrics was applied to raw benthic macroinvertebrate taxa lists and counts for each study transect, as provided in Benthic Community Summary Sheets in Attachment J.3-A. For the purposes of the EAR, this discussion focuses on the RBI multi-metric total scores and associated ratings to draw spatial comparisons, should their results provide corroborative or otherwise auxiliary information relative to the findings of the RBI. Individual component metrics and supplemental metrics are highlighted and discussed in Chapter 3.2.1.1 and Chapter 3.2.1.2**.**

Reservoir Benthic Index (RBI)

The RBI was developed by TVA in support of Section 316(a) biological monitoring requirements to be representative of river-to-reservoir transition areas and has been applied to EIP sampling to characterize overall biological integrity surrounding the JSF Plant. The RBI methodology uses seven metrics that represent different benthic community characteristics. Results for each metric are assigned a weighted score of 1, 3, or 5 based on established and TDEC-approved categorical value ranges (TVA 2012, Table 2). The seven weighted scores are then summed to produce an RBI total score that characterizes the condition of the benthic community in a range from “Very Poor” to “Excellent”.

The seven-component metrics of the RBI are based on genus-level taxonomy and include:

1. Total Taxa Richness (TTR) – The total number of different genera (or next lowest practicable level of taxonomy) identified within the sample
2. Ephemeroptera, Plecoptera, and Trichoptera (EPT) Richness – The total number of different mayfly (Ephemeroptera), stonefly (Plecoptera), and caddisfly (Trichoptera) genera identified within the sample
3. Percent Grabs Containing Long-lived Organisms – Calculated from the raw laboratory data, in which the five grabs from each transect are treated as separate samples. Long-lived organisms, for the purpose of this metric, include Asiatic clams (*Corbicula fluminea*), giant burrowing mayflies (*Hexagenia* spp.), mussels (Unionidae and Dreissenidae), and snails (Gastropoda). A grab is considered “containing long-lived organisms” if one or more individuals from any of these assemblages is identified.
4. Percent Oligochaeta – The proportion of aquatic worms from the major group Oligochaeta in the sample
5. Percent Top Two Dominant Taxa – The proportion of the sample comprised by the two most abundant genera
6. Total Abundance Less Chironomidae and Oligochaeta – The total count of organisms in the sample, excluding midges (Chironomidae) and aquatic worms belonging to the major group Oligochaeta
7. Percent Grabs Containing No Organisms – Calculated from the raw laboratory data in which the five grabs from each transect are treated as separate samples, the proportion of the five Ponar grab samples that did not contain any benthic macroinvertebrates.

As provided in the TVA report, *Biological Monitoring of the Holston River near John Sevier Fossil Plant and Combined Cycle/Combustion Turbine Plant Discharges, Summer and Autumn 2011* (TVA 2012), the following categorical ratings correspond to total score ranges summed from weighted component metric scores:

- Excellent (30-35)
- Good (24-29)

- Fair (19-23)
- Poor (13-18)
- Very Poor (7-12)

Supplemental Metrics

Four additional metrics supplemental to the RBI were also included in this analysis as stand-alone indicators of biological conditions. The following supplemental metrics were applied to samples from the Holston River:

1. Hilsenhoff Biotic Index (HBI) – An index that measures community sensitivity to environmental stress, based on Tennessee-specific tolerance values assigned to individual taxa and their relative abundances. Tolerance values were provided from Appendix C-3 of the TDEC Division of Water Resources *Quality System Standard Operating Procedure for Macroinvertebrate Stream Surveys* (TDEC 2017). These values are consistent with North Carolina state tolerance values adopted for use in Tennessee. The HBI is calculated using the following equation:

$$\text{HBI} = \sum_{i=1}^{S} \frac{x_i t_i}{n}$$

x_i = number of individuals in taxon

t_i = tolerance value of taxon

n = total abundance of sample

S = total number of taxa

HBI scores fall into seven categorical ratings that reflect ecological conditions designed for use in wadable streams. While these categories may not be accurately descriptive of conditions in reservoir-associated systems, such as the Holston River, the value ranges in each category are shown in the exhibits referenced in forthcoming chapters to help evaluate meaningful differences during comparative analysis. Categorical titles, as listed below, have not been labeled or discussed for the exhibits referenced in Chapter 3.2.1.2, as they do not accurately describe conditions for this application. The score ranges within each category remain applicable, however, having been established based on rigorous empirical data and statistical analyses in the development of the HBI model to represent significant differences in community sensitivity (Hilsenhoff 1987). The HBI categories are as follows:

- Excellent (0.00-3.50)
- Very Good (3.51-4.50)
- Good (4.51-5.50)
- Fair (5.51-6.50)
- Fairly Poor (6.51-7.5)

- Poor (7.51-8.50)
- Very Poor (8.51-10.00).

2. Intolerant Taxa Richness – The number of different taxa with assigned tolerance values less than or equal to 3.0
3. Percent Tolerant Taxa – The proportion of organisms in a sample with assigned tolerance values greater than 3.0
4. Percent EPT-H – The proportion of mayflies, stoneflies, and caddisflies represented in the sample, less the caddisfly family Hydropsychidae.

Additionally, functional feeding groups were assigned to each taxon, and community distributions were calculated as relative abundance (%). Taxa lists, the metrics described above, and feeding group distributions are included on benthic community summary sheets in Attachment J.3-A along with a summary table of feeding group distributions across the monitoring locations.

The following subsections summarize the results of the RBI applied to the Holston River. Additionally, relationships among sampling location results observed in TTR and the HBI are also presented. Complete taxa lists, counts, metric results, and functional feeding group distributions are included in the Benthic Community Summary Sheets in Attachment J.3-A.

3.2.1.1 Reservoir Benthic Index (RBI) Results

Holston River

Figure J.3-1 presents the RBI Total Scores and associated categorical ratings from the October 2019 (Low Pool) macroinvertebrate survey on the Holston River. The weighted combination of multiple indicator metrics to derive the RBI values provides a comprehensive representation of overall biological integrity for streamlined spatial comparisons across transects.

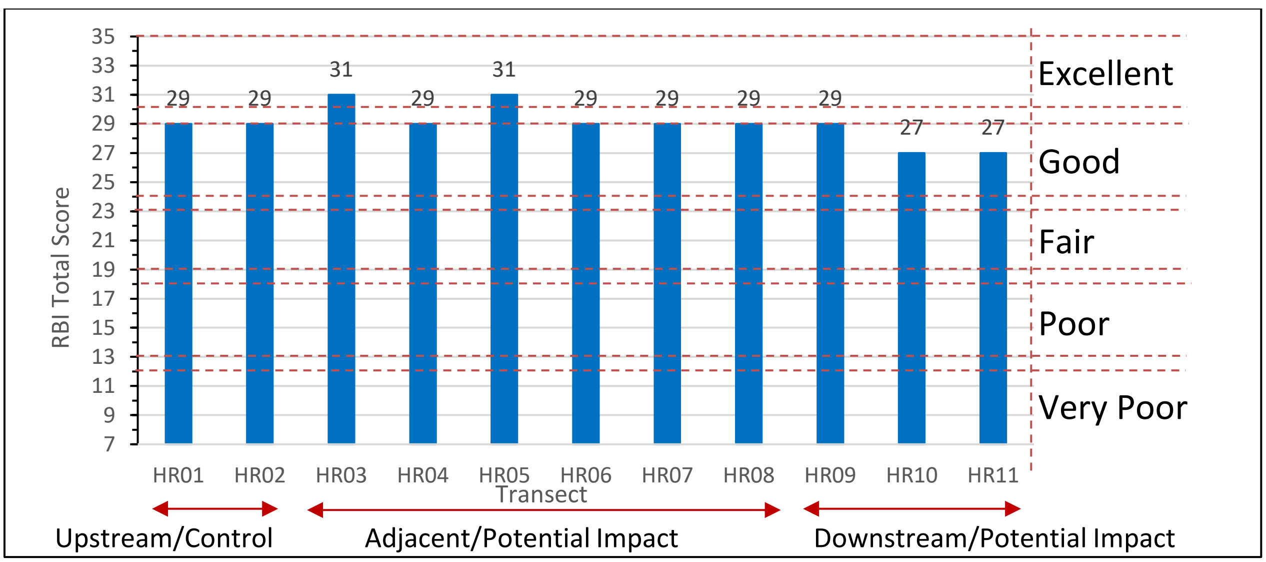

Figure J.3-1 – Holston River 2019 RBI Results Summary

In general, biological integrity in communities adjacent to and downstream of the JSF Plant CCR management units were similar to upstream control communities, and RBI outcomes were consistently between “Good” and “Excellent”. The highest biological integrity (reflected by highest RBI scores) was observed at HR03 and HR05, adjacent to the JSF Plant. These adjacent locations both represent ‘Excellent’ biological integrity. While the farthest downstream transects scored slightly lower at HR10 and HR11, they were rated as ‘Good,’ consistent with categorizations at both upstream controls and the majority of locations adjacent to the Plant. For comparison, Figure J.3-2 provides historical average RBI results and associated categorical ratings from various biological monitoring studies performed by TVA in the Holston River in 2011-2012.

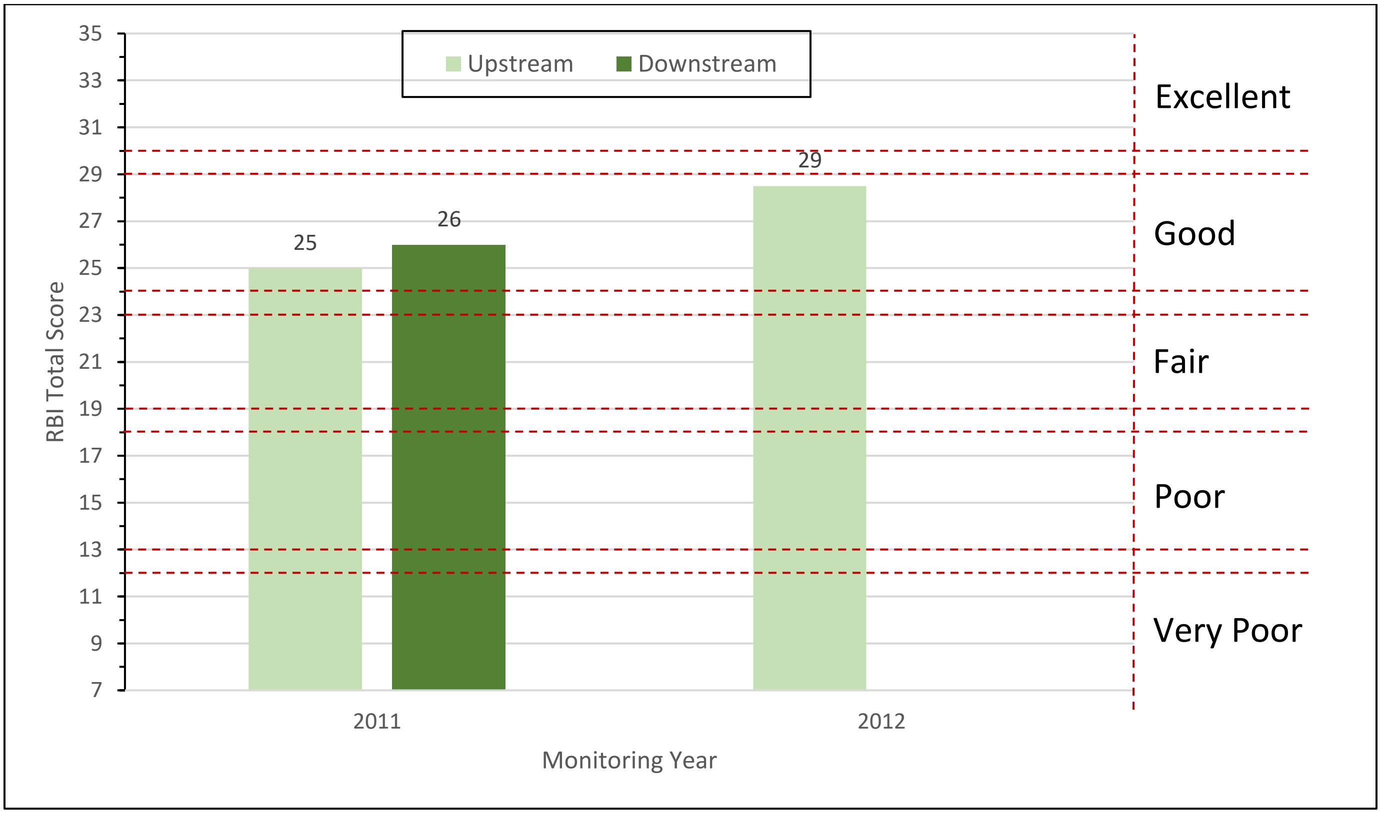

Figure J.3-2 – Historical Average RBI Results Summary, Various Biological Monitoring Studies, 2011/2012

The historical data show general consistency between upstream and downstream average RBI scores between 2011 and 2012, remaining within the same rating category (Good). These spatial relationships were maintained in the 2019 EI results as described in Figure J.3-1, with similar, relatively high RBI scores. As such, neither the EI data collected in 2019 nor historical data suggest potential impacts on benthic macroinvertebrate communities from the JSF Plant CCR management units.

3.2.1.2 Key RBI Component Metrics and Supplemental Metrics

<u>Total Taxa Richness</u>

TTR is the number of different types of organisms observed within the benthic community at each location (typically as genera or next lowest taxonomic level). As stressors increase, they constrain the community by selecting against more sensitive organisms and specialist feeders, so a reduction in total richness is expected with increased environmental stress. TTR results are depicted in Figure J.3-3 for the Holston River.

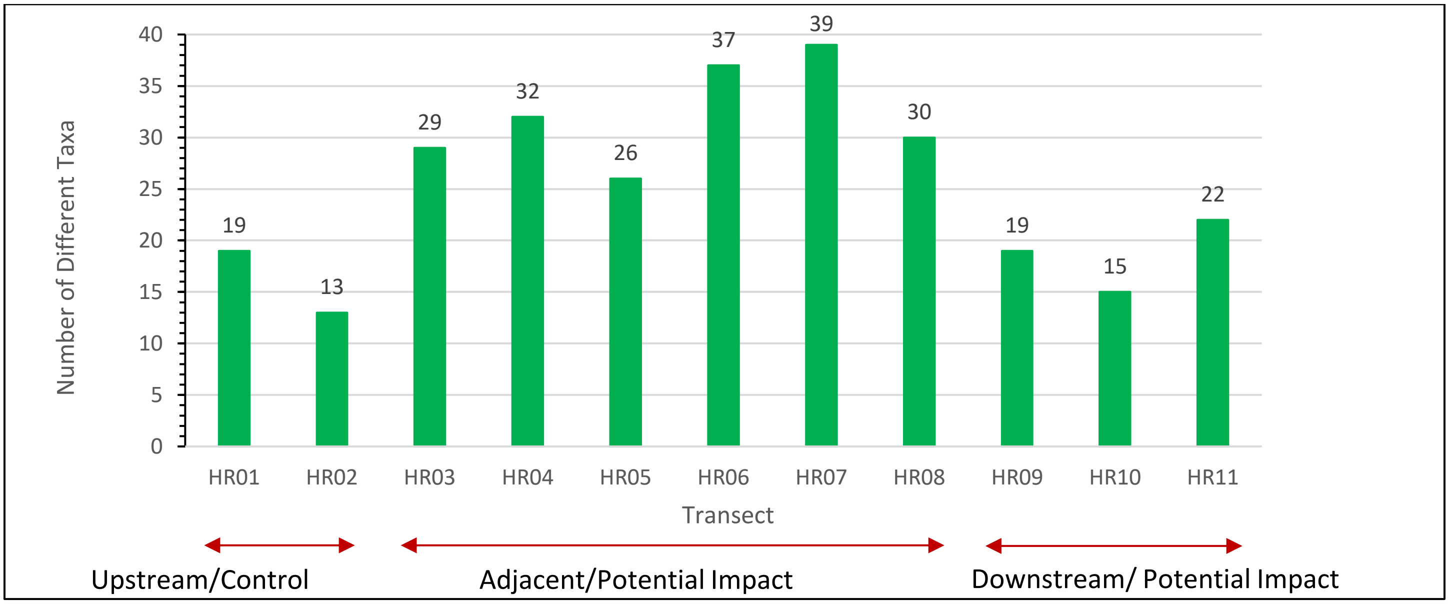

Figure J.3-3 – Holston River Total Taxa Richness Summary 2019

Within the Holston River, the richest communities were located adjacent to the JSF Plant. Downstream communities had similar richness to the two unimpacted control locations upstream of the plant, indicating a similar level of environmental stress. These results suggest that stressors are lowest adjacent to the facility, likely related to habitat quality or availability, and possibly other localized factors favorable to benthic colonization, survival, and reproduction. Spatial relationships in richness values observed in the Holston River support the RBI multi-metric findings previously discussed, which indicated conditions in the vicinity of the JSF Plant CCR management units are at least as favorable as at unimpacted upstream locations. Similarly, the results provide no evidence that JSF Plant operations are constraining downstream communities, nor do they suggest any potential biological impacts from the JSF Plant CCR management units.

Hilsenhoff Biotic Index

The HBI is a supplemental metric not included in the RBI multi-metric calculation; however, it provides corroborative information to help qualify those results. The HBI is a sensitivity metric that measures community environmental stress tolerance using individual taxa tolerance values weighted by relative abundance to output an average representative tolerance value for the community as a whole. More sensitive communities have lower HBI scores; higher HBI values reflect higher levels of environmental stress and a resulting more tolerant community. Figure J.3-4 presents HBI results for the Holston River. Dashed red lines represent categorical breaks (e.g., Excellent, Good, Fair, etc.) to help visualize significant differences among locations, as described in Chapter 3.2.1.

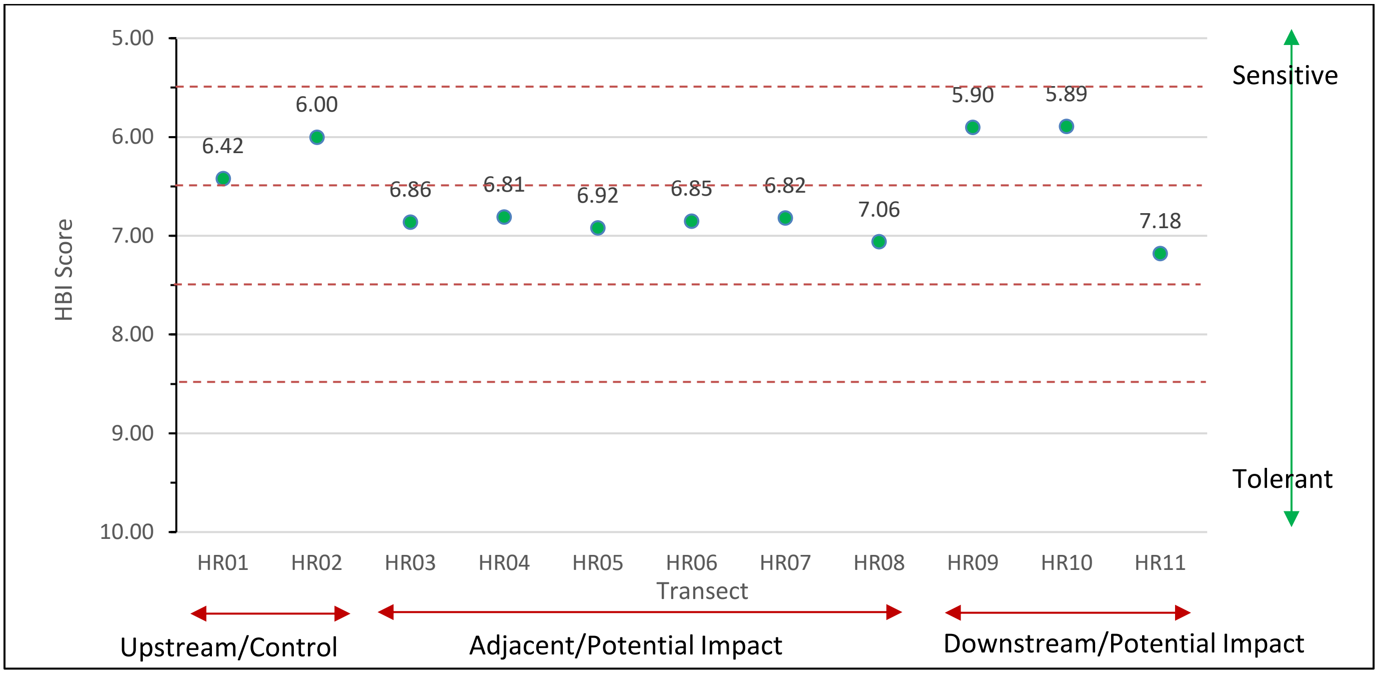

Figure J.3-4 – Holston River Hilsenhoff Biotic Index Summary 2019

Spatial relationships for the HBI in the Holston River were similar throughout the study area. Samples collected adjacent to the Plant's CCR units scored consistently within the same category, although they supported slightly more tolerant communities compared to the upstream transects. Two of the three downstream transect communities scored within the same category as the upstream locations, but the slightly lower scores may reflect marginally reduced environmental stress levels in these downstream areas compared to the upstream controls. These two communities were also categorically more sensitive than those sampled adjacent to the JSF Plant. The farthest downstream transect (HR11) was within the same sensitivity category as the adjacent communities. Based on these results, spatial relationships relative to the JSF Plant CCR management units are apparent; however, possible negative trends moving downstream are not observed. The differences may be related to available habitat quantity and quality or other localized physical site characteristics. Although there is some variation across the stream continuum, these results do not provide strong evidence to indicate impacts to adjacent or downstream communities from JSF Plant CCR management units.

3.3 Mayfly Tissue

In September 2019, composite samples of mayfly (*Hexagenia* spp.) nymphs were collected from random locations in four separate reaches of the Holston River located upstream, adjacent (two separate areas), and downstream of the JSF Plant, as shown on Exhibit J.3-3. In accordance with the SAP, a portion of the mayfly nymphs collected from each reach had their digestive systems depurated prior to preparing the composite samples for laboratory analysis. The remaining non-depurated mayfly nymphs from each reach were prepared as separate composite samples. Adult mayflies were not encountered in numbers sufficient to generate composite samples.

The depurated mayfly nymph and non-depurated mayfly nymph composite samples were submitted for laboratory analysis of metals included in the CCR Parameters list (excluding radium 226/228). For mayfly tissue samples collected in the Holston River, the only constituents identified for further evaluation based on sediment or surface stream sampling results above their respective ESVs and the data analysis were copper, mercury, and zinc (Appendix E.6). In addition, mercury and selenium were reviewed due to their bioaccumulative characteristics. A summary of the mayfly tissue analytical results for copper, mercury, selenium, and zinc is provided in Table J.3-2.

The depurated and non-depurated results were compared to Critical Body Residue (CBR) values for No Observed Adverse Effect Levels (NOAELs) and Lowest Observed Adverse Effect Levels (LOAELs), which were identified as EAR screening levels (Table 1-4 and Appendix A.2). None of the Holston River composite mayfly sample concentrations were above the NOAEL or LOAEL for copper, mercury, or zinc. Selenium concentrations in both the non-depurated and depurated composite mayfly samples collected upstream, adjacent, and downstream locations in the Holston River were above the NOAEL for selenium. The selenium concentration of the non-depurated mayfly nymph composite sample collected from adjacent reach HRA2 was above both the NOAEL and LOAEL for selenium.

Chapter 4 Summary

The following chapters summarize the evaluation findings presented in this appendix for sediment, benthic macroinvertebrate, and mayfly tissue based on historical information and EI sampling results. These data are further evaluated in the context of other environmental data in Appendices J.1 and J.2 of the EAR.

4.1 Sediment Quality

During development of the EIP, TDEC requested an evaluation of potential CCR materials deposition on the streambed of water bodies in proximity to the JSF Plant, including a map depicting the location of CCR material in the stream, if identified during the investigation. Exhibit J.3-4 shows the distribution of CCR Parameter results above their respective chronic ESVs for the sediment samples collected in 2018-2019, as described below and in Chapter 3.1.

In the Holston River and Polly Branch, % ash results were either not detected or detected at very low levels (i.e., between 1% and 8% ash), with very little variation in results among sample locations.

Sediment sampling results for most CCR Parameters were below their respective ESVs. In the Holston River, the concentration of copper at one location (35.9 milligrams per kilogram [mg/kg] at the HR09 left bank location) was slightly above (1.1 times) the chronic ESV of 31.6 mg/kg. The concentration of zinc at the same location was at the chronic ESV of 121 mg/kg. Mercury concentrations were identified at concentrations slightly above the chronic ESV in sediment samples collected from five separate locations along the Holston River (Exhibit J.3-4). These results are attributed to the Saltville Waste Disposal Ponds Superfund (Saltville) site, a documented source of mercury located upstream of the JSF Plant CCR management units. A search of the National Inventory of Dams indicated that there are no dams present between the Saltville site and the JSF Plant.

Sediment sampling results for most CCR Parameters were below their respective ESVs in Polly Branch as well; however, arsenic, beryllium, and nickel were present at concentrations above their respective chronic ESVs in one or more sediment samples from the PB06 and/or PB07 locations (Exhibit J.3-4). The absence of arsenic, beryllium, and nickel in sediment samples collected downstream of the JSF Plant in Polly Branch and in the Holston River indicate that any potential impacts are limited to the area of the PB06 and PB07 sediment sampling locations.

In summary, % ash and CCR Parameter concentrations in sediment samples from the Holston River and Polly Branch were below chronic ESVs, except for copper and zinc in one sediment sample from the Holston River and arsenic, beryllium, and/or nickel in two sediment samples in Polly Branch. These results indicate that sediment quality in the Holston River and Polly Branch are within ranges that are protective of aquatic life. Further evaluation of the CCR Parameters detected in sediment samples equal to and above ESVs will be completed in the CARA Plan.

4.2 Benthic Macroinvertebrate Community Analysis

Generally, the benthic macroinvertebrate community metrics were corroborative and demonstrated spatially consistent relationships among indicators. The RBI results for the Holston River, representative of overall biological integrity, generally showed similar Total Scores among adjacent and downstream locations as well as in comparison to upstream control transects. Of these similar scores, the highest values were observed adjacent to the JSF Plant, and although downstream locations scored slightly lower than adjacent locations, their Total Scores were consistent with the upstream control locations. Historical data from 2011 and 2012 corroborate the findings of the 2019 RBI that potential impacts associated with the JSF Plant CCR management units were not observed, as the majority of historical average downstream Total Scores were higher than at corresponding upstream control transects.

The select component and supplemental metrics included in the Benthic Macroinvertebrate Community Analysis discussion in Chapter 3.2 corroborate the findings of the RBI evaluation. Spatial relationships in TTR showed the richest communities adjacent to the JSF Plant, and downstream richness was roughly equivalent to unimpacted upstream controls. As taxa richness is expected to decrease with increased environmental stress, and congruent with the RBI multi-metric results, these findings do not suggest potential impacts from the JSF Plant CCR management units have occurred, nor do they demonstrate degradation of benthic communities in downstream receiving waters.

Community sensitivity, examined through the HBI, reflects possible spatial relationships that may have resulted from localized differences in habitat conditions or other environmental factors; however, there is no indication of a negative spatial trend in these data. Although benthic communities were slightly more stress-tolerant adjacent to the JSF Plant, downstream transects supported either more sensitive or equivalently sensitive communities compared to unimpacted upstream controls.

In summary, benthic communities within adjacent and downstream areas appear to be at least as healthy, rich, and sensitive as unimpacted control locations upstream of the JSF Plant CCR management units. Impacts on surface stream water quality or other operational impacts are not reflected in the benthic community data.

4.3 Mayfly Tissue

The distribution of mayfly tissue results above their respective CBR values, as described below and in Chapter 3.3, is illustrated on Exhibit J.3-5.

For mayfly composite tissue samples collected in the Holston River, copper and zinc results were reviewed due to the single sediment sample result for each constituent observed at or above the chronic ESV; mercury and selenium were reviewed due to their bioaccumulative characteristics. None of the Holston River composite mayfly sample concentrations were above the NOAELs or LOAELs for copper, mercury, or zinc. The selenium concentrations for the upstream, adjacent, and downstream depurated and non-depurated mayfly nymph composite tissue samples were above the NOAEL for selenium. The selenium concentration in the non-depurated mayfly nymph composite tissue sample from adjacent reach HRA2 was above both the NOAEL and LOAEL for selenium. There was, however, only minimal variability in selenium concentrations relative to sampling locations (i.e., upstream versus adjacent and downstream), which suggests that concentrations greater than NOAELs and/or LOAELs in adjacent or downstream samples are not related to JSF Plant CCR management unit activities. The benthic macroinvertebrate community sampling results indicate bioaccumulation of these CCR Parameter metals is not adversely impacting benthic macroinvertebrate populations in the Holston River. Further evaluation of the ecological implications of the mayfly tissue concentrations will be completed in the CARA Plan.

Chapter 5 References

Environmental Standards, Inc. (2018). Quality Assurance Project Plan for the Tennessee Valley Authority, John Sevier Fossil Plant Environmental Investigation, Revision 2. October 2018.

Hilsenhoff, William L. (1987). "An Improved Biotic Index of Organic Stream Pollution." *The Great Lakes Entomologist*, Vol 20 (1) 20, April 1987. Available at: https://scholar.valpo.edu/tgle/vol20/iss1/7/?utm_source=scholar.valpo.edu%2Ftgle%2Fvol20%2Fiss1%2F7&utm_medium=PDF&utm_campaign=PDFCoverPages

Stantec Consulting Services, Inc. (Stantec). (2018). Benthic Sampling and Analysis Plan, John Sevier Fossil Plant, Revision 3 Final. October 19, 2018.

Tennessee Department of Environment and Conservation (TDEC). (2015). Commissioner's Order No. OGC15- 177. August 6.

TDEC. (2017). Quality System Standard Operating Procedure for Macroinvertebrate Stream Surveys. Revision 6: DWR-PAS-P-01-QSSOP-081117. Division of Water Resources. August 11, 2017.

Tennessee Valley Authority (TVA). (1977). 316(a) and 316(b) Demonstrations, John Sevier Steam Plant. Volumes 1 through 5. April.

TVA. (1979a). Supplemental Information to the Technical Report - Response of Biological Communities of the Holston River to Thermal Effluents from John Sevier Steam Plant. April.

TVA. (1979b). Investigations of Dynamics and Fate of Larval Fish in the Vicinity of John Sevier Stream-Electric Plant. April.

TVA. (1984). Responses of Selected Aquatic Biota to Discharges from John Sevier Steam-Electric Plant, Holston River, Tennessee, 1978 through 1981. June.

TVA. (2012). *Biological Monitoring of the Holston River near John Sevier Fossil Plant and Combined Cycle/Combustion Turbine Plant Discharges, Summer and Autumn 2011*. June.

TVA. (2013a). Biological Monitoring of the Holston River Near John Sevier Fossil and Combined Cycle/Combustion Turbine Plant Discharges, Summer and Autumn 2012. April.

TVA. (2013b). Plankton Monitoring of the Holston River Near John Sevier Fossil and Combined Cycle/Combustion Turbine Plant Discharges, Summer and Autumn 2011. June.

TVA. (2018). Environmental Investigation Plan, John Sevier Fossil Plant, Revision 3 Final. October 19, 2018.

United States Environmental Protection Agency (USEPA). (1977 [Draft]). Interagency 316(a) Technical Guidance Manual and Guide for Thermal Effects sections of Nuclear Facilities Environmental Impact Statements. U.S. Environmental

Protection Agency, Office of Water Enforcement, Permits Division, Industrial Permits Branch, Washington, DC. May 1, 1977.

USEPA. (2017). Fifth Five-Year Review Report for Saltville Waste Disposal Ponds Superfund Site, Smyth County, Virginia. September 26, 2017.

USEPA. (2021). Code of Federal Regulation, Title 40 / Chapter I / Subpart D / Part 125 / Subpart H - 40 C.F.R. § 125.71(c). November 19, 2021. Available at: eCFR :: 40 CFR Part 125 Subpart H -- Criteria for Determining Alternative Effluent Limitations Under Section 316(a) of the Act

TABLES

Table J.3-1 Sediment Analytical Results
John Sevier Fossil Plant
December 2018 and April 2019

Sample Location		Freshwater Sediment		Sediment Quality		JSF-HR01		JSF-HR02		JSF-HR03		JSF-HR04		JSF-HR05	
Sample Date						3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19
Sample ID						JSF-SED-HR01-CORLB-0.0/0.5-20190403	JSF-SED-HR01-CORRB-0.0/0.5-20190403	JSF-SED-HR02-CORLB-0.0/0.5-20190403	JSF-SED-HR02-CORRB-0.0/0.5-20190403	JSF-SED-HR03-CORLB-0.0/0.5-20190403	JSF-SED-HR03-CORRB-0.0/0.5-20190403	JSF-SED-HR04-CORLB-0.0/0.5-20190403	JSF-SED-HR04-CORRB-0.0/0.5-20190403	JSF-SED-HR05-CORLB-0.0/0.5-20190403	JSF-SED-HR05-CORRB-0.0/0.5-20190403
Parent Sample ID															
Sample Depth						0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 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	Normal Environmental Sample
Level of Review	Units	Screening Values		Assessment Guidelines		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
		Chronic	Acute	TEC	PEC										
Metals															
Antimony	mg/kg	2[A]	25[B]	n/v	n/v	0.154 J	0.0905 J	0.104 J	0.107 J	0.115 J	0.0865 J	0.0820 J	0.0983 J	0.0924 J	0.229 J
Arsenic	mg/kg	9.8[A]	33[B]	9.8[C]	33[D]	3.12 J	2.86 J	2.47 J	3.12 J	2.76 J	2.65 J	1.92 J	2.34 J	2.84 J	1.83 J
Barium	mg/kg	240[A]	22,925[B]	n/v	n/v	48.2	81.3	44.7	44.7	57.2	71.9	37.2	59.9	46.2	35.3
Beryllium	mg/kg	1.2[A]	42[B]	n/v	n/v	0.380	0.685	0.403	0.422	0.444	0.657	0.319	0.582	0.411	0.348
Boron	mg/kg	n/v	n/v	n/v	n/v	2.86 J	1.96 J	2.08 J	2.37 J	3.19 J	1.69 J	2.15 J	1.36 J	2.72 J	1.28 J
Cadmium	mg/kg	1[A]	5[B]	1[C]	5[D]	0.146	0.186	0.202	0.123	0.165	0.121	0.118	0.0932	0.130	0.0732
Calcium	mg/kg	n/v	n/v	n/v	n/v	7,700 J	2,590 J	4,540 J	6,610 J	10,900 J	1,610 J	3,710 J	1,660 J	5,130 J	1,870 J
Chromium	mg/kg	43.4[A]	111[B]	43[C]	110[D]	11.1 J	10.9 J	12.4 J	10.6 J	19.4 J	10.6 J	8.95 J	10.2 J	10.7 J	7.92 J
Cobalt	mg/kg	50[A]	n/v	50[C]	n/v	20.2	10.6	16.1	13.9	19.3	9.25	13.4	7.52	13.3	8.38
Copper	mg/kg	31.6[A]	149[B]	32[C]	150[D]	16.9 J	10.3 J	12.1 J	15.5 J	18.0 J	10.7 J	10.8 J	15.6 J	14.0 J	7.37 J
Lead	mg/kg	35.8[A]	128[B]	36[C]	130[D]	16.5	11.2	9.49	10.2	11.0	9.56	8.02	10.1	9.38	6.33
Lithium	mg/kg	n/v	n/v	n/v	n/v	6.84 J	10.7 J	5.78 J	7.16 J	8.10 J	10.7 J	6.46 J	8.83 J	7.92 J	5.56 J
Mercury	mg/kg	0.18[A]	1.1[B]	0.18[C]	1.1[D]	0.179	0.0336	0.125	0.142	0.145	0.0296	**0.191[AC]**	0.0617	0.160	0.0562
Molybdenum	mg/kg	38[A]	69,760[B]	n/v	n/v	0.417	0.448	0.327 J	0.448	0.466	0.431	0.302 J	0.345	0.583	0.251 J
Nickel	mg/kg	22.7[A]	48.6[B]	23[C]	49[D]	8.55	10.6	6.76	8.04	8.57	9.18	6.26	7.62	8.37	5.30
Selenium	mg/kg	2[A]	2.9[B]	n/v	n/v	0.395 J	0.684 J	0.445 J	0.486 J	0.462 J	0.776 J	0.403 J	0.477 J	0.491 J	0.322 J
Silver	mg/kg	1[A]	2.2[B]	n/v	n/v	<0.0232	<0.0219	0.0352 J	<0.0232	<0.0225	<0.0195	<0.0217	0.0236 J	<0.0216	<0.0194
Strontium	mg/kg	n/v	n/v	n/v	n/v	20.2	11.4	12.7	12.9	20.5	9.18	10.5	8.08	12.5	6.76
Thallium	mg/kg	1.2[A]	10[B]	n/v	n/v	0.0937	0.0959	0.0848	0.0875	0.112	0.0941	0.0768 J	0.0808	0.0802	0.0553 J
Vanadium	mg/kg	66[A]	564[B]	n/v	n/v	7.79	14.2	7.25	9.15	9.49	13.0	7.28	11.5	8.96	7.78
Zinc	mg/kg	121[A]	459[B]	120[C]	460[D]	68.4 J	36.4 J	56.5 J	55.6 J	70.6 J	38.5 J	50.2 J	38.1 J	52.9 J	31.1 J
Radiological Parameters															
Radium-226	pCi/g	n/v	n/v	n/v	n/v	0.953 +/-(0.213)	0.703 +/-(0.216)	0.665 +/-(0.164)	0.752 +/-(0.198)	0.819 +/-(0.208)	0.999 +/-(0.280)	0.841 +/-(0.203)	1.01 +/-(0.212)	0.644 +/-(0.176)	0.807 +/-(0.231)
Radium-228	pCi/g	n/v	n/v	n/v	n/v	1.02 +/-(0.286)	1.21 +/-(0.340)	0.657 +/-(0.200)	1.02 +/-(0.260)	1.05 +/-(0.321)	0.285 +/-(0.360)U	0.654 +/-(0.283)	1.49 +/-(0.306)	1.06 +/-(0.254)	0.978 +/-(0.277)
Radium-226+228	pCi/g	90[A]	90[B]	n/v	n/v	1.97 +/-(0.357)	1.91 +/-(0.403)	1.32 +/-(0.259)	1.77 +/-(0.327)	1.87 +/-(0.382)	1.28 +/-(0.456)J	1.50 +/-(0.348)	2.50 +/-(0.372)	1.70 +/-(0.309)	1.79 +/-(0.361)
Anions															
Chloride	mg/kg	n/v	n/v	n/v	n/v	8.86 J	6.61 J	5.55 J	7.14 J	7.75 J	5.37 J	7.66 J	<5.28	<6.05	7.55 J
Fluoride	mg/kg	n/v	n/v	n/v	n/v	<1.11	1.09 J	<0.900	<1.10	<1.08	1.29 J	<1.02	<0.926	<1.06	<0.946
Sulfate	mg/kg	n/v	n/v	n/v	n/v	30.3	17.4	37.3	34.9	57.4	15.7	33.2	13.5 J	42.6	14.8
General Chemistry															
% ASH	%	20[E]	40[F]	n/v	n/v	8	4	4	6	4	2	6	1	8	3
pH (lab)	SU	n/v	n/v	n/v	n/v	7.2	7.8	7.8	7.6	7.6	7.9	7.7	7.7	7.4	7.8

See notes on last page.

Table J.3-1 Sediment Analytical Results
John Sevier Fossil Plant
December 2018 and April 2019

Sample Location		Freshwater Sediment		Sediment Quality		JSF-HR06			JSF-HR07		JSF-HR08		JSF-HR09	
Sample Date						3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19
Sample ID						JSF-SED-HR06-CORLB-0.0/0.5-20190403	JSF-SED-HR06-DUP01-20190403	JSF-SED-HR06-CORRB-0.0/0.5-20190403	JSF-SED-HR07-CORLB-0.0/0.5-20190403	JSF-SED-HR07-CORRB-0.0/0.5-20190403	JSF-SED-HR08-CORLB-0.0/0.5-20190403	JSF-SED-HR08-CORRB-0.0/0.5-20190403	JSF-SED-HR09-CORLB-0.0/0.5-20190403	JSF-SED-HR09-CORRB-0.0/0.5-20190403
Parent Sample ID							JSF-SED-HR06-CORLB-0.0/0.5-20190403							
Sample Depth						0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sample Type						Normal Environmental Sample	Field Duplicate 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	Screening Values		Assessment Guidelines		Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
		Chronic	Acute	TEC	PEC									
Metals														
Antimony	mg/kg	2^{A}	25^{B}	n/v	n/v	0.0800 J	0.0793 J	0.103 J	0.128 J	0.173 J	0.126 J	0.166 J	0.232 J	0.191 J
Arsenic	mg/kg	9.8^{A}	33^{B}	9.8^{C}	33^{D}	2.01 J	2.26 J	2.53 J	3.42 J	3.23 J	2.63 J	5.05 J	4.47 J	2.67 J
Barium	mg/kg	240^{A}	$22,925^{B}$	n/v	n/v	36.0	41.6	52.2	48.3	57.5	51.7	58.5	92.2	44.6
Beryllium	mg/kg	1.2^{A}	42^{B}	n/v	n/v	0.317	0.380	0.521	0.423	0.490	0.448	0.527	0.681	0.513
Boron	mg/kg	n/v	n/v	n/v	n/v	1.58 J	1.75 J	2.17 J	1.69 J	2.87 J	2.19 J	2.60 J	2.77 J	2.09 J
Cadmium	mg/kg	1^{A}	5^{B}	1^{C}	5^{D}	0.0891	0.101	0.120	0.122	0.187	0.126	0.198	0.281	0.107
Calcium	mg/kg	n/v	n/v	n/v	n/v	3,910 J	4,530 J	3,350 J	4,020 J	7,350 J	2,520 J	6,960 J	4,020 J	2,790 J
Chromium	mg/kg	43.4^{A}	111^{B}	43^{C}	110^{D}	8.49 J	9.16 J	11.8 J	11.2 J	13.9 J	10.0 J	13.9 J	17.3 J	10.8 J
Cobalt	mg/kg	50^{A}	n/v	50^{C}	n/v	12.2	13.4	14.1	9.08	18.9	9.66	16.3	15.3	11.4
Copper	mg/kg	31.6^{A}	149^{B}	32^{C}	150^{D}	11.2 J	11.2 J	13.6 J	24.9 J	25.2 J	12.5 J	23.9 J	**35.9 J^{AC}**	18.1 J
Lead	mg/kg	35.8^{A}	128^{B}	36^{C}	130^{D}	11.0	7.98	13.7	10.2	14.1	9.37	14.0	17.3	10.3
Lithium	mg/kg	n/v	n/v	n/v	n/v	6.12 J	6.75 J	8.11 J	6.64 J	8.86 J	8.45 J	8.95 J	12.3 J	7.92 J
Mercury	mg/kg	0.18^{A}	1.1^{B}	0.18^{C}	1.1^{D}	0.124 J	0.109	0.0606 J	**0.216 J^{AC}**	**0.296 J^{AC}**	0.170 J	**0.346 J^{AC}**	**0.550 J^{AC}**	0.140
Molybdenum	mg/kg	38^{A}	$69,760^{B}$	n/v	n/v	0.330 J	0.325 J	0.345 J	0.355 J	0.431 J	0.373	0.509	0.555	0.342 J
Nickel	mg/kg	22.7^{A}	48.6^{B}	23^{C}	49^{D}	6.28	6.93	8.35	7.07	10.4	7.93	9.78	12.2	7.56
Selenium	mg/kg	2^{A}	2.9^{B}	n/v	n/v	0.367 J	0.496 J	0.501 J	0.513 J	0.696 J	0.586 J	0.718 J	0.709 J	0.545 J
Silver	mg/kg	1^{A}	2.2^{B}	n/v	n/v	0.226 J	0.0200 UJ	<0.0207	0.0215 J	0.0302 J	<0.0202	0.0282 J	0.0880	0.0368 J
Strontium	mg/kg	n/v	n/v	n/v	n/v	10.4	11.6	10.5	15.6	18.1	9.54	15.9	19.2	7.72
Thallium	mg/kg	1.2^{A}	10^{B}	n/v	n/v	0.0688 J	0.0771	0.0991	0.0759 J	0.126	0.0779	0.123	0.147	0.0816
Vanadium	mg/kg	66^{A}	564^{B}	n/v	n/v	7.56	8.60	9.92	8.55	11.1	10.5	11.5	14.2	11.4
Zinc	mg/kg	121^{A}	459^{B}	120^{C}	460^{D}	45.9 J	50.8 J	48.4 J	56.4 J	80.3 J	44.1 J	75.3 J	**121 J^{AC}**	42.7 J
Radiological Parameters														
Radium-226	pCi/g	n/v	n/v	n/v	n/v	0.848 +/-(0.239)	0.853 +/-(0.193)	0.613 +/-(0.198)	0.667 +/-(0.166)	0.829 +/-(0.233)	0.651 +/-(0.154)	0.431 +/-(0.178)U	1.04 +/-(0.289)	0.622 +/-(0.206)
Radium-228	pCi/g	n/v	n/v	n/v	n/v	0.523 +/-(0.421)	0.811 +/-(0.249)	0.770 +/-(0.258)	1.01 +/-(0.226)	0.501 +/-(0.246)	1.11 +/-(0.240)	1.24 +/-(0.278)	0.786 +/-(0.504)	0.818 +/-(0.273)
Radium-226+228	pCi/g	90^{A}	90^{B}	n/v	n/v	1.37 +/-(0.484)	1.66 +/-(0.315)	1.38 +/-(0.325)	1.68 +/-(0.280)	1.33 +/-(0.339)	1.76 +/-(0.285)	1.67 +/-(0.330)J	1.83 +/-(0.581)	1.44 +/-(0.342)
Anions														
Chloride	mg/kg	n/v	n/v	n/v	n/v	5.90 J	5.96 J	5.59 J	<5.81	8.59 J	<5.37	10.4 J	6.52 J	<5.62
Fluoride	mg/kg	n/v	n/v	n/v	n/v	<0.945	<0.961	<0.964	<1.02	<1.12	1.22 J	<1.24	<1.10	0.995 J
Sulfate	mg/kg	n/v	n/v	n/v	n/v	29.6	24.9	16.7	24.0	50.5	19.9	14.9 J	26.9	12.0 J
General Chemistry														
% ASH	%	20^{E}	40^{F}	n/v	n/v	6 J	2 J	5	6	3	2	5	5	7
pH (lab)	SU	n/v	n/v	n/v	n/v	7.8	7.8	7.6	7.6	7.5	7.7	7.5	7.5	7.6

See notes on last page.

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Table J.3-1 Sediment Analytical Results
John Sevier Fossil Plant
December 2018 and April 2019

Sample Location		Freshwater Sediment		Sediment Quality		JSF-PB01		JSF-PB02			JSF-PB03			
Sample Date						18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18
Sample ID						JSF-SED-PB01-CORCC-0.0/0.5-20181218	JSF-SED-PB01-CORCC-0.0/0.5-20181218	JSF-SED-PB02-CORCC-0.0/0.5-20181218	JSF-SED-PB02-CORCC-0.0/0.5-20181218	JSF-SED-PB02-CORCC-0.5/2.5-20181218	JSF-SED-PB03-CORCC-0.0/0.5-20181218	JSF-SED-PB03-CORCC-0.0/0.5-20181218	JSF-SED-PB03-CORCC-0.5/1.2-20181218	JSF-SED-PB03-CORLB-0.0/0.5-20181218
Parent Sample ID														
Sample Depth						0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 2.5 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1.2 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	Units	Screening Values		Assessment Guidelines		Final-Verified	Validated	Final-Verified	Validated	Final-Verified	Final-Verified	Validated	Final-Verified	Final-Verified
		Chronic	Acute	TEC	PEC									
Metals														
Antimony	mg/kg	2[A]	25[B]	n/v	n/v	-	0.0944 J	-	0.111 J	-	-	0.125 J	-	-
Arsenic	mg/kg	9.8[A]	33[B]	9.8[C]	33[D]	-	3.34 J	-	3.37 J	-	-	4.29 J	-	-
Barium	mg/kg	240[A]	22,925[B]	n/v	n/v	-	99.6 J	-	79.9 J	-	-	74.3 J	-	-
Beryllium	mg/kg	1.2[A]	42[B]	n/v	n/v	-	0.866 J	-	0.847 J	-	-	0.959 J	-	-
Boron	mg/kg	n/v	n/v	n/v	n/v	-	2.88 J	-	2.68 J	-	-	2.15 J	-	-
Cadmium	mg/kg	1[A]	5[B]	1[C]	5[D]	-	0.128 J	-	0.115 J	-	-	0.0937 J	-	-
Calcium	mg/kg	n/v	n/v	n/v	n/v	-	14,900 J	-	20,500 J	-	-	13,300 J	-	-
Chromium	mg/kg	43.4[A]	111[B]	43[C]	110[D]	-	12.7 J	-	13.5 J	-	-	15.8 J	-	-
Cobalt	mg/kg	50[A]	n/v	50[C]	n/v	-	8.51 J	-	9.36 J	-	-	11.0 J	-	-
Copper	mg/kg	31.6[A]	149[B]	32[C]	150[D]	-	10.1 J	-	12.1 J	-	-	11.6 J	-	-
Lead	mg/kg	35.8[A]	128[B]	36[C]	130[D]	-	17.3 J	-	17.9 J	-	-	18.8 J	-	-
Lithium	mg/kg	n/v	n/v	n/v	n/v	-	21.9 J	-	21.3 J	-	-	25.0 J	-	-
Mercury	mg/kg	0.18[A]	1.1[B]	0.18[C]	1.1[D]	-	0.0337 J	-	0.0423 J	-	-	0.0275 J	-	-
Molybdenum	mg/kg	38[A]	69,760[B]	n/v	n/v	-	0.287 J	-	0.278 J	-	-	0.297 J	-	-
Nickel	mg/kg	22.7[A]	48.6[B]	23[C]	49[D]	-	11.3 J	-	12.3 J	-	-	14.0 J	-	-
Selenium	mg/kg	2[A]	2.9[B]	n/v	n/v	-	0.468 J	-	0.477 J	-	-	0.339 J	-	-
Silver	mg/kg	1[A]	2.2[B]	n/v	n/v	-	0.0170 UJ	-	0.0205 UJ	-	-	0.0165 UJ	-	-
Strontium	mg/kg	n/v	n/v	n/v	n/v	-	43.2 J	-	53.1 J	-	-	35.7 J	-	-
Thallium	mg/kg	1.2[A]	10[B]	n/v	n/v	-	0.123 J	-	0.114 J	-	-	0.102 J	-	-
Vanadium	mg/kg	66[A]	564[B]	n/v	n/v	-	12.0 J	-	12.1 J	-	-	14.4 J	-	-
Zinc	mg/kg	121[A]	459[B]	120[C]	460[D]	-	42.6 J	-	49.7 J	-	-	50.3 J	-	-
Radiological Parameters														
Radium-226	pCi/g	n/v	n/v	n/v	n/v	-	1.37 +/-(0.393)J	-	1.05 +/-(0.364)J	-	-	0.990 +/-(0.278)	-	-
Radium-228	pCi/g	n/v	n/v	n/v	n/v	-	1.80 +/-(0.468)	-	1.89 +/-(0.492)	-	-	1.48 +/-(0.375)	-	-
Radium-226+228	pCi/g	90[A]	90[B]	n/v	n/v	-	3.17 +/-(0.611)J	-	2.94 +/-(0.612)J	-	-	2.47 +/-(0.467)	-	-
Anions														
Chloride	mg/kg	n/v	n/v	n/v	n/v	-	9.36 UJ	-	18.5 J	-	-	9.21 UJ	-	-
Fluoride	mg/kg	n/v	n/v	n/v	n/v	-	2.94 J	-	1.86 UJ	-	-	1.61 UJ	-	-
Sulfate	mg/kg	n/v	n/v	n/v	n/v	-	391 J	-	597 J	-	-	408 J	-	-
General Chemistry														
% ASH	%	20[E]	40[F]	n/v	n/v	<1	-	1	-	1	2	-	2	2
pH (lab)	SU	n/v	n/v	n/v	n/v	-	6.9	-	6.8	-	-	6.9	-	-

See notes on last page.

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Table J.3-1 Sediment Analytical Results
John Sevier Fossil Plant
December 2018 and April 2019

Sample Location		Freshwater Sediment		Sediment Quality		JSF-PB03						
Sample Date						18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18
Sample ID						JSF-SED-PB03-CORLB-0.0/0.5-20181218	JSF-SED-PB03-CORLB-0.5/1.4-20181218	JSF-SED-PB03-CORRB-0.0/0.5-20181218	JSF-SED-PB03-DUP01-20181218	JSF-SED-PB03-CORRB-0.0/0.5-20181218	JSF-SED-PB03-DUP01-20181218	JSF-SED-PB03-CORRB-0.5/1.6-20181218
Parent Sample ID									JSF-SED-PB03-CORRB-0.0/0.5-20181218		JSF-SED-PB03-CORRB-0.0/0.5-20181218	
Sample Depth						0 - 0.5 ft	0.5 - 1.4 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1.6 ft
Sample Type						Normal Environmental Sample	Normal Environmental Sample	Normal Environmental Sample	Field Duplicate Sample	Normal Environmental Sample	Field Duplicate Sample	Normal Environmental Sample
Level of Review	Units	Screening Values		Assessment Guidelines		Validated	Final-Verified	Final-Verified	Final-Verified	Validated	Validated	Final-Verified
		Chronic	Acute	TEC	PEC							
Metals												
Antimony	mg/kg	2[A]	25[B]	n/v	n/v	0.0602 UJ	-	-	-	0.137 J	0.194 J	-
Arsenic	mg/kg	9.8[A]	33[B]	9.8[C]	33[D]	2.25	-	-	-	3.94 J	4.34 J	-
Barium	mg/kg	240[A]	22,925[B]	n/v	n/v	41.8	-	-	-	73.0 J	80.3 J	-
Beryllium	mg/kg	1.2[A]	42[B]	n/v	n/v	0.484 J	-	-	-	0.953 J	1.01 J	-
Boron	mg/kg	n/v	n/v	n/v	n/v	1.30 J	-	-	-	2.64 J	3.39 J	-
Cadmium	mg/kg	1[A]	5[B]	1[C]	5[D]	0.0641 J	-	-	-	0.163 J	0.131 J	-
Calcium	mg/kg	n/v	n/v	n/v	n/v	12,900 J	-	-	-	11,900 J	13,500 J	-
Chromium	mg/kg	43.4[A]	111[B]	43[C]	110[D]	7.28 J	-	-	-	14.2 J	15.6 J	-
Cobalt	mg/kg	50[A]	n/v	50[C]	n/v	5.92 J	-	-	-	9.15 J	10.4 J	-
Copper	mg/kg	31.6[A]	149[B]	32[C]	150[D]	5.51 J	-	-	-	13.4 J	14.2 J	-
Lead	mg/kg	35.8[A]	128[B]	36[C]	130[D]	10.4	-	-	-	19.5 J	19.8 J	-
Lithium	mg/kg	n/v	n/v	n/v	n/v	10.6 J	-	-	-	22.0 J	24.4 J	-
Mercury	mg/kg	0.18[A]	1.1[B]	0.18[C]	1.1[D]	0.0189 J	-	-	-	0.0441 J	0.0437 J	-
Molybdenum	mg/kg	38[A]	69,760[B]	n/v	n/v	0.149 J	-	-	-	0.338 J	0.377 J	-
Nickel	mg/kg	22.7[A]	48.6[B]	23[C]	49[D]	6.53 J	-	-	-	12.7 J	14.3 J	-
Selenium	mg/kg	2[A]	2.9[B]	n/v	n/v	0.177 J	-	-	-	0.449 J	0.537 J	-
Silver	mg/kg	1[A]	2.2[B]	n/v	n/v	<0.0136	-	-	-	0.0226 UJ	0.0231 UJ	-
Strontium	mg/kg	n/v	n/v	n/v	n/v	29.5	-	-	-	35.8 J	37.4 J	-
Thallium	mg/kg	1.2[A]	10[B]	n/v	n/v	0.0693 J	-	-	-	0.131 J	0.144 J	-
Vanadium	mg/kg	66[A]	564[B]	n/v	n/v	6.70 J	-	-	-	14.0 J	15.5 J	-
Zinc	mg/kg	121[A]	459[B]	120[C]	460[D]	24.8 J	-	-	-	54.7 J	60.3 J	-
Radiological Parameters												
Radium-226	pCi/g	n/v	n/v	n/v	n/v	1.08 +/-(0.328)J	-	-	-	1.14 +/-(0.370)J	1.14 +/-(0.277)J	-
Radium-228	pCi/g	n/v	n/v	n/v	n/v	1.51 +/-(0.460)	-	-	-	1.91 +/-(0.432)	1.45 +/-(0.475)	-
Radium-226+228	pCi/g	90[A]	90[B]	n/v	n/v	2.59 +/-(0.565)J	-	-	-	3.05 +/-(0.569)J	2.59 +/-(0.550)J	-
Anions												
Chloride	mg/kg	n/v	n/v	n/v	n/v	12.3 J	-	-	-	12.1 UJ	12.3 UJ	-
Fluoride	mg/kg	n/v	n/v	n/v	n/v	<1.32	-	-	-	2.11 UJ	2.16 UJ	-
Sulfate	mg/kg	n/v	n/v	n/v	n/v	289	-	-	-	1,910 J	592 J	-
General Chemistry												
% ASH	%	20[E]	40[F]	n/v	n/v	-	<1	<1	<1	-	-	<1
pH (lab)	SU	n/v	n/v	n/v	n/v	6.9	-	-	-	6.9	6.9	-

See notes on last page.

Table J.3-1 Sediment Analytical Results
John Sevier Fossil Plant
December 2018 and April 2019

Sample Location		Freshwater Sediment		Sediment Quality		JSF-PB04								
Sample Date						18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18	18-Dec-18
Sample ID						JSF-SED-PB04-CORCC-0.0/0.5-20181218	JSF-SED-PB04-CORCC-0.0/0.5-20181218	JSF-SED-PB04-CORCC-0.5/1.8-20181218	JSF-SED-PB04-CORLB-0.0/0.5-20181218	JSF-SED-PB04-CORLB-0.0/0.5-20181218	JSF-SED-PB04-CORLB-0.5/1.0-20181218	JSF-SED-PB04-CORRB-0.0/0.5-20181218	JSF-SED-PB04-CORRB-0.0/0.5-20181218	JSF-SED-PB04-CORRB-0.5/1.2-20181218
Parent Sample ID														
Sample Depth						0 - 0.5 ft	0 - 0.5 ft	0.5 - 0.8 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1.2 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	Screening Values		Assessment Guidelines		Final-Verified	Validated	Final-Verified	Final-Verified	Validated	Final-Verified	Final-Verified	Validated	Final-Verified
		Chronic	Acute	TEC	PEC									
Metals														
Antimony	mg/kg	2[A]	25[B]	n/v	n/v	-	0.225 J	-	-	0.101 J	-	-	0.162 J	-
Arsenic	mg/kg	9.8[A]	33[B]	9.8[C]	33[D]	-	5.77 J	-	-	2.96 J	-	-	4.21 J	-
Barium	mg/kg	240[A]	22,925[B]	n/v	n/v	-	98.3 J	-	-	26.7 J	-	-	58.8 J	-
Beryllium	mg/kg	1.2[A]	42[B]	n/v	n/v	-	1.04 J	-	-	0.379 J	-	-	0.746 J	-
Boron	mg/kg	n/v	n/v	n/v	n/v	-	4.91 J	-	-	1.60 J	-	-	3.24 J	-
Cadmium	mg/kg	1[A]	5[B]	1[C]	5[D]	-	0.166 J	-	-	0.0486 J	-	-	0.123 J	-
Calcium	mg/kg	n/v	n/v	n/v	n/v	-	8,210 J	-	-	1,900 J	-	-	31,000 J	-
Chromium	mg/kg	43.4[A]	111[B]	43[C]	110[D]	-	17.9 J	-	-	7.87 J	-	-	12.4 J	-
Cobalt	mg/kg	50[A]	n/v	50[C]	n/v	-	9.69 J	-	-	4.64 J	-	-	7.05 J	-
Copper	mg/kg	31.6[A]	149[B]	32[C]	150[D]	-	16.9 J	-	-	6.00 J	-	-	11.5 J	-
Lead	mg/kg	35.8[A]	128[B]	36[C]	130[D]	-	24.1 J	-	-	8.25 J	-	-	20.8 J	-
Lithium	mg/kg	n/v	n/v	n/v	n/v	-	27.4 J	-	-	6.59 J	-	-	16.8 J	-
Mercury	mg/kg	0.18[A]	1.1[B]	0.18[C]	1.1[D]	-	0.0666 J	-	-	0.0179 UJ	-	-	0.0570 J	-
Molybdenum	mg/kg	38[A]	69,760[B]	n/v	n/v	-	0.661 J	-	-	0.354 J	-	-	0.427 J	-
Nickel	mg/kg	22.7[A]	48.6[B]	23[C]	49[D]	-	14.2 J	-	-	4.77 J	-	-	9.40 J	-
Selenium	mg/kg	2[A]	2.9[B]	n/v	n/v	-	0.538 J	-	-	0.260 J	-	-	0.511 J	-
Silver	mg/kg	1[A]	2.2[B]	n/v	n/v	-	0.0224 UJ	-	-	0.0173 UJ	-	-	0.0166 UJ	-
Strontium	mg/kg	n/v	n/v	n/v	n/v	-	21.1 J	-	-	5.51 J	-	-	58.0 J	-
Thallium	mg/kg	1.2[A]	10[B]	n/v	n/v	-	0.196 J	-	-	0.0646 J	-	-	0.156 J	-
Vanadium	mg/kg	66[A]	564[B]	n/v	n/v	-	20.0 J	-	-	8.01 J	-	-	13.6 J	-
Zinc	mg/kg	121[A]	459[B]	120[C]	460[D]	-	59.8 J	-	-	19.5 J	-	-	42.1 J	-
Radiological Parameters														
Radium-226	pCi/g	n/v	n/v	n/v	n/v	-	1.13 +/-(0.458)J	-	-	0.635 +/-(0.439)J	-	-	1.30 +/-(0.348)J	-
Radium-228	pCi/g	n/v	n/v	n/v	n/v	-	2.51 +/-(0.628)	-	-	0.587 +/-(0.339)U	-	-	1.61 +/-(0.666)	-
Radium-226+228	pCi/g	90[A]	90[B]	n/v	n/v	-	3.64 +/-(0.777)J	-	-	1.22 +/-(0.555)J	-	-	2.91 +/-(0.751)J	-
Anions														
Chloride	mg/kg	n/v	n/v	n/v	n/v	-	12.5 UJ	-	-	15.8 J	-	-	9.40 J	-
Fluoride	mg/kg	n/v	n/v	n/v	n/v	-	2.19 UJ	-	-	1.65 UJ	-	-	2.00 J	-
Sulfate	mg/kg	n/v	n/v	n/v	n/v	-	1,380 J	-	-	451 J	-	-	674 J	-
General Chemistry														
% ASH	%	20[E]	40[F]	n/v	n/v	<1	-	1	<1	-	2	<1	-	<1
pH (lab)	SU	n/v	n/v	n/v	n/v	-	6.9	-	-	6.4	-	-	7.2	-

See notes on last page.

Table J.3-1 Sediment Analytical Results
John Sevier Fossil Plant
December 2018 and April 2019

Sample Location						JSF-PB05			JSF-PB06		JSF-PB07		JSF-PB08		JSF-PB09	
Sample Date		Freshwater Sediment		Sediment Quality		19-Dec-18	19-Dec-18	19-Dec-18	19-Dec-18	19-Dec-18	19-Dec-18	19-Dec-18	19-Dec-18	19-Dec-18	19-Dec-18	19-Dec-18
Sample ID						JSF-SED-PB05-CORCC-0.0/0.5-20181219	JSF-SED-PB05-CORCC-0.0/0.5-20181219	JSF-SED-PB05-CORCC-0.5/0.9-20181219	JSF-SED-PB06-CORCC-0.0/0.5-20181219	JSF-SED-PB06-CORCC-0.0/0.5-20181219	JSF-SED-PB07-CORCC-0.0/0.5-20181219	JSF-SED-PB07-CORCC-0.0/0.5-20181219	JSF-SED-PB08-CORCC-0.0/0.5-20181219	JSF-SED-PB08-CORCC-0.0/0.5-20181219	JSF-SED-PB09-CORCC-0.0/0.5-20181219	JSF-SED-PB09-CORCC-0.0/0.5-20181219
Parent Sample ID																
Sample Depth						0 - 0.5 ft	0 - 0.5 ft	0.5 - 0.9 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 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	Normal Environmental Sample	Normal Environmental Sample
Level of Review	Units	Screening Values		Assessment Guidelines		Final-Verified	Validated	Final-Verified	Final-Verified	Validated	Final-Verified	Validated	Final-Verified	Validated	Final-Verified	Validated
		Chronic	Acute	TEC	PEC											
Metals																
Antimony	mg/kg	2[A]	25[B]	n/v	n/v	-	0.280 J	-	-	0.292 J	-	0.469 J	-	0.106 J	-	0.152 J
Arsenic	mg/kg	9.8[A]	33[B]	9.8[C]	33[D]	-	5.04 J	-	-	**12.9 J[AC]**	-	**20.7 J[AC]**	-	5.20	-	6.33
Barium	mg/kg	240[A]	22,925[B]	n/v	n/v	-	73.5 J	-	-	88.9 J	-	107 J	-	38.7	-	46.2
Beryllium	mg/kg	1.2[A]	42[B]	n/v	n/v	-	1.01 J	-	-	**1.47 J[A]**	-	**1.59 J[A]**	-	0.605 J	-	0.655 J
Boron	mg/kg	n/v	n/v	n/v	n/v	-	5.47 J	-	-	6.31 J	-	8.96 J	-	1.50 J	-	3.19 J
Cadmium	mg/kg	1[A]	5[B]	1[C]	5[D]	-	0.137 J	-	-	0.151 J	-	0.347 J	-	0.0352 J	-	0.212
Calcium	mg/kg	n/v	n/v	n/v	n/v	-	11,400 J	-	-	29,400 J	-	8,340 J	-	2,600 J	-	5,810 J
Chromium	mg/kg	43.4[A]	111[B]	43[C]	110[D]	-	14.0 J	-	-	15.9 J	-	20.0 J	-	15.1 J	-	9.27 J
Cobalt	mg/kg	50[A]	n/v	50[C]	n/v	-	12.5 J	-	-	13.5 J	-	17.6 J	-	4.90 J	-	7.28 J
Copper	mg/kg	31.6[A]	149[B]	32[C]	150[D]	-	18.8 J	-	-	17.3 J	-	22.5 J	-	6.43 J	-	10.8 J
Lead	mg/kg	35.8[A]	128[B]	36[C]	130[D]	-	20.7 J	-	-	17.2 J	-	19.1 J	-	11.2	-	10.6
Lithium	mg/kg	n/v	n/v	n/v	n/v	-	24.0 J	-	-	28.0 J	-	34.4 J	-	11.0 J	-	14.5 J
Mercury	mg/kg	0.18[A]	1.1[B]	0.18[C]	1.1[D]	-	0.107 J	-	-	0.0508 J	-	0.0604 J	-	0.0389	-	0.0677
Molybdenum	mg/kg	38[A]	69,760[B]	n/v	n/v	-	0.590 J	-	-	5.67 J	-	14.3 J	-	0.777	-	1.07
Nickel	mg/kg	22.7[A]	48.6[B]	23[C]	49[D]	-	14.4 J	-	-	20.6 J	-	**24.5 J[AC]**	-	7.04 J	-	8.94 J
Selenium	mg/kg	2[A]	2.9[B]	n/v	n/v	-	0.612 J	-	-	0.795 J	-	1.06 J	-	0.332 J	-	0.426 J
Silver	mg/kg	1[A]	2.2[B]	n/v	n/v	-	0.0386 J	-	-	0.0224 UJ	-	0.0343 J	-	0.0136 J	-	0.0183 J
Strontium	mg/kg	n/v	n/v	n/v	n/v	-	19.2 J	-	-	47.6 J	-	30.4 J	-	8.61	-	15.9
Thallium	mg/kg	1.2[A]	10[B]	n/v	n/v	-	0.174 J	-	-	0.349 J	-	0.409 J	-	0.137	-	0.174
Vanadium	mg/kg	66[A]	564[B]	n/v	n/v	-	16.5 J	-	-	17.5 J	-	20.7 J	-	16.2 J	-	9.95 J
Zinc	mg/kg	121[A]	459[B]	120[C]	460[D]	-	66.9 J	-	-	66.3 J	-	86.2 J	-	21.5 J	-	38.2 J
Radiological Parameters																
Radium-226	pCi/g	n/v	n/v	n/v	n/v	-	1.12 +/-(0.290)J	-	-	1.24 +/-(0.320)J	-	1.36 +/-(0.415)J	-	0.935 +/-(0.241)	-	0.974 +/-(0.223)
Radium-228	pCi/g	n/v	n/v	n/v	n/v	-	1.60 +/-(0.466)	-	-	1.16 +/-(0.399)	-	2.24 +/-(0.586)	-	1.37 +/-(0.493)	-	1.24 +/-(0.266)
Radium-226+228	pCi/g	90[A]	90[B]	n/v	n/v	-	2.72 +/-(0.549)J	-	-	2.40 +/-(0.511)J	-	3.60 +/-(0.718)J	-	2.31 +/-(0.549)	-	2.21 +/-(0.347)
Anions																
Chloride	mg/kg	n/v	n/v	n/v	n/v	-	10.2 UJ	-	-	12.0 UJ	-	11.4 J	-	<6.09	-	<5.86
Fluoride	mg/kg	n/v	n/v	n/v	n/v	-	1.79 UJ	-	-	2.10 UJ	-	2.16 J	-	1.16 J	-	<1.03
Sulfate	mg/kg	n/v	n/v	n/v	n/v	-	236 J	-	-	384 J	-	364 J	-	79.3	-	88.4
General Chemistry																
% ASH	%	20[E]	40[F]	n/v	n/v	<1	-	4	7	-	5	-	2	-	<1	-
pH (lab)	SU	n/v	n/v	n/v	n/v	-	7.3	-	-	7.2	-	7.2	-	7.2	-	7.3

Notes:

A	Freshwater Sediment Screening Values - Chronic
B	Freshwater Sediment Screening Values - Acute
C	Sediment Quality Assessment Guidelines - TEC
D	Sediment Quality Assessment Guidelines - PEC
E	Trigger for Phase 2 sampling
F	Threshold value for potential effects to benthic fauna
6.5[A]	Concentration is greater than or equal to the indicated standard.
15.2	measured concentration did not exceed the indicated standard
<0.03	analyte was not detected at a concentration greater than the Method Detection Limit
ft	feet
ID	Identification
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
J	quantitation is approximate due to limitations identified during data validation
UJ	This compound was not detected, but the reporting or detection limit should be considered estimated due to a bias identified during data validation.
%	percent
mg/kg	milligrams per kilogram
pCi/g	picocuries per gram

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

Table J.3-2 Mayfly Analytical Results
John Sevier Fossil Plant
September 2019

Sample Location	Sample Date	Sample ID	Parent Sample ID	Sample Type	Level of Review	% Moisture	Arsenic	Beryllium	Copper	Mercury	Nickel	Zinc
						%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
							NOAEL / LOAEL		NOAEL / LOAEL	NOAEL / LOAEL	NOAEL / LOAEL	NOAEL / LOAEL
						n/v	0.0249[A] / 0.249[B]	n/v	26[A] / 260[B]	2.7[A] / 27[B]	0.115[A] / 1.15[B]	382[A] / 3,820[B]
JSF-HRA1	26-Sep-19	JSF-MFN-HRA1-20190926		Normal Environmental Sample	Validated	83.2	**0.39[AB]**	<0.030	2.7	0.032 J	**0.75[A]**	32.0
	26-Sep-19	JSF-MFP-HRA1-20190926		Normal Environmental Sample	Validated	86.3	**0.18[A]**	<0.033	1.9	0.025 J	**0.21[A]**	31.5
JSF-HRA2	26-Sep-19	JSF-MFN-DUP01-20190926	JSF-MFN-HRA2-20190926	Field Duplicate Sample	Validated	83.3	**0.43[AB]**	0.039 J	3.3	0.044 J	**0.90[A]**	32.8
	26-Sep-19	JSF-MFN-HRA2-20190926		Normal Environmental Sample	Validated	84.4	**0.45[AB]**	0.035 J	3.5	0.052 J	**0.93[A]**	35.9
	26-Sep-19	JSF-MFP-HRA2-20190926		Normal Environmental Sample	Validated	86.5	**0.13[A]**	<0.032	1.7	0.018 J	**0.18[A]**	29.9
JSF-HRD	27-Sep-19	JSF-MFN-DUP02-20190927	JSF-MFN-HRD-20190927	Field Duplicate Sample	Validated	81.2	**0.55[AB]**	0.046 J	3.9	0.050 J	**1.2[AB]**	37.1
	27-Sep-19	JSF-MFN-HRD-20190927		Normal Environmental Sample	Validated	80.7	**0.62[AB]**	0.058 J	4.4	0.055 J	**1.5[AB]**	34.4
	27-Sep-19	JSF-MFP-HRD-20190927		Normal Environmental Sample	Validated	85.1	**0.14[A]**	<0.031	1.9	0.018 J	**0.22[A]**	29.6
JSF-HRU	27-Sep-19	JSF-MFN-HRU-20190927		Normal Environmental Sample	Validated	81.3	**0.71[AB]**	0.057 J	4.8	0.039 J	**1.6[AB]**	39.5
	27-Sep-19	JSF-MFP-HRU-20190927		Normal Environmental Sample	Validated	84.7	**0.19[A]**	<0.031	2.2	<0.0074	**0.37[A]**	34.9

Notes:

A	Critical Body Residue NOAEL
B	Critical Body Residue LOAEL
NOAEL	No Observed Adverse Effect Level
LOAEL	Lowest Observed Adverse Effect Level
6.5[A]	Concentration exceeds the indicated standard as described in Note 2 below.
15.2	Measured concentration did not exceed the indicated standard.
<0.03	analyte was not detected at a concentration greater than the Method Detection Limit
J	quantitation is approximate due to limitations identified during data validation
%	percent
mg/kg	milligrams per kilogram

1. Level of review is defined in the Quality Assurance Project Plan.
2. Mayfly tissue sampling results were evaluated using Critical Body Residue (CBR) values for the CCR parameters detected above ESVs in surface stream water and sediment samples (see Chapters 3.3 and 4.3).

EXHIBITS

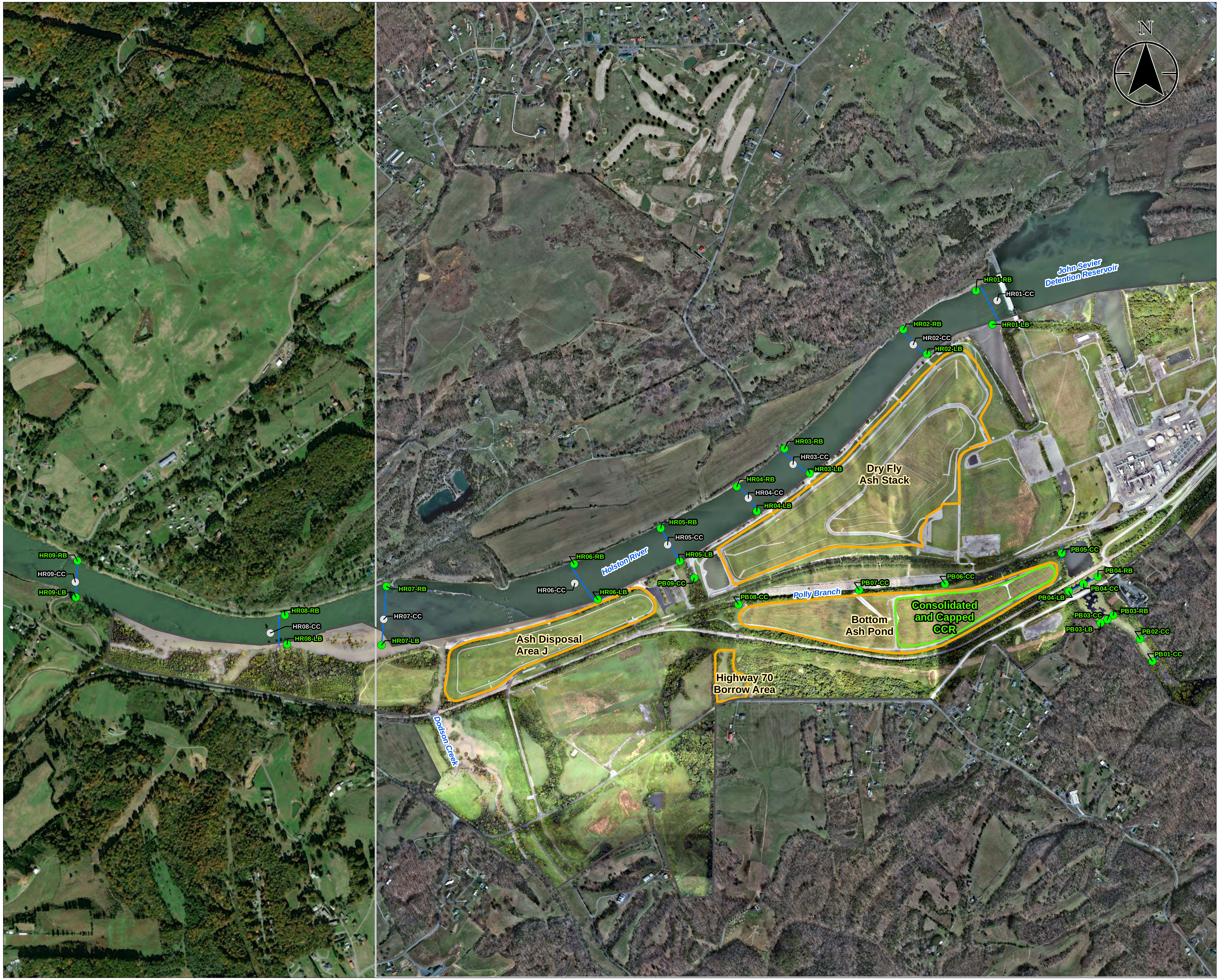


Exhibit No.

J.3-1

Title

Sediment Sampling Locations

Client/Project

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

Project Location

Rogersville, Tennessee

175568225
Prepared by DMB on 2022-05-31
Technical Review by BL on 2022-05-31

0 600 1,200 1,800 2,400 Feet

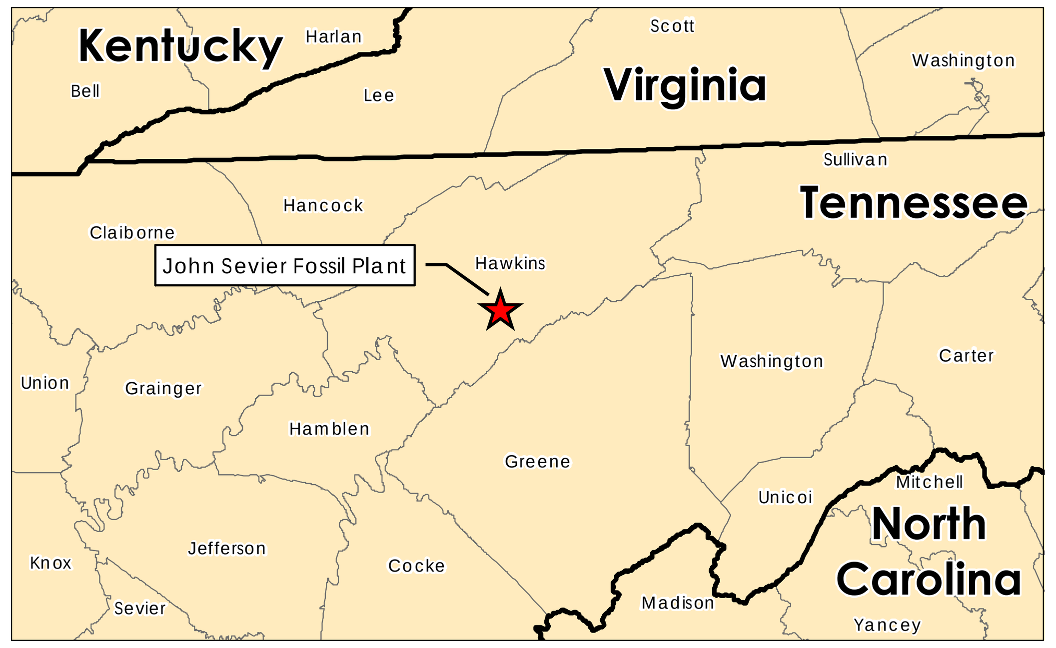
1:7,200 (At original document size of 22x34)

Legend

- Sediment Sampling Locations - Collected
- Sediment Sampling Locations - Attempted: Insufficient Sediment for Sampling
- Sediment Sampling Location Transects
- 2017 Imagery Boundary
- 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), TVA (2018-09-11), and Esri World Imagery



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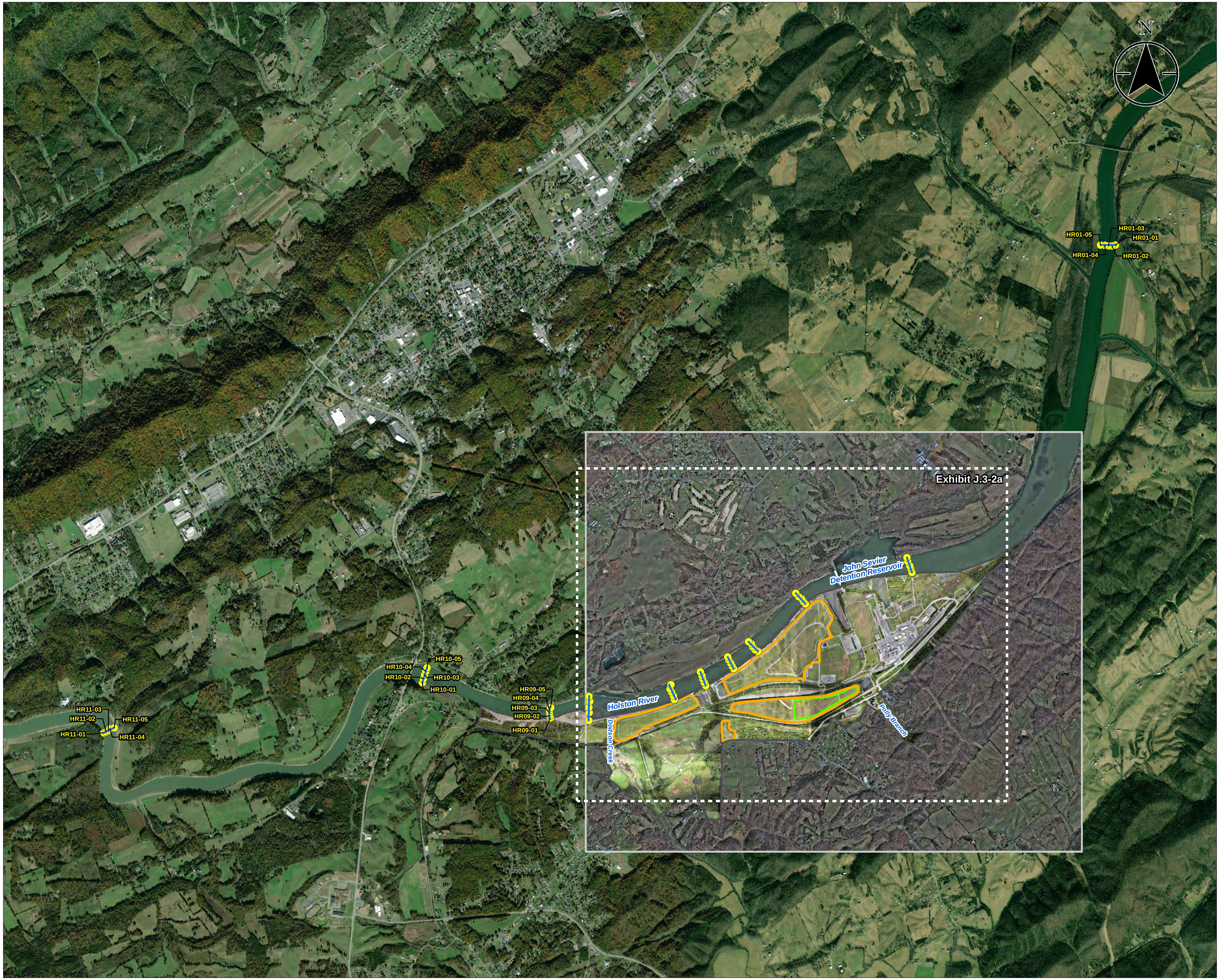


Exhibit No.
J.3-2

Title

Benthic Macroinvertebrate Sampling Locations

Client/Project

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

Project Location
Rogersville, Tennessee

175568225
Prepared by DMB on 2022-05-31
Technical Review by BL on 2022-05-31

0 1,500 3,000 4,500 6,000 Feet

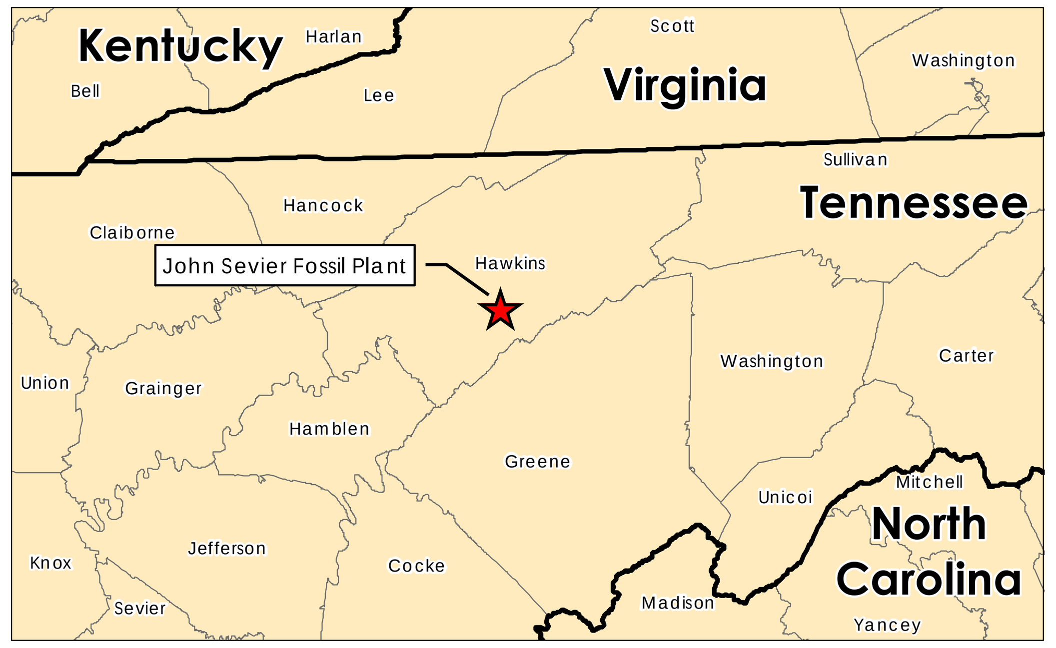
1:18,000 (At original document size of 22x34)

Legend

- Benthic Macroinvertebrate Sampling Community Sampling Locations
- Benthic Macroinvertebrate Sampling Community Sampling Locations - Transect
- 2017 Imagery Boundary
- 2018 Imagery Boundary
- CCR Unit Area
- Consolidated & Capped CCR Area

Notes

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



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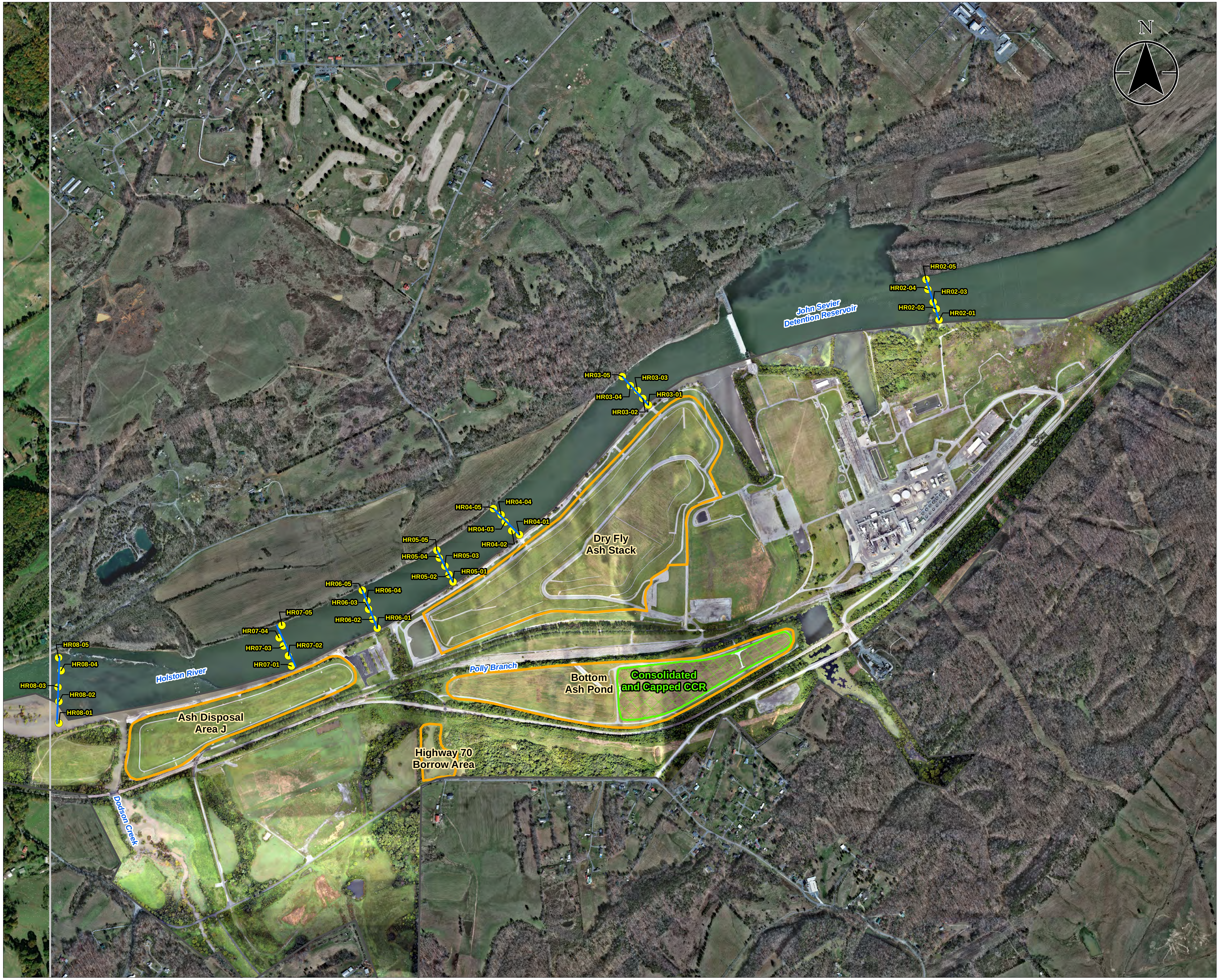


Exhibit No.

J.3-2a

Title

Benthic Macroinvertebrate Sampling Locations

Client/Project

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

Project Location

Rogersville, Tennessee

175568225
Prepared by DMB on 2022-05-31
Technical Review by BL on 2022-05-31

0 550 1,100 1,650 2,200 Feet

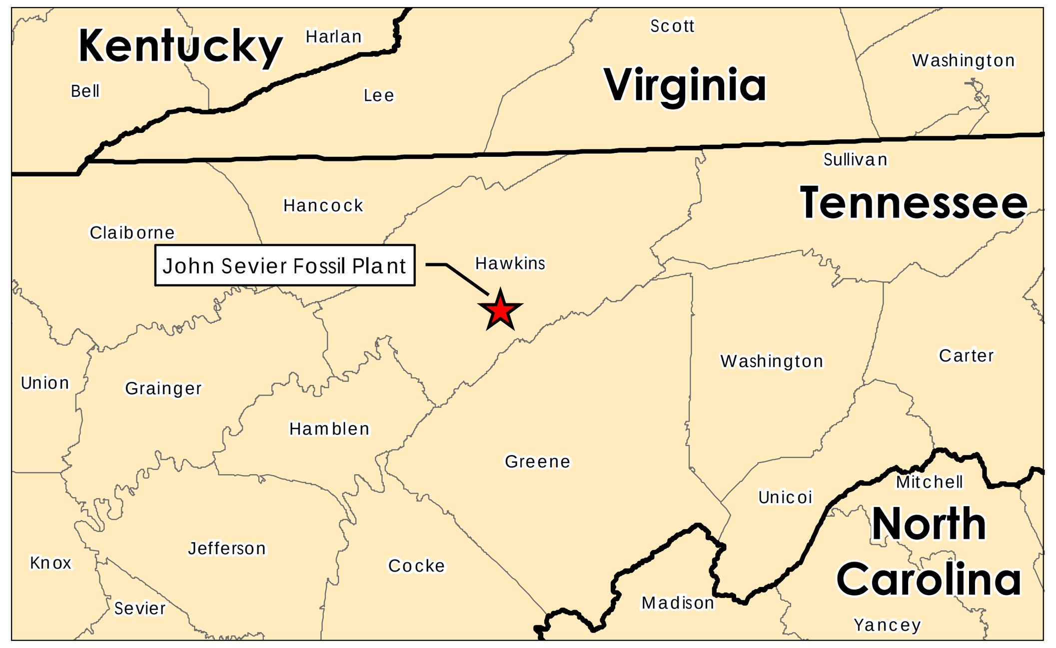
1:6,600 (At original document size of 22x34)

Legend

- Benthic Macroinvertebrate Sampling Community Sampling Locations
- Benthic Macroinvertebrate Sampling Community Sampling Locations - Transect
- 2017 Imagery Boundary
- 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), TVA (2018-09-11), and Esri World Imagery



Stantec TVA

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Exhibit No.

J.3-3

Title

Mayfly Sampling Reaches

Client/Project

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

Project Location

Rogersville, Tennessee

175568225
Prepared by DMB on 2022-05-31
Technical Review by BL on 2022-05-31

0 2,000 4,000 6,000 8,000 Feet

1:24,000 (At original document size of 22x34)

Legend

Mayfly Sampling Reaches

HRU – Holston River Upstream
HRA1 – Holston River Adjacent 1
HRA2 – Holston River Adjacent 2
HRD – Holston River Downstream

2017 Imagery Boundary

2018 Imagery Boundary

Limit of Historical Ash Disposal Ponds (Approximate)

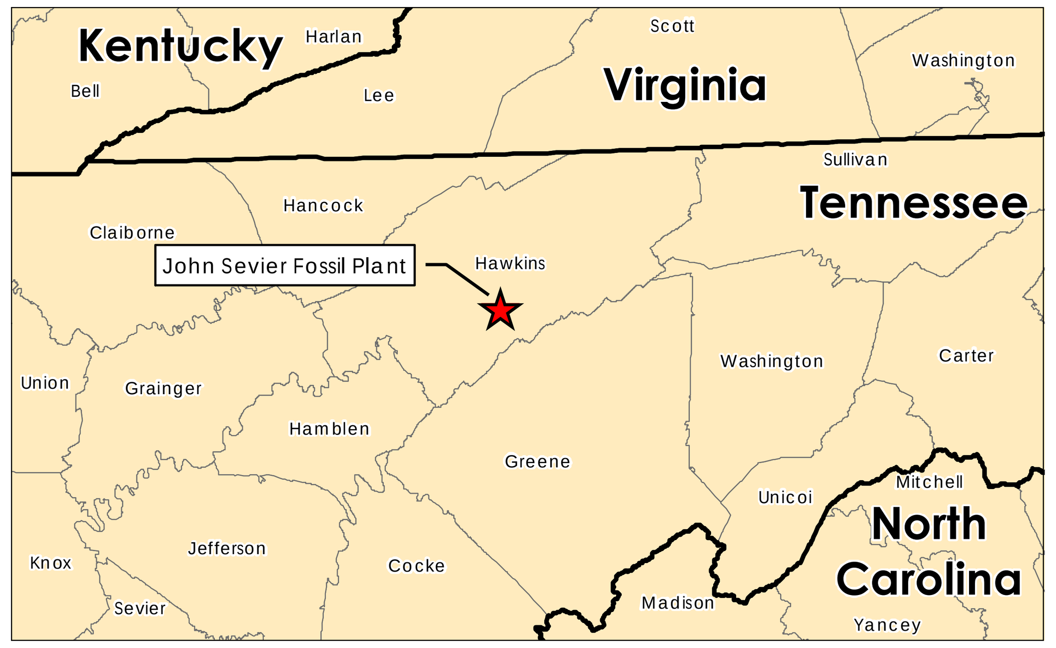
CCR Unit Area (Approximate)

Closed Coal Yards and Chemical Ponds (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), TVA (2018-09-11), and Bing Imagery



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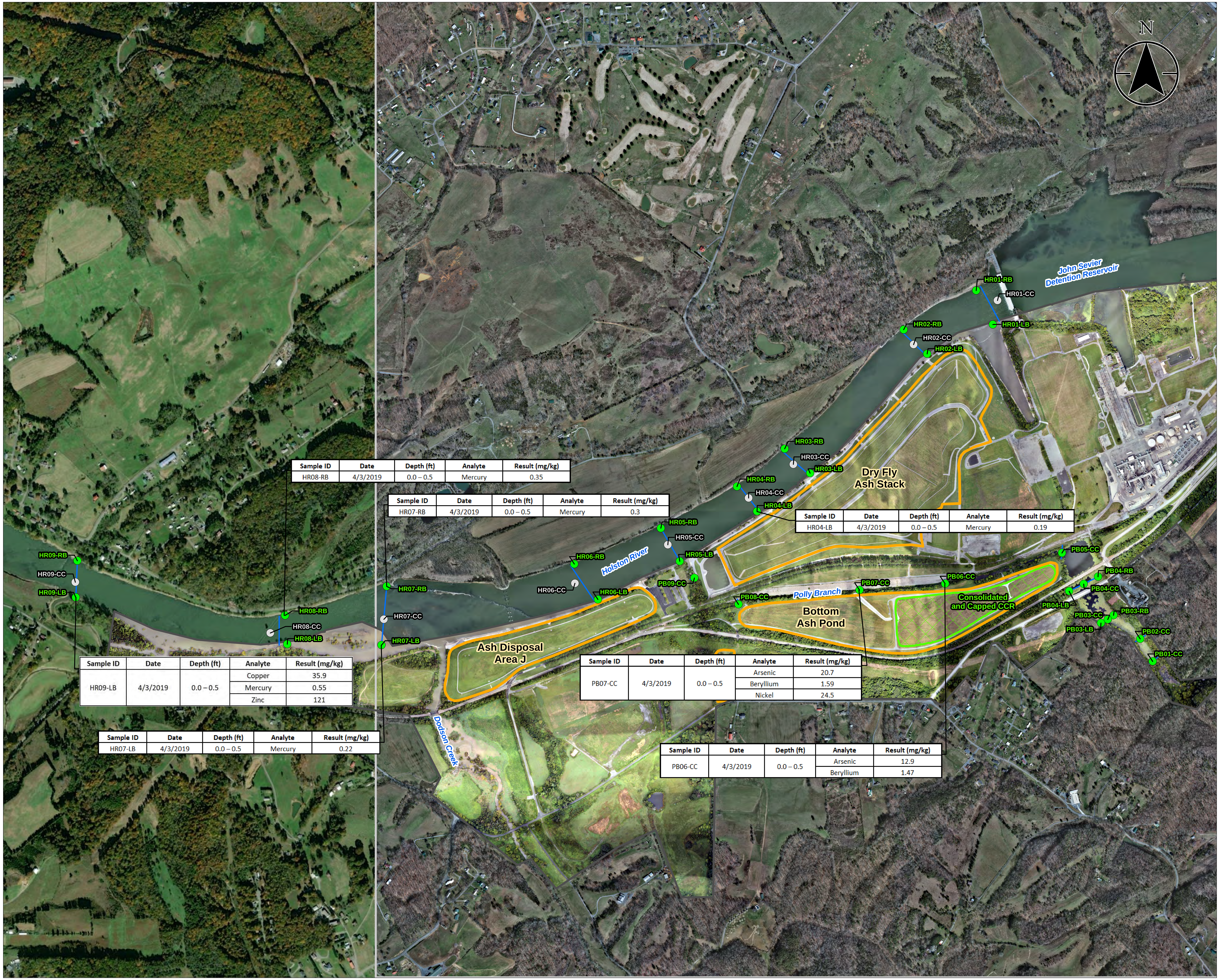

Sample ID	Date	Depth (ft)	Analyte	Result (mg/kg)
HR08-RB	4/3/2019	0.0 – 0.5	Mercury	0.35

Sample ID	Date	Depth (ft)	Analyte	Result (mg/kg)
HR07-RB	4/3/2019	0.0 – 0.5	Mercury	0.3

Sample ID	Date	Depth (ft)	Analyte	Result (mg/kg)
HR04-LB	4/3/2019	0.0 – 0.5	Mercury	0.19

Sample ID	Date	Depth (ft)	Analyte	Result (mg/kg)
HR09-LB	4/3/2019	0.0 – 0.5	Copper	35.9
			Mercury	0.55
			Zinc	121

Sample ID	Date	Depth (ft)	Analyte	Result (mg/kg)
PB07-CC	4/3/2019	0.0 – 0.5	Arsenic	20.7
			Beryllium	1.59
			Nickel	24.5

Sample ID	Date	Depth (ft)	Analyte	Result (mg/kg)
HR07-LB	4/3/2019	0.0 – 0.5	Mercury	0.22

Sample ID	Date	Depth (ft)	Analyte	Result (mg/kg)
PB06-CC	4/3/2019	0.0 – 0.5	Arsenic	12.9
			Beryllium	1.47

Exhibit No.

J.3-4

Title

Sediment Sampling Results At Or Above Ecological Screening Values

Client/Project

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

Project Location

Rogersville, Tennessee

175568225
Prepared by DMB on 2022-10-20
Technical Review by BL on 2022-10-20

0 600 1,200 1,800 2,400 Feet

1:7,200 (At original document size of 22x34)

Legend

- Sediment Sampling Locations - Collected
- Sediment Sampling Locations - Attempted: Insufficient Sediment for Sampling
- Sediment Sampling Location Transects
- 2017 Imagery Boundary
- 2018 Imagery Boundary
- CCR Unit Area (Approximate)
- Consolidated & Capped CCR Area (Approximate)

ESV - Ecological Screening Value
CC - Center Channel
RB- Right Bank
LB- Left Bank
mg/kg - milligrams per kilogram

CCR Parameters	Freshwater Sediment Screening Values		Sediment Quality Assessment Guidelines	
	Chronic (mg/kg-dw)	Acute (mg/kg-dw)	TEC (mg/kg)	PEC (mg/kg)
Arsenic	9.8	33	9.8	33
Beryllium	1.2	42	NA	NA
Mercury	0.18	1.1	0.18	1.1
Copper	31.6	149	32	150
Nickel	22.7	48.6	23	49
Zinc	121	459	120	460

Notes

1. Mercury results in Holston River sediments are considered related to a documented source of mercury upstream of the JSF Plant (USEPA 2017).
2. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet
3. Imagery Provided by Tuck Mapping (2017-03-08), TVA (2018-09-11), and Esri World Imagery

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Exhibit No.
J.3-5

Title
Mayfly Sampling Results Above Critical Body Residue Values

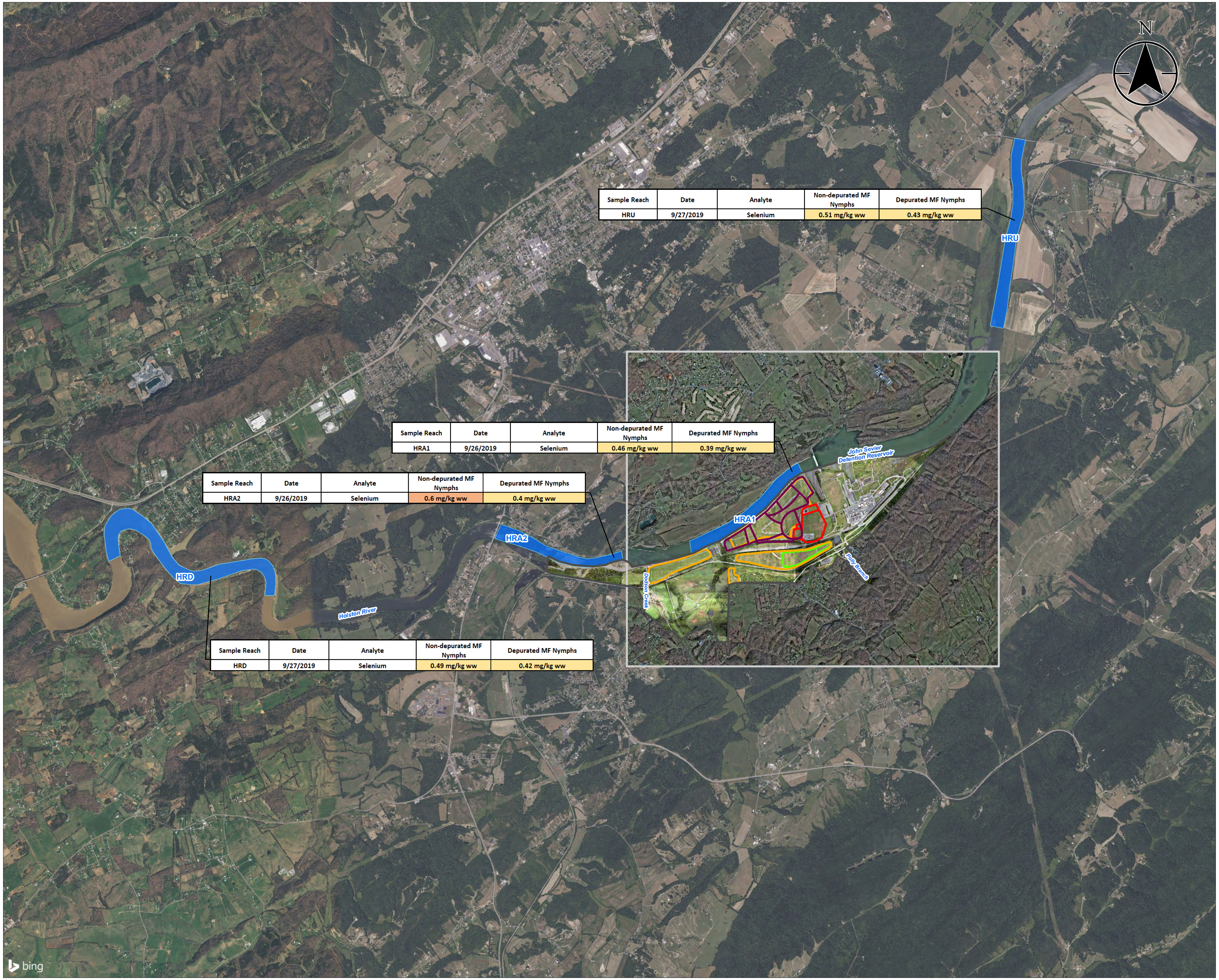
Client/Project

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

Project Location
Rogersville, Tennessee

175568225
Prepared by DMB on 2022-10-20
Technical Review by BL on 2022-10-20

0 2,000 4,000 6,000 8,000 Feet
1:24,000 (At original document size of 22x34)



Sample Reach	Date	Analyte	Non-depurated MF Nymphs	Depurated MF Nymphs
HRU	9/27/2019	Selenium	0.51 mg/kg ww	0.43 mg/kg ww

Sample Reach	Date	Analyte	Non-depurated MF Nymphs	Depurated MF Nymphs
HRA1	9/26/2019	Selenium	0.46 mg/kg ww	0.39 mg/kg ww

Sample Reach	Date	Analyte	Non-depurated MF Nymphs	Depurated MF Nymphs
HRA2	9/26/2019	Selenium	0.6 mg/kg ww	0.4 mg/kg ww

Sample Reach	Date	Analyte	Non-depurated MF Nymphs	Depurated MF Nymphs
HRD	9/27/2019	Selenium	0.49 mg/kg ww	0.42 mg/kg ww

Legend

Mayfly Sampling Reaches
HRU – Holston River Upstream
HRA1 – Holston River Adjacent 1
HRA2 – Holston River Adjacent 2
HRD – Holston River Downstream

2017 Imagery Boundary
2018 Imagery Boundary
Limit of Historical Ash Disposal Ponds (Approximate)
CCR Unit Area (Approximate)
Closed Coal Yards and Chemical Ponds (Approximate)
Consolidated & Capped CCR Area (Approximate)

Concentration > CBR NOAEL
Concentration > CBR LOAEL

Abbreviations:

mg/kg ww Milligrams per kilogram wet weight
CBR Critical body residue
NOAEL No observed adverse effect level
LOAEL Lowest observed adverse effect level
MF Mayflies

	Mayfly Tissue Critical Body Residue	
	NOAEL	LOAEL
Selenium	0.051	0.51

Notes

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

Stantec
TVA

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ATTACHMENT J.3-A - BENTHIC COMMUNITY SUMMARY SHEETS

John Sevier Fossil Plant
Waterbody: Holston River, Transition Zone
Site: HR01 (HRM 109.3)
Date: 10/03/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	18
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	15
Diptera	Ceratopogonidae	Ceratopogonidae	PR	6.8	2
Diptera	Ceratopogonidae	Probezzia sp.	PR	6.8	6
Diptera	Chironomidae	Ablabesmyia annulata	CG	7.1	44
Diptera	Chironomidae	Chironomus sp.	CG	9.3	21
Diptera	Chironomidae	Coelotanypus sp.	CG	8	1
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	4
Diptera	Chironomidae	Epoicocladius flavens	CG	0.1	1
Diptera	Chironomidae	Neostempellina sp.	CG	6	1
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	8
Diptera	Chironomidae	Procladius sp.	CG	8.8	2
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	1
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	68
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	2
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	1
Oligochaeta	Naididae	Naididae	CG	8	1
Oligochaeta	Naididae	Tubificinae whc	CG	10	2
Oligochaeta	Naididae	Tubificinae wohc	CG	10	12
Plecoptera	Plecoptera	Plecoptera	PR	4	1
			Total Organisms Collected		**211**

Reservoir Benthic Index

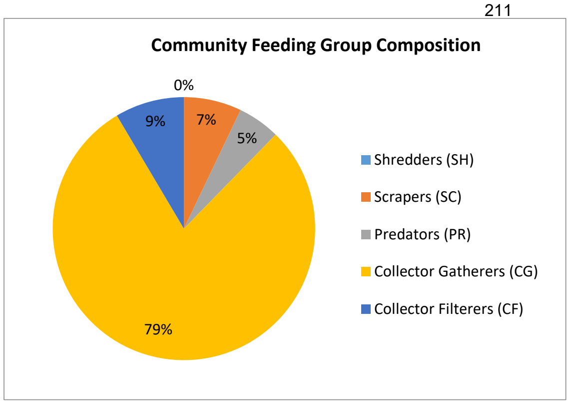
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	19	5	
EPT Richness (Genus)	2	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	7.6	5	
Percent Top Two Dominant Taxa (Genus)	53.1	5	(Hexagenia, Ablabesmyia)
Total Abundance Less Chironomidae and Oligochaeta	112	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.42	Fair
Intolerant Taxa Richness (TV ≤ 3)	1	
Percent Tolerant Taxa (TV > 3)	99.5	
Percent EPT-H	32.7	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	15	7
Predators (PR)	11	5
Collector Gatherers (CG)	167	79
Collector Filterers (CF)	18	9
	211	100



John Sevier Fossil Plant
Waterbody: Holston River, Forebay
Site: HR02 (HRM 106.7)
Date: 10/03/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	14
Coleoptera	Dytiscidae	Uvarus sp.	PR	6.4	1
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	6
Diptera	Ceratopogonidae	Probezzia sp.	PR	6.8	2
Diptera	Chironomidae	Ablabesmyia annulata	CG	7.1	13
Diptera	Chironomidae	Coelotanypus sp.	CG	8	23
Diptera	Chironomidae	Corynoneura sp.	CG	5.7	1
Diptera	Chironomidae	Epoicocladius flavens	CG	0.1	2
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	25
Diptera	Chironomidae	Polypedilum sp.	CG	6.1	1
Diptera	Chironomidae	Procladius sp.	CG	8.8	6
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	117
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	1
Oligochaeta	Naididae	Tubificinae whc	CG	10	4
Oligochaeta	Naididae	Tubificinae wohc	CG	10	23
			Total Organisms Collected		**239**

Reservoir Benthic Index

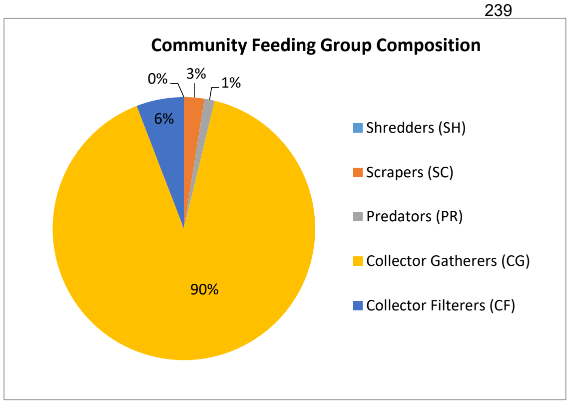
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	13	5	
EPT Richness (Genus)	1	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	11.7	5	
Percent Top Two Dominant Taxa (Genus)	60.3	5	(Hexagenia, Tubificinae)
Total Abundance Less Chironomidae and Oligochaeta	140	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.00	Fair
Intolerant Taxa Richness (TV ≤ 3)	1	
Percent Tolerant Taxa (TV > 3)	99.2	
Percent EPT-H	49.0	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	6	3
Predators (PR)	3	1
Collector Gatherers (CG)	216	90
Collector Filterers (CF)	14	6
	239	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR03 (HRM 106.0)
Date: 10/02/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	52
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	19
Coleoptera	Elmidae	Stenelmis sp.	SC	5.6	1
Diptera	Chironomidae	Chironomus sp.	CG	9.3	1
Diptera	Chironomidae	Cladotanytarsus sp.	CG	4	2
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	23
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	130
Diptera	Chironomidae	Paracladopelma undine	CG	6.3	1
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	1
Diptera	Chironomidae	Polypedilum scalaenum gp.	CG	6.1	1
Diptera	Chironomidae	Polypedilum tritum	CG	6.1	1
Diptera	Chironomidae	Pseudochironomus sp.	CG	4.9	1
Diptera	Chironomidae	Rheotanytarsus exiguus gp.	CG	6.6	6
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	24
Diptera	Chironomidae	Thienemanniella xena	CG	6.4	16
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	4
Ephemeroptera	Heptageniidae	Maccaffertium sp.	SC	3.1	1
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	4
Ephemeroptera	Leptohyphidae	Tricorythodes sp.	CG	5	1
Gastropoda	Ancylidae	Ferrissia rivularis	SC	6.6	5
Oligochaeta	Naididae	Aulodrilus pigueti	CG	7	2
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	3
Oligochaeta	Naididae	Dero trifida	CG	9.8	1
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	1
Oligochaeta	Naididae	Tubificinae wohc	CG	10	7
Trichoptera	Hydroptilidae	Hydroptila sp.	SC	6.5	3
Trichoptera	Leptoceridae	Nectopsyche pavida	SH	4.9	1
Trichoptera	Leptoceridae	Oecetis sp.	PR	5.1	2
Trichoptera	Polycentropodidae	Cyrnellus fraternus	CF	6.8	1
Trichoptera	Polycentropodidae	Polycentropodidae	CF	6.8	1
Tricladida	Planariidae	Girardia tigrina	CG	7.1	3
			Total Organisms Collected		**319**

Reservoir Benthic Index

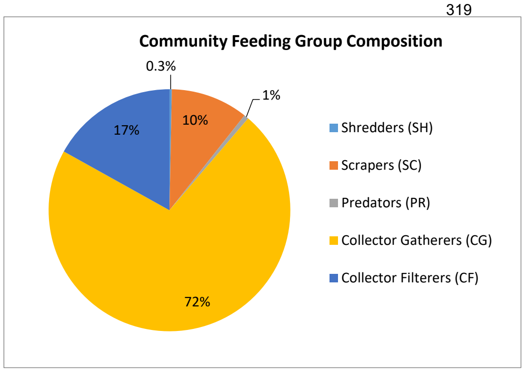
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	29	5	
EPT Richness (Genus)	9	5	
Percent Grabs Containing Long Lived Organisms	100.0	5	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	4.4	5	
Percent Top Two Dominant Taxa (Genus)	57.1	5	(Dicrotendipes, Corbicula)
Total Abundance Less Chironomidae and Oligochaeta	98	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**31**	**EXCELLENT**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.86	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	0	
Percent Tolerant Taxa (TV > 3)	100.0	
Percent EPT-H	5.64	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	1	0.3
Scrapers (SC)	33	10
Predators (PR)	2	1
Collector Gatherers (CG)	229	72
Collector Filterers (CF)	54	17
	319	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR04 (HRM 105.7)
Date: 10/02/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	18
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	2
Coleoptera	Elmidae	Stenelmis sp.	SC	5.6	2
Diptera	Chironomidae	Ablabesmyia mallochi	CG	7.1	5
Diptera	Chironomidae	Coelotanypus sp.	CG	8	1
Diptera	Chironomidae	Conchapelopia sp.	CG	8.4	1
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	70
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	163
Diptera	Chironomidae	Dicrotendipes sp.	CG	7.2	2
Diptera	Chironomidae	Nanocladius distinctus	CG	7.4	4
Diptera	Chironomidae	Parakiefferiella sp.	CG	4.8	1
Diptera	Chironomidae	Pseudochironomus sp.	CG	4.9	2
Diptera	Chironomidae	Rheotanytarsus exiguus gp.	CG	6.6	4
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	13
Diptera	Chironomidae	Thienemanniella xena	CG	6.4	34
Diptera	Tabanidae	Chrysops sp.	CG	6.7	1
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	1
Ephemeroptera	Ephemerellidae	Eurylophella sp.	SC	4	1
Ephemeroptera	Heptageniidae	Heptageniidae	SC	3	15
Ephemeroptera	Heptageniidae	Maccaffertium sp.	SC	3.1	4
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	5
Ephemeroptera	Leptohyphidae	Tricorythodes sp.	CG	5	2
Gastropoda	Ancylidae	Ferrissia rivularis	SC	6.6	1
Gastropoda	Pleuroceridae	Leptoxis praerosa	SC	1.7	1
Gastropoda	Pleuroceridae	Pleurocera unciale	SC	6	1
Gastropoda	Pleuroceridae	Pleuroceridae	SC	6	1
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	1
Oligochaeta	Naididae	Dero trifida	CG	9.8	1
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	1
Oligochaeta	Naididae	Nais sp.	CG	8.7	6
Oligochaeta	Naididae	Tubificinae wohc	CG	10	2
Trichoptera	Hydropsychidae	Cheumatopsyche sp.	CF	6.6	6
Trichoptera	Hydropsychidae	Hydropsychidae	CF	4.3	1
Trichoptera	Leptoceridae	Oecetis sp.	PR	5.1	2
Tricladida	Planariidae	Girardia tigrina	CG	7.1	4
			Total Organisms Collected		**379**

Reservoir Benthic Index

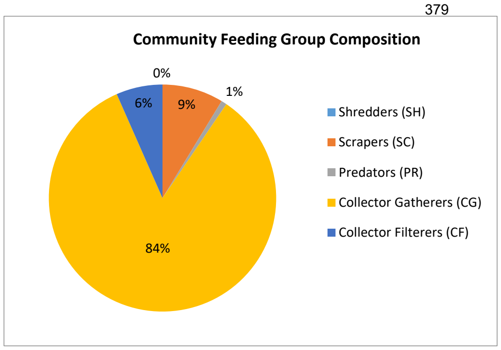
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	32	5	
EPT Richness (Genus)	9	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	2.6	5	
Percent Top Two Dominant Taxa (Genus)	62.0	5	(Dicrotendipes, Cricotopus)
Total Abundance Less Chironomidae and Oligochaeta	69	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.81	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	2	
Percent Tolerant Taxa (TV > 3)	98.8	
Percent EPT-H	7.92	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	33	9
Predators (PR)	3	1
Collector Gatherers (CG)	318	84
Collector Filterers (CF)	25	7
	379	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR05 (HRM 105.5)
Date: 10/02/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	6
Coleoptera	Elmidae	Stenelmis sp.	SC	5.6	2
Diptera	Chironomidae	Ablabesmyia mallochi	CG	7.1	1
Diptera	Chironomidae	Chironomus sp.	CG	9.3	1
Diptera	Chironomidae	Cladotanytarsus sp.	CG	4	2
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	31
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	111
Diptera	Chironomidae	Dicrotendipes simpsoni	CG	7.2	1
Diptera	Chironomidae	Polypedilum flavum	CG	6.1	4
Diptera	Chironomidae	Pseudochironomus sp.	CG	4.9	11
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	9
Diptera	Chironomidae	Thienemanniella xena	CG	6.4	26
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	3
Ephemeroptera	Heptageniidae	Heptageniidae	SC	3	1
Ephemeroptera	Heptageniidae	Maccaffertium sp.	SC	3.1	1
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	2
Ephemeroptera	Leptohyphidae	Tricorythodes sp.	CG	5	3
Gastropoda	Ancylidae	Ferrissia rivularis	SC	6.6	5
Oligochaeta	Lumbriculidae	Lumbriculidae	CG	7	2
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	7
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	1
Oligochaeta	Naididae	Nais sp.	CG	8.7	1
Oligochaeta	Naididae	Tubificinae whc	CG	10	1
Oligochaeta	Naididae	Tubificinae wohc	CG	10	4
Trichoptera	Hydropsychidae	Cheumatopsyche sp.	CF	6.6	2
Trichoptera	Hydroptilidae	Hydroptila sp.	SC	6.5	1
Trichoptera	Hydroptilidae	Orthotrichia sp.	SC	8.3	1
Tricladida	Planariidae	Girardia tigrina	CG	7.1	1
			Total Organisms Collected		**241**

Reservoir Benthic Index

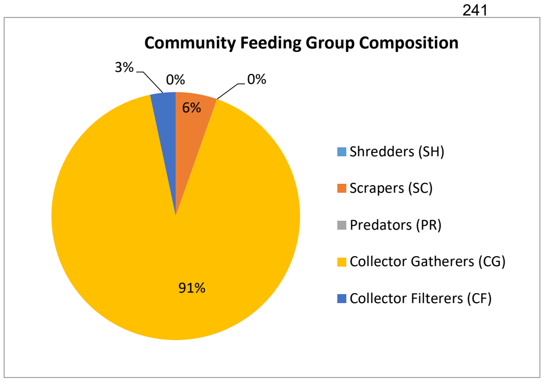
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	26	5	
EPT Richness (Genus)	8	5	
Percent Grabs Containing Long Lived Organisms	100.0	5	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	6.6	5	
Percent Top Two Dominant Taxa (Genus)	59.3	5	(Dicrotendipes, Cricotopus)
Total Abundance Less Chironomidae and Oligochaeta	28	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**31**	**EXCELLENT**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.92	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	1	
Percent Tolerant Taxa (TV > 3)	99.6	
Percent EPT-H	4.98	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	13	5
Predators (PR)	0	0
Collector Gatherers (CG)	220	91
Collector Filterers (CF)	8	3
	241	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR06 (HRM 105.3)
Date: 10/02/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	22
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	3
Coleoptera	Elmidae	Stenelmis sp.	SC	5.6	2
Diptera	Ceratopogonidae	Probezzia sp.	PR	6.8	1
Diptera	Chironomidae	Ablabesmyia mallochi	CG	7.1	3
Diptera	Chironomidae	Chironomus sp.	CG	9.3	23
Diptera	Chironomidae	Cladotanytarsus sp.	CG	4	1
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	104
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	2
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	250
Diptera	Chironomidae	Paralauterborniella nigrohalteralis	CG	4.9	2
Diptera	Chironomidae	Polypedilum flavum	CG	6.1	52
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	14
Diptera	Chironomidae	Polypedilum sp.	CG	6.1	4
Diptera	Chironomidae	Pseudochironomus sp.	CG	4.9	25
Diptera	Chironomidae	Rheotanytarsus exiguus gp.	CG	6.6	17
Diptera	Chironomidae	Rheotanytarsus sp.	CG	6.6	1
Diptera	Chironomidae	Stempellina sp.	CG	0	1
Diptera	Chironomidae	Synorthocladius semivirens	CG	4.2	2
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	135
Diptera	Chironomidae	Thienemanniella xena	CG	6.4	100
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	7
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	2
Ephemeroptera	Heptageniidae	Heptageniidae	SC	3	1
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	4
Ephemeroptera	Leptohyphidae	Tricorythodes sp.	CG	5	3
Gastropoda	Ancylidae	Ferrissia rivularis	SC	6.6	6
Gastropoda	Pleuroceridae	Leptoxis praerosa	SC	1.7	1
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	3
Oligochaeta	Naididae	Aulodrilus pigueti	CG	7	3
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	5
Oligochaeta	Naididae	Naidinae	CG	8	1
Oligochaeta	Naididae	Nais sp.	CG	8.7	3
Oligochaeta	Naididae	Pristina leidyi	CG	7.7	1
Oligochaeta	Naididae	Tubificinae whc	CG	10	9
Oligochaeta	Naididae	Tubificinae wohc	CG	10	3
Trichoptera	Hydropsychidae	Cheumatopsyche sp.	CF	6.6	13
Trichoptera	Hydropsychidae	Hydropsyche sp.	CF	4.3	2
Trichoptera	Hydroptilidae	Hydroptila sp.	SC	6.5	9
Trichoptera	Leptoceridae	Oecetis sp.	PR	5.1	4
Trichoptera	Polycentropodidae	Cyrnellus fraternus	CF	6.8	1
Tricladida	Planariidae	Girardia tigrina	CG	7.1	5
			Total Organisms Collected		**850**

Reservoir Benthic Index

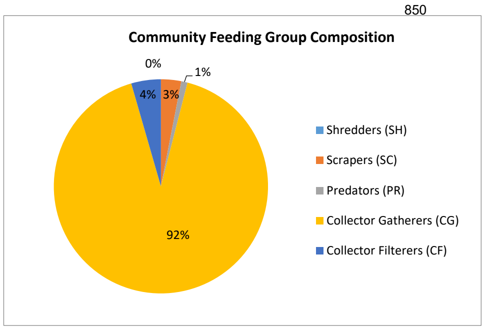
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	37	5	
EPT Richness (Genus)	10	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	2.9	5	
Percent Top Two Dominant Taxa (Genus)	45.3	5	(Dicrotendipes, Tanytarsus)
Total Abundance Less Chironomidae and Oligochaeta	89	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.85	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	3	
Percent Tolerant Taxa (TV > 3)	99.6	
Percent EPT-H	3.65	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	26	3
Predators (PR)	8	1
Collector Gatherers (CG)	778	92
Collector Filterers (CF)	38	4
	850	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR07 (HRM 105.1)
Date: 10/02/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	13
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	4
Coleoptera	Elmidae	Stenelmis sp.	SC	5.6	4
Diptera	Chironomidae	Ablabesmyia mallochi	CG	7.1	1
Diptera	Chironomidae	Ablabesmyia rhamphe gp.	CG	7.1	1
Diptera	Chironomidae	Cladotanytarsus sp.	CG	4	5
Diptera	Chironomidae	Cricotopus (Isocladius) sp. "Ozarks"	CG	7.44	6
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	260
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	6
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	227
Diptera	Chironomidae	Parachironomus sp.	CG	8	1
Diptera	Chironomidae	Paracladopelma undine	CG	6.3	1
Diptera	Chironomidae	Paralauterborniella nigrohalteralis	CG	4.9	1
Diptera	Chironomidae	Polypedilum flavum	CG	6.1	56
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	2
Diptera	Chironomidae	Pseudochironomus sp.	CG	4.9	29
Diptera	Chironomidae	Rheotanytarsus exiguus gp.	CG	6.6	25
Diptera	Chironomidae	Synorthocladius semivirens	CG	4.2	4
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	52
Diptera	Chironomidae	Thienemanniella xena	CG	6.4	92
Diptera	Empididae	Hemerodromia sp.	PR	6	1
Diptera	Tipulidae	Antocha sp.	CG	4.4	1
Ephemeroptera	Baetidae	Baetidae	CG	6	1
Ephemeroptera	Caenidae	Caenis hilaris	CG	6.8	4
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	3
Ephemeroptera	Heptageniidae	Heptageniidae	SC	3	3
Ephemeroptera	Heptageniidae	Maccaffertium sp.	SC	3.1	4
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	2
Ephemeroptera	Leptohyphidae	Tricorythodes sp.	CG	5	1
Ephemeroptera	Potamanthidae	Anthopotamus sp.	CG	1.5	4
Gastropoda	Ancylidae	Ferrissia rivularis	SC	6.6	5
Gastropoda	Pleuroceridae	Leptoxis praerosa	SC	1.7	3
Gastropoda	Pleuroceridae	Pleurocera unciale	SC	6	4
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	3
Odonata/Zygoptera	Coenagrionidae	Argia sp.	PR	8.3	1
Oligochaeta	Naididae	Aulodrilus limnobius	CG	7	1
Oligochaeta	Naididae	Aulodrilus pigueti	CG	7	2
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	3
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	1
Oligochaeta	Naididae	Tubificinae whc	CG	10	1
Oligochaeta	Naididae	Tubificinae wohc	CG	10	2
Trichoptera	Hydropsychidae	Cheumatopsyche sp.	CF	6.6	12
Trichoptera	Hydropsychidae	Hydropsyche sp.	CF	4.3	1
Trichoptera	Leptoceridae	Nectopsyche sp.	SH	4.9	1
Trichoptera	Leptoceridae	Oecetis sp.	PR	5.1	1
Tricladida	Planariidae	Girardia tigrina	CG	7.1	4
			Total Organisms Collected		**859**

Reservoir Benthic Index

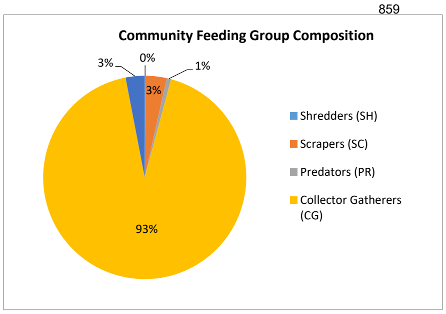
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	39	5	
EPT Richness (Genus)	8	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	1.2	5	
Percent Top Two Dominant Taxa (Genus)	57.4	5	(Cricotopus, Dicrotendipes)
Total Abundance Less Chironomidae and Oligochaeta	80	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.82	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	3	
Percent Tolerant Taxa (TV > 3)	98.8	
Percent EPT-H	2.79	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	1	0
Scrapers (SC)	29	3
Predators (PR)	6	1
Collector Gatherers (CG)	797	93
Collector Filterers (CF)	26	3
	859	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR08 (HRM 104.6)
Date: 10/01/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	6
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	1
Diptera	Chironomidae	Ablabesmyia annulata	CG	7.1	2
Diptera	Chironomidae	Ablabesmyia mallochi	CG	7.1	2
Diptera	Chironomidae	Chironomus sp.	CG	9.3	14
Diptera	Chironomidae	Cladotanytarsus sp.	CG	4	7
Diptera	Chironomidae	Coelotanypus sp.	CG	8	2
Diptera	Chironomidae	Cricotopus bicinctus	CG	7.44	2
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	146
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	3
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	61
Diptera	Chironomidae	Paralauterborniella nigrohalteral	CG	4.9	1
Diptera	Chironomidae	Polypedilum flavum	CG	6.1	27
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	6
Diptera	Chironomidae	Polypedilum scalaenum gp.	CG	6.1	2
Diptera	Chironomidae	Stempellina sp.	CG	0	1
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	38
Diptera	Chironomidae	Thienemanniella sp.	CG	6.4	1
Diptera	Chironomidae	Thienemanniella xena	CG	6.4	14
Ephemeroptera	Baetidae	Baetidae	CG	6	1
Ephemeroptera	Baetidae	Baetis intercalaris	CG	6	1
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	2
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	5
Ephemeroptera	Heptageniidae	Heptageniidae	SC	3	2
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	1
Ephemeroptera	Heptageniidae	Stenonema femoratum	SC	6.9	1
Ephemeroptera	Leptohyphidae	Tricorythodes sp.	CG	5	1
Ephemeroptera	Potamanthidae	Anthopotamus myops	CG	1.5	1
Hirudinea	Glossiphoniidae	Helobdella elongata	PR	9.3	1
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	2
Oligochaeta	Naididae	Aulodrilus pigueti	CG	7	1
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	2
Oligochaeta	Naididae	Tubificinae whc	CG	10	2
Oligochaeta	Naididae	Tubificinae wohc	CG	10	8
Trichoptera	Hydropsychidae	Hydropsychidae	CF	4.1	1
Trichoptera	Leptoceridae	Oecetis sp.	PR	5.1	1
Trichoptera	Polycentropodidae	Cyrnellus fraternus	CF	6.8	1
Tricladida	Planariidae	Girardia tigrina	CG	7.1	1
			Total Organisms Collected		**371**

Reservoir Benthic Index

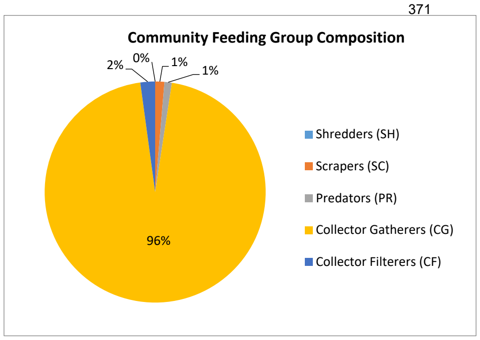
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	30	5	
EPT Richness (Genus)	7	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	3.5	5	
Percent Top Two Dominant Taxa (Genus)	56.3	5	(Cricotopus, Dicrotendipes)
Total Abundance Less Chironomidae and Oligochaeta	29	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	7.06	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	3	
Percent Tolerant Taxa (TV > 3)	98.9	
Percent EPT-H	4.58	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	5	1
Predators (PR)	4	1
Collector Gatherers (CG)	354	95
Collector Filterers (CF)	8	2
	371	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR09 (HRM 104.3)
Date: 10/01/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	9
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	2
Diptera	Chironomidae	Ablabesmyia annulata	CG	7.1	1
Diptera	Chironomidae	Ablabesmyia mallochi	CG	7.1	1
Diptera	Chironomidae	Coelotanypus sp.	CG	8	18
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	7
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	5
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	6
Diptera	Chironomidae	Nanocladius distinctus	CG	7.4	2
Diptera	Chironomidae	Polypedilum flavum	CG	6.1	5
Diptera	Chironomidae	Rheotanytarsus exiguus gp.	CG	6.6	2
Diptera	Chironomidae	Stempellina sp.	CG	0	1
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	8
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	1
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	48
Ephemeroptera	Heptageniidae	Heptageniidae	SC	3	1
Odonata/Anisoptera	Gomphidae	Gomphidae	PR	4	1
Oligochaeta	Naididae	Slavina appendiculata	CG	8.4	1
Trichoptera	Leptoceridae	Oecetis sp.	PR	5.1	1
Trichoptera	Polycentropodidae	Cyrnellus fraternus	CF	6.8	3
			Total Organisms Collected		**123**

Reservoir Benthic Index

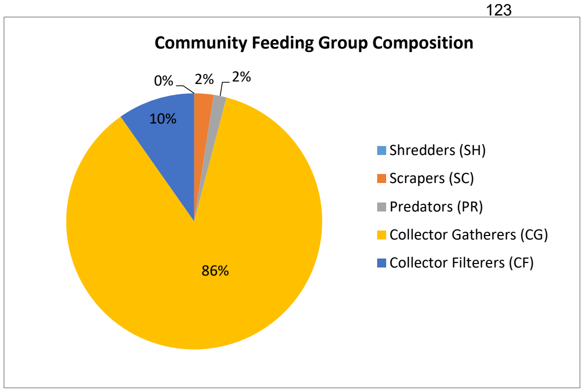
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	19	5	
EPT Richness (Genus)	5	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	0.8	5	
Percent Top Two Dominant Taxa (Genus)	53.7	5	(Hexagenia, Coelotanypus)
Total Abundance Less Chironomidae and Oligochaeta	66	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	5.90	Fair
Intolerant Taxa Richness (TV ≤ 3)	2	
Percent Tolerant Taxa (TV > 3)	98.4	
Percent EPT-H	43.90	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	3	2
Predators (PR)	2	2
Collector Gatherers (CG)	106	86
Collector Filterers (CF)	12	10
	123	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR10 (HRM 103.5)
Date: 10/01/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Sphaeriidae	Sphaeriidae	CF	6.9	6
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	2
Diptera	Ceratopogonidae	Ceratopogonidae	PR	6.8	1
Diptera	Chironomidae	Ablabesmyia annulata	CG	7.1	1
Diptera	Chironomidae	Coelotanypus sp.	CG	8	41
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	2
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	1
Diptera	Chironomidae	Epoicocladius flavens	CG	0.1	3
Diptera	Chironomidae	Procladius sp.	CG	8.8	1
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	1
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	85
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	7
Oligochaeta	Naididae	Arcteonais lomondi	CG	8	1
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	2
Oligochaeta	Naididae	Tubificinae wohc	CG	10	3
			Total Organisms Collected		**157**

Reservoir Benthic Index

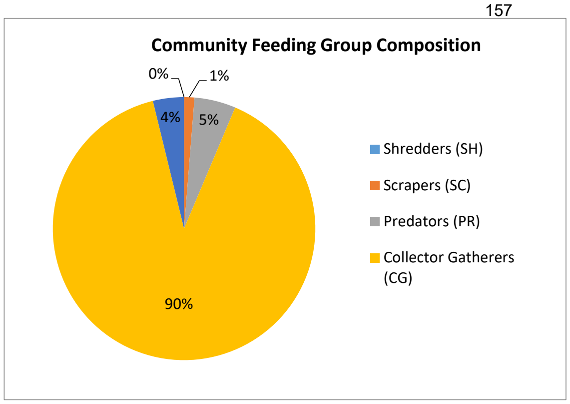
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	15	5	
EPT Richness (Genus)	1	3	
Percent Grabs Containing Long Lived Organisms	100.0	5	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	3.8	5	
Percent Top Two Dominant Taxa (Genus)	80.3	3	(Hexagenia, Coelotanypus)
Total Abundance Less Chironomidae and Oligochaeta	101	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**27**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	5.89	Fair
Intolerant Taxa Richness (TV ≤ 3)	1	
Percent Tolerant Taxa (TV > 3)	98.1	
Percent EPT-H	54.14	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	2	1
Predators (PR)	8	5
Collector Gatherers (CG)	141	90
Collector Filterers (CF)	6	4
	157	100



John Sevier Fossil Plant
Waterbody: Holston River, Transition
Site: HR11 (HRM 100.75)
Date: 10/01/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	2
Coleoptera	Elmidae	Stenelmis sp.	SC	5.6	1
Diptera	Ceratopogonidae	Probezzia sp.	PR	6.8	1
Diptera	Chironomidae	Ablabesmyia annulata	CG	7.1	23
Diptera	Chironomidae	Axarus sp.	CG	2	1
Diptera	Chironomidae	Chironomus sp.	CG	9.3	1
Diptera	Chironomidae	Coelotanypus sp.	CG	8	32
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	1
Diptera	Chironomidae	Dicrotendipes sp.	CG	7.2	1
Diptera	Chironomidae	Parachironomus sp.	CG	8	1
Diptera	Chironomidae	Polypedilum flavum	CG	6.1	2
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	1
Diptera	Chironomidae	Procladius sp.	CG	8.8	1
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	3
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	1
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	58
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	1
Gastropoda	Pleuroceridae	Leptoxis praerosa	SC	1.7	1
Hirudinea	Glossiphoniidae	Helobdella elongata	PR	9.3	1
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	13
Oligochaeta	Naididae	Aulodrilus pigueti	CG	7	30
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	8
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	2
Oligochaeta	Naididae	Limnodrilus sp.	CG	9.5	1
Oligochaeta	Naididae	Tubificinae whc	CG	10	10
Oligochaeta	Naididae	Tubificinae wohc	CG	10	31
Trichoptera	Polycentropodidae	Cyrnellus fraternus	CF	6.8	5
			Total Organisms Collected		**233**

Reservoir Benthic Index

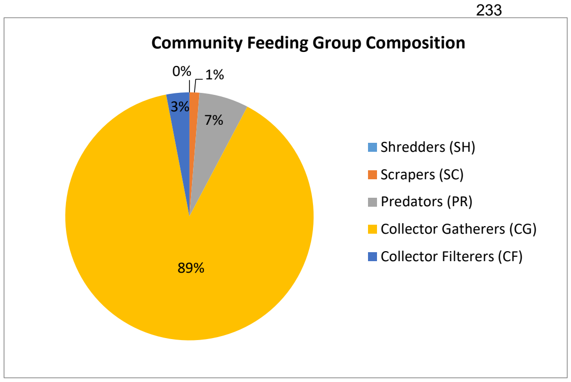
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	22	5	
EPT Richness (Genus)	4	5	
Percent Grabs Containing Long Lived Organisms	100.0	5	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	35.2	1	
Percent Top Two Dominant Taxa (Genus)	38.6	5	(Hexagenia, Coelotanypus)
Total Abundance Less Chironomidae and Oligochaeta	84	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**27**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	7.18	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	2	
Percent Tolerant Taxa (TV > 3)	99.1	
Percent EPT-H	27.90	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	3	1
Predators (PR)	15	6
Collector Gatherers (CG)	208	89
Collector Filterers (CF)	7	3
	233	100



ATTACHMENT J.3-A - BENTHIC COMMUNITY SUMMARY SHEETS

John Sevier Fossil Plant
Waterbody: Holston River, Transition Zone
Site: HR01 (HRM 109.3)
Date: 10/03/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	18
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	15
Diptera	Ceratopogonidae	Ceratopogonidae	PR	6.8	2
Diptera	Ceratopogonidae	Probezzia sp.	PR	6.8	6
Diptera	Chironomidae	Ablabesmyia annulata	CG	7.1	44
Diptera	Chironomidae	Chironomus sp.	CG	9.3	21
Diptera	Chironomidae	Coelotanypus sp.	CG	8	1
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	4
Diptera	Chironomidae	Epoicocladius flavens	CG	0.1	1
Diptera	Chironomidae	Neostempellina sp.	CG	6	1
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	8
Diptera	Chironomidae	Procladius sp.	CG	8.8	2
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	1
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	68
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	2
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	1
Oligochaeta	Naididae	Naididae	CG	8	1
Oligochaeta	Naididae	Tubificinae whc	CG	10	2
Oligochaeta	Naididae	Tubificinae wohc	CG	10	12
Plecoptera	Plecoptera	Plecoptera	PR	4	1
			Total Organisms Collected		**211**

Reservoir Benthic Index

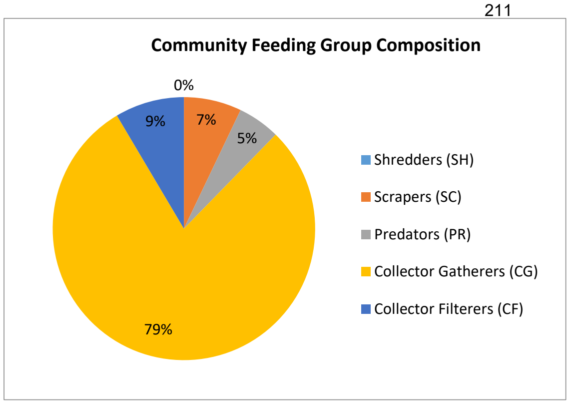
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	19	5	
EPT Richness (Genus)	2	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	7.6	5	
Percent Top Two Dominant Taxa (Genus)	53.1	5	(Hexagenia, Ablabesmyia)
Total Abundance Less Chironomidae and Oligochaeta	112	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.42	Fair
Intolerant Taxa Richness (TV ≤ 3)	1	
Percent Tolerant Taxa (TV > 3)	99.5	
Percent EPT-H	32.7	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	15	7
Predators (PR)	11	5
Collector Gatherers (CG)	167	79
Collector Filterers (CF)	18	9
	211	100



John Sevier Fossil Plant
Waterbody: Holston River, Forebay
Site: HR02 (HRM 106.7)
Date: 10/03/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	14
Coleoptera	Dytiscidae	Uvarus sp.	PR	6.4	1
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	6
Diptera	Ceratopogonidae	Probezzia sp.	PR	6.8	2
Diptera	Chironomidae	Ablabesmyia annulata	CG	7.1	13
Diptera	Chironomidae	Coelotanypus sp.	CG	8	23
Diptera	Chironomidae	Corynoneura sp.	CG	5.7	1
Diptera	Chironomidae	Epoicocladius flavens	CG	0.1	2
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	25
Diptera	Chironomidae	Polypedilum sp.	CG	6.1	1
Diptera	Chironomidae	Procladius sp.	CG	8.8	6
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	117
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	1
Oligochaeta	Naididae	Tubificinae whc	CG	10	4
Oligochaeta	Naididae	Tubificinae wohc	CG	10	23
			Total Organisms Collected		**239**

Reservoir Benthic Index

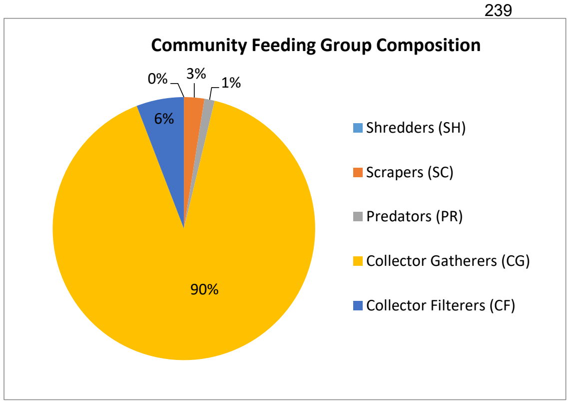
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	13	5	
EPT Richness (Genus)	1	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	11.7	5	
Percent Top Two Dominant Taxa (Genus)	60.3	5	(Hexagenia, Tubificinae)
Total Abundance Less Chironomidae and Oligochaeta	140	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.00	Fair
Intolerant Taxa Richness (TV ≤ 3)	1	
Percent Tolerant Taxa (TV > 3)	99.2	
Percent EPT-H	49.0	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	6	3
Predators (PR)	3	1
Collector Gatherers (CG)	216	90
Collector Filterers (CF)	14	6
	239	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR03 (HRM 106.0)
Date: 10/02/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	52
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	19
Coleoptera	Elmidae	Stenelmis sp.	SC	5.6	1
Diptera	Chironomidae	Chironomus sp.	CG	9.3	1
Diptera	Chironomidae	Cladotanytarsus sp.	CG	4	2
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	23
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	130
Diptera	Chironomidae	Paracladopelma undine	CG	6.3	1
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	1
Diptera	Chironomidae	Polypedilum scalaenum gp.	CG	6.1	1
Diptera	Chironomidae	Polypedilum tritum	CG	6.1	1
Diptera	Chironomidae	Pseudochironomus sp.	CG	4.9	1
Diptera	Chironomidae	Rheotanytarsus exiguus gp.	CG	6.6	6
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	24
Diptera	Chironomidae	Thienemanniella xena	CG	6.4	16
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	4
Ephemeroptera	Heptageniidae	Maccaffertium sp.	SC	3.1	1
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	4
Ephemeroptera	Leptohyphidae	Tricorythodes sp.	CG	5	1
Gastropoda	Ancylidae	Ferrissia rivularis	SC	6.6	5
Oligochaeta	Naididae	Aulodrilus pigueti	CG	7	2
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	3
Oligochaeta	Naididae	Dero trifida	CG	9.8	1
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	1
Oligochaeta	Naididae	Tubificinae wohc	CG	10	7
Trichoptera	Hydroptilidae	Hydroptila sp.	SC	6.5	3
Trichoptera	Leptoceridae	Nectopsyche pavida	SH	4.9	1
Trichoptera	Leptoceridae	Oecetis sp.	PR	5.1	2
Trichoptera	Polycentropodidae	Cyrnellus fraternus	CF	6.8	1
Trichoptera	Polycentropodidae	Polycentropodidae	CF	6.8	1
Tricladida	Planariidae	Girardia tigrina	CG	7.1	3
			Total Organisms Collected		**319**

Reservoir Benthic Index

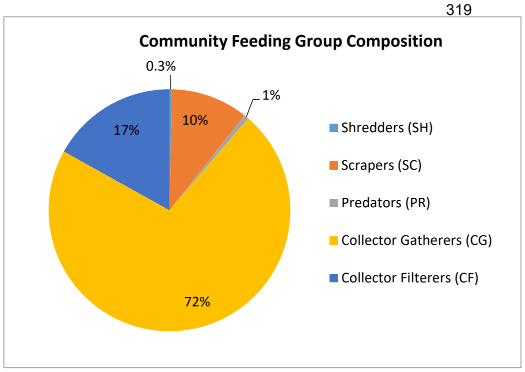
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	29	5	
EPT Richness (Genus)	9	5	
Percent Grabs Containing Long Lived Organisms	100.0	5	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	4.4	5	
Percent Top Two Dominant Taxa (Genus)	57.1	5	(Dicrotendipes, Corbicula)
Total Abundance Less Chironomidae and Oligochaeta	98	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**31**	**EXCELLENT**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.86	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	0	
Percent Tolerant Taxa (TV > 3)	100.0	
Percent EPT-H	5.64	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	1	0.3
Scrapers (SC)	33	10
Predators (PR)	2	1
Collector Gatherers (CG)	229	72
Collector Filterers (CF)	54	17
	319	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR04 (HRM 105.7)
Date: 10/02/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	18
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	2
Coleoptera	Elmidae	Stenelmis sp.	SC	5.6	2
Diptera	Chironomidae	Ablabesmyia mallochi	CG	7.1	5
Diptera	Chironomidae	Coelotanypus sp.	CG	8	1
Diptera	Chironomidae	Conchapelopia sp.	CG	8.4	1
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	70
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	163
Diptera	Chironomidae	Dicrotendipes sp.	CG	7.2	2
Diptera	Chironomidae	Nanocladius distinctus	CG	7.4	4
Diptera	Chironomidae	Parakiefferiella sp.	CG	4.8	1
Diptera	Chironomidae	Pseudochironomus sp.	CG	4.9	2
Diptera	Chironomidae	Rheotanytarsus exiguus gp.	CG	6.6	4
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	13
Diptera	Chironomidae	Thienemanniella xena	CG	6.4	34
Diptera	Tabanidae	Chrysops sp.	CG	6.7	1
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	1
Ephemeroptera	Ephemerellidae	Eurylophella sp.	SC	4	1
Ephemeroptera	Heptageniidae	Heptageniidae	SC	3	15
Ephemeroptera	Heptageniidae	Maccaffertium sp.	SC	3.1	4
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	5
Ephemeroptera	Leptohyphidae	Tricorythodes sp.	CG	5	2
Gastropoda	Ancylidae	Ferrissia rivularis	SC	6.6	1
Gastropoda	Pleuroceridae	Leptoxis praerosa	SC	1.7	1
Gastropoda	Pleuroceridae	Pleurocera unciale	SC	6	1
Gastropoda	Pleuroceridae	Pleuroceridae	SC	6	1
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	1
Oligochaeta	Naididae	Dero trifida	CG	9.8	1
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	1
Oligochaeta	Naididae	Nais sp.	CG	8.7	6
Oligochaeta	Naididae	Tubificinae wohc	CG	10	2
Trichoptera	Hydropsychidae	Cheumatopsyche sp.	CF	6.6	6
Trichoptera	Hydropsychidae	Hydropsychidae	CF	4.3	1
Trichoptera	Leptoceridae	Oecetis sp.	PR	5.1	2
Tricladida	Planariidae	Girardia tigrina	CG	7.1	4
			Total Organisms Collected		**379**

Reservoir Benthic Index

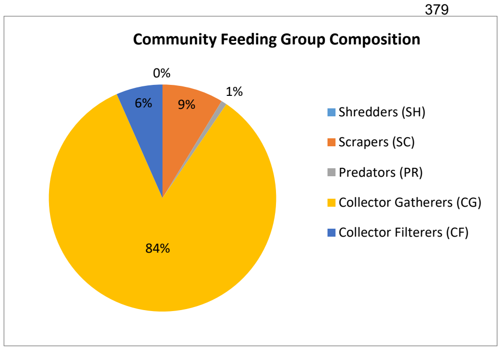
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	32	5	
EPT Richness (Genus)	9	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	2.6	5	
Percent Top Two Dominant Taxa (Genus)	62.0	5	(Dicrotendipes, Cricotopus)
Total Abundance Less Chironomidae and Oligochaeta	69	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.81	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	2	
Percent Tolerant Taxa (TV > 3)	98.8	
Percent EPT-H	7.92	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	33	9
Predators (PR)	3	1
Collector Gatherers (CG)	318	84
Collector Filterers (CF)	25	7
	379	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR05 (HRM 105.5)
Date: 10/02/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	6
Coleoptera	Elmidae	Stenelmis sp.	SC	5.6	2
Diptera	Chironomidae	Ablabesmyia mallochi	CG	7.1	1
Diptera	Chironomidae	Chironomus sp.	CG	9.3	1
Diptera	Chironomidae	Cladotanytarsus sp.	CG	4	2
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	31
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	111
Diptera	Chironomidae	Dicrotendipes simpsoni	CG	7.2	1
Diptera	Chironomidae	Polypedilum flavum	CG	6.1	4
Diptera	Chironomidae	Pseudochironomus sp.	CG	4.9	11
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	9
Diptera	Chironomidae	Thienemanniella xena	CG	6.4	26
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	3
Ephemeroptera	Heptageniidae	Heptageniidae	SC	3	1
Ephemeroptera	Heptageniidae	Maccaffertium sp.	SC	3.1	1
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	2
Ephemeroptera	Leptohyphidae	Tricorythodes sp.	CG	5	3
Gastropoda	Ancylidae	Ferrissia rivularis	SC	6.6	5
Oligochaeta	Lumbriculidae	Lumbriculidae	CG	7	2
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	7
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	1
Oligochaeta	Naididae	Nais sp.	CG	8.7	1
Oligochaeta	Naididae	Tubificinae whc	CG	10	1
Oligochaeta	Naididae	Tubificinae wohc	CG	10	4
Trichoptera	Hydropsychidae	Cheumatopsyche sp.	CF	6.6	2
Trichoptera	Hydroptilidae	Hydroptila sp.	SC	6.5	1
Trichoptera	Hydroptilidae	Orthotrichia sp.	SC	8.3	1
Tricladida	Planariidae	Girardia tigrina	CG	7.1	1
			Total Organisms Collected		**241**

Reservoir Benthic Index

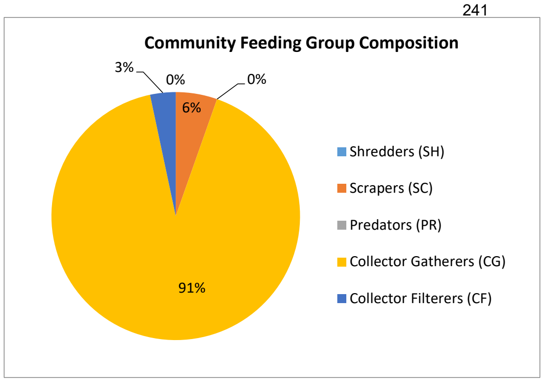
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	26	5	
EPT Richness (Genus)	8	5	
Percent Grabs Containing Long Lived Organisms	100.0	5	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	6.6	5	
Percent Top Two Dominant Taxa (Genus)	59.3	5	(Dicrotendipes, Cricotopus)
Total Abundance Less Chironomidae and Oligochaeta	28	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**31**	**EXCELLENT**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.92	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	1	
Percent Tolerant Taxa (TV > 3)	99.6	
Percent EPT-H	4.98	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	13	5
Predators (PR)	0	0
Collector Gatherers (CG)	220	91
Collector Filterers (CF)	8	3
	241	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR06 (HRM 105.3)
Date: 10/02/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	22
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	3
Coleoptera	Elmidae	Stenelmis sp.	SC	5.6	2
Diptera	Ceratopogonidae	Probezzia sp.	PR	6.8	1
Diptera	Chironomidae	Ablabesmyia mallochi	CG	7.1	3
Diptera	Chironomidae	Chironomus sp.	CG	9.3	23
Diptera	Chironomidae	Cladotanytarsus sp.	CG	4	1
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	104
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	2
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	250
Diptera	Chironomidae	Paralauterborniella nigrohalteralis	CG	4.9	2
Diptera	Chironomidae	Polypedilum flavum	CG	6.1	52
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	14
Diptera	Chironomidae	Polypedilum sp.	CG	6.1	4
Diptera	Chironomidae	Pseudochironomus sp.	CG	4.9	25
Diptera	Chironomidae	Rheotanytarsus exiguus gp.	CG	6.6	17
Diptera	Chironomidae	Rheotanytarsus sp.	CG	6.6	1
Diptera	Chironomidae	Stempellina sp.	CG	0	1
Diptera	Chironomidae	Synorthocladius semivirens	CG	4.2	2
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	135
Diptera	Chironomidae	Thienemanniella xena	CG	6.4	100
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	7
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	2
Ephemeroptera	Heptageniidae	Heptageniidae	SC	3	1
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	4
Ephemeroptera	Leptohyphidae	Tricorythodes sp.	CG	5	3
Gastropoda	Ancylidae	Ferrissia rivularis	SC	6.6	6
Gastropoda	Pleuroceridae	Leptoxis praerosa	SC	1.7	1
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	3
Oligochaeta	Naididae	Aulodrilus pigueti	CG	7	3
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	5
Oligochaeta	Naididae	Naidinae	CG	8	1
Oligochaeta	Naididae	Nais sp.	CG	8.7	3
Oligochaeta	Naididae	Pristina leidyi	CG	7.7	1
Oligochaeta	Naididae	Tubificinae whc	CG	10	9
Oligochaeta	Naididae	Tubificinae wohc	CG	10	3
Trichoptera	Hydropsychidae	Cheumatopsyche sp.	CF	6.6	13
Trichoptera	Hydropsychidae	Hydropsyche sp.	CF	4.3	2
Trichoptera	Hydroptilidae	Hydroptila sp.	SC	6.5	9
Trichoptera	Leptoceridae	Oecetis sp.	PR	5.1	4
Trichoptera	Polycentropodidae	Cyrnellus fraternus	CF	6.8	1
Tricladida	Planariidae	Girardia tigrina	CG	7.1	5
			Total Organisms Collected		**850**

Reservoir Benthic Index

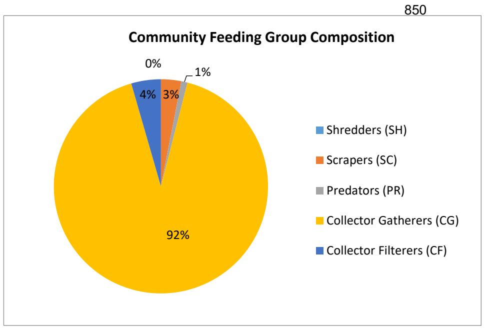
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	37	5	
EPT Richness (Genus)	10	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	2.9	5	
Percent Top Two Dominant Taxa (Genus)	45.3	5	(Dicrotendipes, Tanytarsus)
Total Abundance Less Chironomidae and Oligochaeta	89	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.85	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	3	
Percent Tolerant Taxa (TV > 3)	99.6	
Percent EPT-H	3.65	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	26	3
Predators (PR)	8	1
Collector Gatherers (CG)	778	92
Collector Filterers (CF)	38	4
	850	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR07 (HRM 105.1)
Date: 10/02/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	13
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	4
Coleoptera	Elmidae	Stenelmis sp.	SC	5.6	4
Diptera	Chironomidae	Ablabesmyia mallochi	CG	7.1	1
Diptera	Chironomidae	Ablabesmyia rhamphe gp.	CG	7.1	1
Diptera	Chironomidae	Cladotanytarsus sp.	CG	4	5
Diptera	Chironomidae	Cricotopus (Isocladius) sp. "Ozarks"	CG	7.44	6
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	260
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	6
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	227
Diptera	Chironomidae	Parachironomus sp.	CG	8	1
Diptera	Chironomidae	Paracladopelma undine	CG	6.3	1
Diptera	Chironomidae	Paralauterborniella nigrohalteralis	CG	4.9	1
Diptera	Chironomidae	Polypedilum flavum	CG	6.1	56
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	2
Diptera	Chironomidae	Pseudochironomus sp.	CG	4.9	29
Diptera	Chironomidae	Rheotanytarsus exiguus gp.	CG	6.6	25
Diptera	Chironomidae	Synorthocladius semivirens	CG	4.2	4
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	52
Diptera	Chironomidae	Thienemanniella xena	CG	6.4	92
Diptera	Empididae	Hemerodromia sp.	PR	6	1
Diptera	Tipulidae	Antocha sp.	CG	4.4	1
Ephemeroptera	Baetidae	Baetidae	CG	6	1
Ephemeroptera	Caenidae	Caenis hilaris	CG	6.8	4
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	3
Ephemeroptera	Heptageniidae	Heptageniidae	SC	3	3
Ephemeroptera	Heptageniidae	Maccaffertium sp.	SC	3.1	4
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	2
Ephemeroptera	Leptohyphidae	Tricorythodes sp.	CG	5	1
Ephemeroptera	Potamanthidae	Anthopotamus sp.	CG	1.5	4
Gastropoda	Ancylidae	Ferrissia rivularis	SC	6.6	5
Gastropoda	Pleuroceridae	Leptoxis praerosa	SC	1.7	3
Gastropoda	Pleuroceridae	Pleurocera unciale	SC	6	4
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	3
Odonata/Zygoptera	Coenagrionidae	Argia sp.	PR	8.3	1
Oligochaeta	Naididae	Aulodrilus limnobius	CG	7	1
Oligochaeta	Naididae	Aulodrilus pigueti	CG	7	2
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	3
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	1
Oligochaeta	Naididae	Tubificinae whc	CG	10	1
Oligochaeta	Naididae	Tubificinae wohc	CG	10	2
Trichoptera	Hydropsychidae	Cheumatopsyche sp.	CF	6.6	12
Trichoptera	Hydropsychidae	Hydropsyche sp.	CF	4.3	1
Trichoptera	Leptoceridae	Nectopsyche sp.	SH	4.9	1
Trichoptera	Leptoceridae	Oecetis sp.	PR	5.1	1
Tricladida	Planariidae	Girardia tigrina	CG	7.1	4
			Total Organisms Collected		**859**

Reservoir Benthic Index

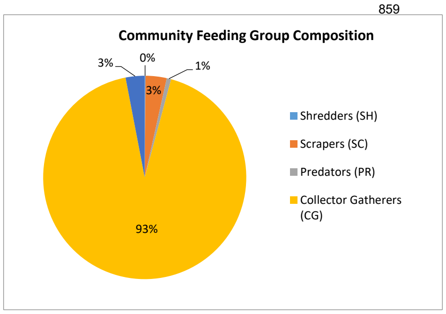
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	39	5	
EPT Richness (Genus)	8	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	1.2	5	
Percent Top Two Dominant Taxa (Genus)	57.4	5	(Cricotopus, Dicrotendipes)
Total Abundance Less Chironomidae and Oligochaeta	80	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	6.82	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	3	
Percent Tolerant Taxa (TV > 3)	98.8	
Percent EPT-H	2.79	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	1	0
Scrapers (SC)	29	3
Predators (PR)	6	1
Collector Gatherers (CG)	797	93
Collector Filterers (CF)	26	3
	859	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR08 (HRM 104.6)
Date: 10/01/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	6
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	1
Diptera	Chironomidae	Ablabesmyia annulata	CG	7.1	2
Diptera	Chironomidae	Ablabesmyia mallochi	CG	7.1	2
Diptera	Chironomidae	Chironomus sp.	CG	9.3	14
Diptera	Chironomidae	Cladotanytarsus sp.	CG	4	7
Diptera	Chironomidae	Coelotanypus sp.	CG	8	2
Diptera	Chironomidae	Cricotopus bicinctus	CG	7.44	2
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	146
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	3
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	61
Diptera	Chironomidae	Paralauterborniella nigrohalteral	CG	4.9	1
Diptera	Chironomidae	Polypedilum flavum	CG	6.1	27
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	6
Diptera	Chironomidae	Polypedilum scalaenum gp.	CG	6.1	2
Diptera	Chironomidae	Stempellina sp.	CG	0	1
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	38
Diptera	Chironomidae	Thienemanniella sp.	CG	6.4	1
Diptera	Chironomidae	Thienemanniella xena	CG	6.4	14
Ephemeroptera	Baetidae	Baetidae	CG	6	1
Ephemeroptera	Baetidae	Baetis intercalaris	CG	6	1
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	2
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	5
Ephemeroptera	Heptageniidae	Heptageniidae	SC	3	2
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	1
Ephemeroptera	Heptageniidae	Stenonema femoratum	SC	6.9	1
Ephemeroptera	Leptohyphidae	Tricorythodes sp.	CG	5	1
Ephemeroptera	Potamanthidae	Anthopotamus myops	CG	1.5	1
Hirudinea	Glossiphoniidae	Helobdella elongata	PR	9.3	1
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	2
Oligochaeta	Naididae	Aulodrilus pigueti	CG	7	1
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	2
Oligochaeta	Naididae	Tubificinae whc	CG	10	2
Oligochaeta	Naididae	Tubificinae wohc	CG	10	8
Trichoptera	Hydropsychidae	Hydropsychidae	CF	4.1	1
Trichoptera	Leptoceridae	Oecetis sp.	PR	5.1	1
Trichoptera	Polycentropodidae	Cyrnellus fraternus	CF	6.8	1
Tricladida	Planariidae	Girardia tigrina	CG	7.1	1
			Total Organisms Collected		**371**

Reservoir Benthic Index

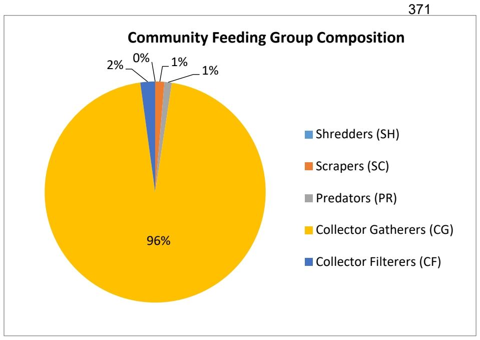
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	30	5	
EPT Richness (Genus)	7	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	3.5	5	
Percent Top Two Dominant Taxa (Genus)	56.3	5	(Cricotopus, Dicrotendipes)
Total Abundance Less Chironomidae and Oligochaeta	29	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	7.06	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	3	
Percent Tolerant Taxa (TV > 3)	98.9	
Percent EPT-H	4.58	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	5	1
Predators (PR)	4	1
Collector Gatherers (CG)	354	95
Collector Filterers (CF)	8	2
	371	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR09 (HRM 104.3)
Date: 10/01/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	9
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	2
Diptera	Chironomidae	Ablabesmyia annulata	CG	7.1	1
Diptera	Chironomidae	Ablabesmyia mallochi	CG	7.1	1
Diptera	Chironomidae	Coelotanypus sp.	CG	8	18
Diptera	Chironomidae	Cricotopus sp.	CG	7.44	7
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	5
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	6
Diptera	Chironomidae	Nanocladius distinctus	CG	7.4	2
Diptera	Chironomidae	Polypedilum flavum	CG	6.1	5
Diptera	Chironomidae	Rheotanytarsus exiguus gp.	CG	6.6	2
Diptera	Chironomidae	Stempellina sp.	CG	0	1
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	8
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	1
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	48
Ephemeroptera	Heptageniidae	Heptageniidae	SC	3	1
Odonata/Anisoptera	Gomphidae	Gomphidae	PR	4	1
Oligochaeta	Naididae	Slavina appendiculata	CG	8.4	1
Trichoptera	Leptoceridae	Oecetis sp.	PR	5.1	1
Trichoptera	Polycentropodidae	Cyrnellus fraternus	CF	6.8	3
			Total Organisms Collected		**123**

Reservoir Benthic Index

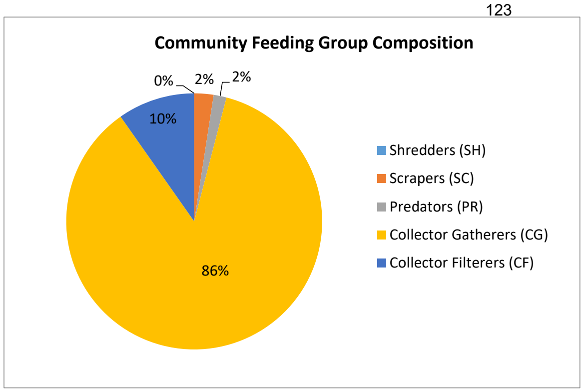
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	19	5	
EPT Richness (Genus)	5	5	
Percent Grabs Containing Long Lived Organisms	80.0	3	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	0.8	5	
Percent Top Two Dominant Taxa (Genus)	53.7	5	(Hexagenia, Coelotanypus)
Total Abundance Less Chironomidae and Oligochaeta	66	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**29**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	5.90	Fair
Intolerant Taxa Richness (TV ≤ 3)	2	
Percent Tolerant Taxa (TV > 3)	98.4	
Percent EPT-H	43.90	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	3	2
Predators (PR)	2	2
Collector Gatherers (CG)	106	86
Collector Filterers (CF)	12	10
	123	100



John Sevier Fossil Plant
Waterbody: Holston River, Inflow
Site: HR10 (HRM 103.5)
Date: 10/01/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Sphaeriidae	Sphaeriidae	CF	6.9	6
Coleoptera	Elmidae	Dubiraphia sp.	SC	5.5	2
Diptera	Ceratopogonidae	Ceratopogonidae	PR	6.8	1
Diptera	Chironomidae	Ablabesmyia annulata	CG	7.1	1
Diptera	Chironomidae	Coelotanypus sp.	CG	8	41
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	2
Diptera	Chironomidae	Dicrotendipes neomodestus	CG	7.2	1
Diptera	Chironomidae	Epoicocladius flavens	CG	0.1	3
Diptera	Chironomidae	Procladius sp.	CG	8.8	1
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	1
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	85
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	7
Oligochaeta	Naididae	Arcteonais lomondi	CG	8	1
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	2
Oligochaeta	Naididae	Tubificinae wohc	CG	10	3
			Total Organisms Collected		**157**

Reservoir Benthic Index

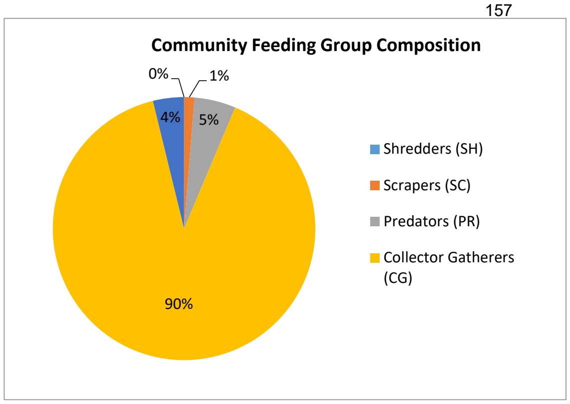
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	15	5	
EPT Richness (Genus)	1	3	
Percent Grabs Containing Long Lived Organisms	100.0	5	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	3.8	5	
Percent Top Two Dominant Taxa (Genus)	80.3	3	(Hexagenia, Coelotanypus)
Total Abundance Less Chironomidae and Oligochaeta	101	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**27**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	5.89	Fair
Intolerant Taxa Richness (TV ≤ 3)	1	
Percent Tolerant Taxa (TV > 3)	98.1	
Percent EPT-H	54.14	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	2	1
Predators (PR)	8	5
Collector Gatherers (CG)	141	90
Collector Filterers (CF)	6	4
	157	100



John Sevier Fossil Plant
Waterbody: Holston River, Transition
Site: HR11 (HRM 100.75)
Date: 10/01/2019

Taxa List

Order/Major Group	Family	Genus species/Final ID	Feeding Group	Tolerance (NCBI)	Quantity
Bivalvia	Corbiculidae	Corbicula fluminea	CF	6.6	2
Coleoptera	Elmidae	Stenelmis sp.	SC	5.6	1
Diptera	Ceratopogonidae	Probezzia sp.	PR	6.8	1
Diptera	Chironomidae	Ablabesmyia annulata	CG	7.1	23
Diptera	Chironomidae	Axarus sp.	CG	2	1
Diptera	Chironomidae	Chironomus sp.	CG	9.3	1
Diptera	Chironomidae	Coelotanypus sp.	CG	8	32
Diptera	Chironomidae	Cryptochironomus sp.	CG	6.4	1
Diptera	Chironomidae	Dicrotendipes sp.	CG	7.2	1
Diptera	Chironomidae	Parachironomus sp.	CG	8	1
Diptera	Chironomidae	Polypedilum flavum	CG	6.1	2
Diptera	Chironomidae	Polypedilum halterale gp.	CG	6.1	1
Diptera	Chironomidae	Procladius sp.	CG	8.8	1
Diptera	Chironomidae	Tanytarsus sp.	CG	6.6	3
Ephemeroptera	Caenidae	Caenis sp.	CG	6.8	1
Ephemeroptera	Ephemeridae	Hexagenia sp.	CG	4.4	58
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	SC	3.5	1
Gastropoda	Pleuroceridae	Leptoxis praerosa	SC	1.7	1
Hirudinea	Glossiphoniidae	Helobdella elongata	PR	9.3	1
Hirudinea	Glossiphoniidae	Helobdella stagnalis	PR	9.3	13
Oligochaeta	Naididae	Aulodrilus pigueti	CG	7	30
Oligochaeta	Naididae	Branchiura sowerbyi	CG	8.6	8
Oligochaeta	Naididae	Limnodrilus hoffmeisteri	CG	9.5	2
Oligochaeta	Naididae	Limnodrilus sp.	CG	9.5	1
Oligochaeta	Naididae	Tubificinae whc	CG	10	10
Oligochaeta	Naididae	Tubificinae wohc	CG	10	31
Trichoptera	Polycentropodidae	Cyrnellus fraternus	CF	6.8	5
			Total Organisms Collected		**233**

Reservoir Benthic Index

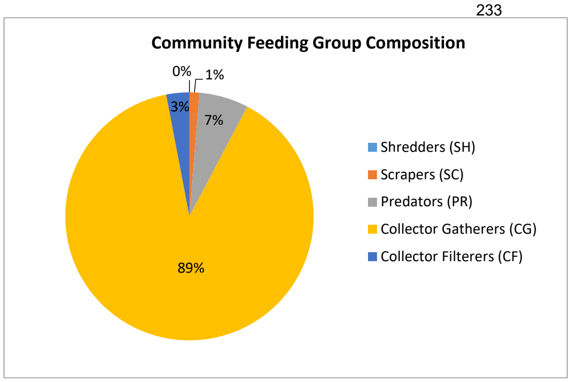
Component Metrics	Value	Index Score	
Total Taxa Richness (Genus)	22	5	
EPT Richness (Genus)	4	5	
Percent Grabs Containing Long Lived Organisms	100.0	5	Includes: Corbicula, Hexagenia, Unionidae/Dreissenidae, Gastropoda
Percent Oligochaeta	35.2	1	
Percent Top Two Dominant Taxa (Genus)	38.6	5	(Hexagenia, Coelotanypus)
Total Abundance Less Chironomidae and Oligochaeta	84	1	
Percent Grabs Containing No Organisms	0.0	5	
IBI Score		**27**	**GOOD**

Supplemental Metric Computations

Water Quality Metrics	Value	
Hilsenhoff Biotic Index (HBI)	7.18	Fairly Poor
Intolerant Taxa Richness (TV ≤ 3)	2	
Percent Tolerant Taxa (TV > 3)	99.1	
Percent EPT-H	27.90	

Feeding Group Community Distribution

Feeding Group	Quantity	Rel. Abundance (%)
Shredders (SH)	0	0
Scrapers (SC)	3	1
Predators (PR)	15	6
Collector Gatherers (CG)	208	89
Collector Filterers (CF)	7	3
	233	100



APPENDIX J.4

BENTHIC INVESTIGATION SAMPLING AND ANALYSIS REPORT

John Sevier Fossil Plant - Benthic Sampling and Analysis Report

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

February 9, 2022

Prepared by:

Tennessee Valley Authority

TVA TENNESSEE VALLEY AUTHORITY

Revision Record

Revision	Description	Date
0	Submittal to TDEC	February 9, 2022

Table of Contents

LIST OF APPENDICES

APPENDIX A - EXHIBITS

APPENDIX B - TABLES

Abbreviations

°C	degrees Celsius
CCR	Coal Combustion Residuals
CCR Parameters	Constituents listed in Appendices III and IV of 40 CFR 257, five inorganic constituents included in Appendix I of Tennessee Rule 0400-11-01-.04, and strontium
CEC	Civil & Environmental Consultants, Inc.
CFR	Code of Federal Regulations
COC	Chain-of-Custody
DI	Deionized
EAR	Environmental Assessment Report
EIP	Environmental Investigation Plan
EnvStds	Environmental Standards, Inc.
GPS	Global Positioning System
HRA	Holston River Adjacent
HRD	Holston River Downstream
HRU	Holston River Upstream
ID	Identification
IDW	Investigation Derived Waste
JSF Plant	John Sevier Fossil Plant
PLM	Polarized Light Microscopy
PPE	Personal Protective Equipment
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	Eurofins TestAmerica Inc.
TI	Technical Instruction
TVA	Tennessee Valley Authority

1.0 INTRODUCTION

The Tennessee Valley Authority (TVA) has prepared this sampling and analysis report (SAR) to document completion of activities related to the benthic investigation at TVA's John Sevier Fossil Plant (JSF Plant) in Rogersville, Tennessee.

The purpose of the benthic investigation is to characterize sediment chemistry, benthic macroinvertebrate (invertebrate) communities, and benthic invertebrate (mayfly) bioaccumulation in the vicinity of 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 performed and to present the information and data collected during the execution of the Benthic Sampling and Analysis Plan (SAP) (Stantec 2018a). This SAR is not intended to provide conclusions or evaluate results. The scope of the benthic 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 residuals (CCR) programs, and will be presented in the Environmental Assessment Report (EAR).

Benthic investigation activities were performed in general accordance with the following documents developed by TVA to support fulfilling the requirements of the TDEC Order:

- *Benthic SAP* (Stantec 2018a)
- *Environmental Investigation Plan (EIP)* (Stantec 2018b)
- *Quality Assurance Project Plan (QAPP)* (Environmental Standards, Inc. 2018).

The benthic investigation was implemented in accordance with TVA- and TDEC-approved Programmatic and Project-specific changes. Variations in scope and procedures from those outlined in the Benthic SAP and occurring during field activities due to field conditions and programmatic updates are referenced in Section 3.6.

Sediment sampling was conducted during the weeks of December 17, 2018 and April 1, 2019. Benthic invertebrate community sampling was conducted the week of September 30, 2019. Mayfly (*Hexagenia* spp.) nymph sampling and processing was conducted September 26 through 29, 2019. TVA personnel performed the sample collection and processing activities.

Laboratory analysis of constituents in sediments was performed by Eurofins TestAmerica, 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). Laboratory analysis of constituents in mayflies was performed by Pace Analytical in Green Bay, Wisconsin. Laboratory processing and taxonomy of benthic invertebrate community samples was performed by Pennington and Associates, Inc.

in Cookeville, Tennessee. TVA performed verification of quantitative benthic invertebrate community data. 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.

2.0 OBJECTIVE AND SCOPE

The primary objectives of the investigation conducted pursuant to the Benthic SAP are to characterize sediment chemistry, benthic invertebrate communities, and benthic invertebrate bioaccumulation in surface streams on or adjacent to the JSF Plant property to evaluate whether CCR constituents have migrated into those surface streams and, if so, the magnitude and extent of any effects on benthic organisms. Each component of the benthic investigation included samples collected from locations upstream of, adjacent to, and downstream of the JSF Plant CCR units. The phased approach for the benthic investigation was to:

Phase 1

- Collect sediment samples for chemical analyses to evaluate the potential presence of material and/or constituents related to CCR
    - Analyze surficial sediments (upper six inches) and sediments collected from deeper strata for percentage ash
    - Analyze surficial sediment samples for CCR-related constituents
    - Retain sediment sampled from deeper strata for analysis of CCR-related constituents, pending the results of Phase 1 analyses
- Collect quantitative samples of benthic invertebrate populations to assess the condition of the benthic communities
- Collect composite samples of mayfly nymphs (both depurated and non-depurated) and composite samples of mayfly adults for analysis of CCR constituents to evaluate potential bioaccumulation.

Phase 2

- Perform chemical analyses of retained sediment samples from any deeper strata where ash content exceeded 20 percent in one or more of the sediment samples collected during Phase 1
- Evaluate the need for additional sediment samples depending on the location(s) of the exceedance(s) and the collective results of the Phase 1 data.

The scope of work for Phase 1 of the benthic investigation consisted of collecting samples of sediments from 11 transect locations and seven single-point locations, benthic invertebrate populations from 11 transect locations, and mayflies from four river reaches. This report describes the activities related to the sampling events performed to complete Phase 1.

Phase 2 was not implemented since ash content did not exceed 20 percent in the sediment samples collected within the JSF Plant study area.

3.0 FIELD ACTIVITIES

Sediment sampling was conducted during the weeks of December 17, 2018 and April 1, 2019. Benthic invertebrate community sampling was conducted the week of September 30, 2019. Mayfly nymph sampling and processing was conducted September 26 through 29, 2019.

TVA performed the benthic investigation sample collection activities based on guidance and specifications listed in TVA's Technical Instructions (TIs) and Standard Operating Procedures (SOPs), the SAP, and the QAPP, except as noted in the Variations section of this report (Section 3.6). As part of TVA's commitment to generate representative and reliable data, data validation and/or verification of laboratory analytical results were performed by EnvStds under contract with TVA. In addition, Civil and Environmental Consultants, Inc. (CEC), on behalf of TDEC, accompanied TVA during sediment sampling on December 18, 2018 and April 3, 2019. CEC obtained split samples from surficial sediments collected at each station on transect SED-PB04 and from surficial sediments collected at stations SED-HR03-LB, SED-HR03-RB, and SED-HR04-LB.

During the benthic investigation, TVA:

- Verified and documented sampling locations using the global positioning system (GPS)
- Collected sediment samples from 11 transects and seven single-point locations
- Collected quantitative benthic invertebrate community samples from 11 transects
- Collected mayfly nymphs from four sampling reaches and generated composite samples of non-depurated nymphs and of depurated nymphs for each sampling reach
- Collected quality control (QC) samples, including two sediment matrix spike/matrix spike duplicate/lab duplicates, two field duplicates, four field banks, and four equipment blanks; and two mayfly field duplicates and six equipment blanks
- Shipped the sediment samples to TestAmerica and RJ Lee, and the mayfly samples to Pace Analytical via commercial courier service for analysis
- Conveyed the benthic invertebrate community samples to Pennington and Associates, Inc. for quantitative processing.

Details on each activity are presented in the sections below.

3.1 SAMPLING LOCATIONS

The sediment, benthic invertebrate community, and mayfly sampling locations and the TDEC Order CCR units at the JSF Plant (Dry Fly Ash Stack, Bottom Ash Pond, Ash Disposal Area J, and Highway 70 Borrow Area) are shown on Exhibits A.1, A.2, A.2a, A.3, and A.3a (Appendix A). Tables B.1 through B.3 (Appendix B) provide summaries of the sampling locations. Table B.4 summarizes the corresponding sampling locations for the surface stream, benthic, and fish tissue investigations, as identified in their respective SAPs.

<u>Sediment</u>

Sediment sampling was conducted at 11 transect and seven single-point locations under the benthic investigation scope of work (Exhibit A.1). These locations were selected to generally coincide with the surface stream sampling locations (Stantec 2018c). Sampling locations consisted of nine transects on the Holston River, and two transects and seven single-point locations on Polly Branch. Sample transects were established across the width of the stream perpendicular to the direction of flow. Along each transect, attempts were made to collect samples at center channel, left bank, and right bank stations. “Left bank” and “right bank” were determined with a downstream-facing orientation. At single-point locations, samples were collected from the approximate center of the channel. In total, sediments were obtained from 31 of the 40 sediment sampling stations proposed in the SAP. Additional information regarding samples that were not collected is provided in Section 3.3.1, Sediment Sampling, and Section 3.6.1, Variations in Scope.

<u>Benthic Invertebrate Community</u>

Benthic invertebrate community sampling was conducted at 11 transect locations on the Holston River as shown on Exhibits A.2 and A.2a. These locations were selected to generally coincide with the sediment and surface stream sampling locations or with historical biological monitoring locations used to support the JSF Plant and John Sevier Combined Cycle Plant Alternate Thermal Limit site discharge National Pollutant Discharge Elimination System permit. Sample transects were established across the mainstream of the Holston River perpendicular to the direction of flow, and discrete grab samples were collected from five approximately equally spaced locations along each transect.

<u>Mayfly</u>

Mayfly nymph sample locations were randomly selected within the four sampling reaches depicted on Exhibits A.3 and A.3a. These areas represent background, adjacent, and downstream conditions relative to the CCR units and coincide with the fish tissue sampling areas (Stantec 2018d), and also incorporate many of the sediment and benthic invertebrate community sample transects. Adult mayflies were not encountered in adequate numbers to obtain the sample mass necessary for analysis. Additional information regarding the collection of adult mayflies is provided in Section 3.6.1, Variations in Scope.

3.2 DOCUMENTATION

TVA maintained field documentation in accordance with TVA TI ENV-TI-05.80.03, *Field Record Keeping* and the QAPP. Field activities were recorded in field logbooks. Health and safety forms were completed in accordance with TVA health and safety requirements. Additional information regarding field documentation is provided below.

3.2.1 Field Forms

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

- *Reservoir Benthic Macroinvertebrate Community Field Data Form*
- *Benthic Invertebrate Bioaccumulation Field Form and Sample Custody Record*
- *TVA Biota Field Chain-of-Custody (COC)*
- *Laboratory COCs*.

3.2.1.1 Field Logbook

TVA field sampling personnel recorded field activities, observations, and supporting information (e.g., GPS coordinates, sample collection depths) in field logbooks to chronologically document the activities and progress of the field program. Deviations from the SAP, TIs, SOPs, or QAPP were documented in the field logbooks.

3.2.1.2 Reservoir Benthic Macroinvertebrate Community Field Data Form

TVA field sampling personnel completed a *Reservoir Benthic Macroinvertebrate Community Field Data Form* for each benthic invertebrate community transect. The form documented the field collection team, sample identifications (IDs), collection dates and times, waypoint IDs, water depths, visual assessments of substrate composition, and photograph IDs for specimens not retained (i.e., native freshwater mussels).

3.2.1.3 Benthic Invertebrate Bioaccumulation Field Form and Sample Custody Record

TVA field sampling personnel completed a *Benthic Invertebrate Bioaccumulation Field Form and Sample Custody Record* for boat sampled reaches Holston River Upstream (HRU) and Holston River Downstream (HRD). The form documented the field collection team, the sampling reach/area, collection date and times, waypoint IDs, the number of mayfly nymphs collected in each Ponar or Peterson substrate grab during field collections, and the custody record for the collected organisms.

3.2.1.4 TVA Biota Field Chain-of-Custody

TVA field sampling personnel completed *Biota Field COCs* to document the mayflies collected during the invertebrate bioaccumulation investigation field activities. The *Biota Field COC* documents the field collection team, sampling locations, collection dates and times, the number of sample containers containing the collected adult mayflies or the number of mayfly nymphs retained from each sampling location, and the custody record for the collected organisms.

3.2.1.5 Laboratory Chain-of-Custody

TVA personnel completed *Laboratory COCs*, listing each sediment, benthic invertebrate community, and mayfly sample. Information applicable to each sample matrix (i.e., sample ID, sample location, sample depth, type of sample, sample date and time, and/or analyses requested) and the sample custody record were recorded on the *COCs*. The Field Team Leader or designee reviewed the *COCs* for completeness and correctness, and a QC check was performed for samples in each cooler comparing sample IDs to those on the corresponding *COC*. *COCs* were completed in accordance with ENV-TI-05.80.02, *Sample Labeling and Custody*.

3.2.2 Photographs

Photographs of the sediment samples and the benthic invertebrate community substrate samples were taken during the benthic investigation and are provided in Attachments C.1 and C.2, respectively, in Appendix C.

3.3 SAMPLING METHODS

The following sections present data collection and sampling procedures used in the benthic investigation.

3.3.1 Sediment Sampling

Sediment sampling was conducted at 11 transect locations and seven single-point locations under Phase 1 of the benthic investigation scope of work (Exhibit A.1). Sediment 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*. The analytical samples collected, including field duplicates, are listed in Table B.5 (Appendix B). Split samples collected by CEC during this investigation are also identified in Table B.5. Descriptions of the sediment samples collected, including the sediment core lengths and depths of horizon changes, if applicable, are provided in Table B.6.

The nine Phase 1 sediment sampling transects on the Holston River were located within a three mile reach extending downstream from John Sevier Dam. Due to high flow velocities in this river reach, depositional areas were expected to be lacking. Therefore, TVA conducted reconnaissance of the substrates within the proposed study area on April 2, 2019. During this reconnaissance, dredge samplers were used to evaluate the likelihood of success in collecting grab samples of depositional sediments within the proposed sampling reach. A total of 186 substrate grabs were collected, both from near-shore locations and across the river channel. The substrates were predominantly composed of varying proportions of bedrock, cobble, gravel, sands, and/or mollusk shells. Depositional areas occurred only at near-shore locations, primarily where bank structures divert enough river flow to reduce velocities enough to allow suspended sediments (silts and clays) to be deposited. Additionally, only shallow layers of depositional sediments were collected, and most depositional sediments were mixed with higher fractions of sand.

On April 3, 2019, Cherokee Reservoir's pool elevation, which was approximately 12 feet below summer pool levels, and reduced flows in the Holston River allowed for wading the river. As a result, TVA field sampling personnel determined that it was possible to collect sediments at the bank toe (inundated intersection of the bank with the channel bed) and more so along the shoreline that was armored with riprap or boulders that provided crevices that retained sediment deposits.

Accordingly, the sampling approach was modified. Sediment samples continued to be collected in accordance with TVA TI ENV-TI-05.80.50, *Soil and Sediment Sampling.* Because the use of a VibeCore™ or dredge sampler was not practical, sediments were collected using certified clean scoops and gloved hands. Additionally, the nine Holston River sediment sampling transects planned for under Phase 1 of the benthic investigation continued to be planned as shown in Exhibit A.1. However, as allowed for in the TDEC-approved Benthic SAP, the number and location of the proposed sediment samples was modified as needed based on conditions encountered in the field. Sediment samples were collected at the left bank and right bank locations on each transect. Depositional sediments were only encountered at near-shore locations; therefore, no sediment samples were obtained mid-channel within the Holston River.

To obtain sufficient sample volumes for analysis, each sediment sample comprised the contents of several scoops collected within an approximately 100 foot distance upstream and/or downstream of each sampling transect, except as noted in the Variations section of this report (Section 3.6). The collected sediments were deposited directly into clean, resealable plastic bags. Samples were labeled, custody-sealed, and maintained in a cooler with ice until processed.

Polly Branch sediment sampling locations comprised two transects and seven single-point locations (13 stations). The two transects (PB03 and PB04) and three of the single-point sampling locations (PB01, PB02, and PB05) were located in the upstream-most portion of Polly Branch that consists of a series of three ponds separated by adjacent railroad and roadway embankments (Exhibit A.1). Polly Branch enters the stream channel immediately downstream of PB05, but it remains impounded for approximately an additional 1,200 feet. From this point, Polly Branch becomes a shallow, free-flowing stream to the Holston River. Single-point locations PB06, PB07, PB08 and PB09 were located within this lower reach of Polly Branch. Additionally, it should be noted that the downstream-most station (PB09) is inundated by backwater from the Holston River when Cherokee Reservoir is at summer pool elevations.

The upper, impounded portion of Polly Branch was sampled from a canoe. At each station, a VibeCore™ sampler with attached decontaminated polycarbonate core tube was advanced until refusal. Upon retrieval, the core tube was capped and labeled, and then was transported to shore for processing.

The lower, free-flowing portion of Polly Branch had limited depositional sediments; therefore, only surficial sediments (0 to 6 inches deep) were encountered. The sediments within this reach were sampled by wading and collecting grabs of sediments using certified clean scoops and gloved hands. Each sediment sample comprised the contents of several scoops collected within an approximately 50 foot distance along the streambed at each station. The collected sediments were deposited directly into clean, resealable plastic bags and labeled, and then were processed on shore.

Each sediment core was processed by discharging the core on to a half-round PVC pipe enclosed in new plastic tubing. The core was inspected and distinct horizons were identified based on color, texture, and other visual characteristics. A sediment sample was collected from the upper six inches of each sediment core. For each distinct horizon identified below six inches, the sediment was portioned and homogenized to create a representative sample. Additionally, if no distinct horizons were identified, then the core was segmented at approximately equal intervals based on the assumption that deeper sediments were deposited over an extended time period, and each segment was homogenized to create a representative sample. Samples were not collected for deeper sediment-free native soil (i.e., parent material) if recovered.

For surficial sediments collected using scoops, the sediments were homogenized in the plastic bags or transferred to a decontaminated plastic bowl and homogenized.

Sediments were homogenized using new, certified clean scoops. To the extent practicable, twigs, roots, leaves, mollusk shells, rocks and miscellaneous debris were removed. Scoops were treated as single-use and were discarded after each sample collection. Homogenized sediments were transferred to laboratory-supplied sample containers. Samples were labeled and handled in accordance with ENV-TI-05.80.02, *Sample Labeling and Custody.* Field sampling personnel secured a cap on each container, attached a custody seal across each cap, and placed samples in coolers; samples for metals and anions were maintained in ice. Field sampling personnel wore new, clean nitrile gloves when handling sample containers and sampling equipment that could potentially come in contact with sediment samples. New gloves were used when collecting and handling samples at each station.

Core tubes were decontaminated and sealed individually in plastic tubing prior to mobilizing to the field. Core tubes were replaced between sampling stations. Scoops were treated as single-use and were discarded after each sample collection. Decontamination of sampling equipment was conducted in accordance with TVA, ENV-TI-05.80.05, *Field Sampling Equipment Cleaning and Decontamination*.

For Phase 1, collected sediment samples were analyzed for the presence of ash (percent ash) by polarized light microscopy (PLM). Surficial sediments (0 to 6 inches deep) also were analyzed for the CCR-related constituents listed in Appendices III and IV of Title 40 of the Code of Federal Regulations (CFR) Part 257 (40 CFR 257) and strontium. In addition, in order to maintain continuity with other TDEC environmental programs, five inorganic constituents (copper, nickel, silver, vanadium, and zinc) listed in Appendix I of Tennessee Rule 0400-11-01-.04 and not included in the 40 CFR 257 Appendices III and IV also were analyzed. The combined federal CCR Appendices III and IV constituents, strontium, and TDEC Appendix I inorganic constituents are hereafter referred to as “CCR Parameters” for the benthic investigation.

Phase 1 sediment samples collected from deeper strata for the analysis of CCR Parameters were held pending the results of the Phase 1 analyses. Phase 2 was not implemented since ash content did not exceed 20 percent in the sediment samples collected within the JSF Plant study area; therefore, sediments collected from deeper strata were not analyzed for CCR Parameters other than percent ash.

Laboratory analysis of CCR Parameters was performed by TestAmerica in Pittsburgh, Pennsylvania, and St. Louis, Missouri (radium samples only). RJ Lee in Monroeville, Pennsylvania, performed PLM analysis to determine percent ash. Sediment analytical data are presented in Table B.7.

3.3.2 Benthic Invertebrate Community Sampling

Quantitative benthic invertebrate community samples were collected at 11 transect locations under Phase 1 of the benthic investigation scope of work (Exhibits A.2 and A.2a). Benthic invertebrate community samples were collected in accordance with TVA-KIF-SOP-35, *Standard Operating Procedure for: Reservoir Benthic Macroinvertebrate Sampling.* A list of the benthic community samples collected is provided in Table B.8

Benthic community sampling transects were established across the width of the Holston River perpendicular to the direction of flow, and discrete grab samples were collected from five approximately equally spaced locations along each transects using a standard Ponar dredge. Care was taken to collect samples only from the permanently wetted bottom portion of the reservoir (i.e., below the elevation of the minimum winter pool level). For each sample, water depth and a visual assessment of substrate composition were recorded. Sampling personnel also recorded the estimated percentage of the dredge that was filled with substrate when the sample was retrieved (i.e., % Dredge Full). The field data are provided in Table B.8

Each sample was washed over a 500-micron mesh screen to remove finer materials. The substrate retained on the screen was photographed and then was transferred into sample containers along with the benthic organisms. Each sample was preserved with a 10 percent buffered formalin solution and each sample container received an internal and external sample label and a custody seal that was placed across the cap. Photographs of native mussels substituted for preservation, and the number collected and released was recorded on the *Reservoir Benthic Macroinvertebrate Community Field Data Form*. Samples were submitted under chain of custody to Pennington and Associates, Inc. for processing and the identification and enumeration of organisms to the lowest practicable taxonomic level. The benthic invertebrate taxonomic data are provided in Table B.9.

3.3.3 Mayfly Sampling

Samples of mayfly nymphs were collected from the four Holston River reaches specified under Phase 1 of the benthic investigation scope of work (Exhibit A.3 and Exhibit A.3a). Samples of nymphs were collected in accordance with TVA-KIF-SOP-29, *Standard Operating Procedure for: Mayfly Sampling* and ENV-TI-05.80.04, *Field Sampling Quality Control*. Adult mayflies were not encountered in adequate numbers to obtain the sample mass necessary for analysis. The analytical samples collected, including field duplicates, are listed in Table B.10. Additional information regarding adult mayflies is provided in Section 3.6.1, Variations in Scope.

The nymphs of the targeted mayfly (*Hexagenia* spp.) inhabit fine silt-clay substrates which were lacking within the sample reaches (Holston River Adjacent (HRA)1 and HRA2) located within a three mile reach extending downstream from John Sevier Dam. However, using an approach similar to that used during sediment sampling, it was possible to collect samples of mayfly nymphs from these areas. Substrates in the sample reach (HRU) upstream of the John Sevier Dam and the downstream-most sample reach (HRD) approximately six river miles downstream of the John Sevier Dam contained higher percentages of fine silt-clay substrates. Consequently, mayflies were more abundant and more distributed throughout these areas.

Mayfly sampling was conducted during late September 2019 when Cherokee Reservoir pool elevations were approximately 12 feet below summer pool levels and flows were reduced in the Holston River. Field sampling personnel waded the river within sample reaches HRA1 and HRA2 and collected sediments from crevices between riprap and boulders along the shoreline using certified clean scoops and gloved hands. Within sample reaches HRU and HRD, sediments were collected using a boat-mounted boom and motorized winch with attached Peterson or Ponar dredge.

Multiple random grabs of sediment were collected within a sample reach and the nymphs were selectively removed. Each sediment grab was deposited onto a stainless steel, Nitex, or Teflon screen then rinsed with river water to remove fine sediments and expose the nymphs. The nymphs were then removed from the screen using decontaminated stainless steel forceps and placed into a clean plastic container filled with surface water from the sampling location to allow preliminary removal of substrate adhering to the organisms. Nymphs that appeared damaged (i.e. severed head/abdomen) were discarded. Undamaged nymphs collected from an area were randomly sorted into composite samples, with a minimum of 50 to 75 nymphs for each depurated (i.e., held 48-hrs to allow evacuation of digestive system contents) and non-depurated sample. Additional nymphs were collected to form duplicate and archived samples.

Nymphs collected for analysis without depuration of their gut contents were transferred into certified clean, glass sample containers and held in wet ice at temperatures less than six degrees Celsius (ºC) pending processing. These nymphs were triple rinsed with deionized (DI) water and transferred to new, certified clean glass containers, weighed, and frozen within 24 hours of collection to form the non-depurated samples for each location. Nymphs collected for depuration prior to laboratory analysis were maintained alive by proportioning the nymphs between two or more certified clean, glass quart sample containers filled with surface water from the sampling reach and maintaining the containers in a cooler containing wet ice pending transport to the off-site processing location. These nymphs were held in a DI water bath for a 48-hour depuration period. DI water baths consisted of decontaminated six-quart plastic containers partially filled with DI water which was periodically exchanged throughout the depuration period. After 48 hours, the nymphs were triple rinsed with DI water and transferred to new, certified clean glass containers, weighed, and frozen to form the depurated samples for each location. Mayfly samples were maintained at or below −20 ºC in secure freezers at the TVA Chickamauga Power Service Center. Personnel wore new, clean nitrile gloves when handling and processing mayflies.

Decontamination was performed for mayfly sampling and processing equipment in accordance with TVA TI ENV-TI-05.80.05, *Field Sampling Equipment Cleaning and Decontamination.* QC samples were collected in accordance with TVA 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*.

Mayfly samples were submitted to Pace Analytical in Green Bay, Wisconsin, to be analyzed for percent moisture and CCR Parameters. As specified in the SAP, the mayfly tissue analysis did not include chloride, fluoride, pH, sulfate, or radium. The analytical data for mayflies are presented in Table B.11.

3.4 INVESTIGATION DERIVED WASTE

Investigation derived waste (IDW) generated during the benthic investigation included:

- Disposable personal protective equipment (PPE)
- Decontamination fluids
- General trash.

IDW was handled in accordance with ENV-TI-05.80.05, *Field Sampling Equipment Cleaning and Decontamination*; the JSF Plant-specific waste management plan; and local, state, and federal regulations. Used disposable PPE (e.g., nitrile gloves) and general trash generated throughout the day were stored in garbage bags and disposed of in a general trash dumpster onsite or at another TVA facility.

3.5 SAMPLE SHIPMENT

Samples were packed, transported, and shipped under *COC* procedures specified in ENV-TI-05.80.06, *Handling and Shipping of Samples*. Samples were shipped as described below.

- Sediment samples were shipped via a commercial courier to the TestAmerica facility in Pittsburgh, Pennsylvania, for official sample login. Once samples were logged, the radium samples were shipped under internal lab protocols to the TestAmerica St. Louis, Missouri, laboratory. Samples to be analyzed for percent ash by PLM were shipped to RJ Lee located in Monroeville, Pennsylvania. TestAmerica and RJ Lee submitted sample receipt confirmation forms to EnvStds for review and confirmation.
- Mayfly samples were shipped overnight on dry ice via a commercial courier to Pace Analytical in Green Bay, Wisconsin. Pace Analytical submitted sample receipt confirmation forms to EnvStds for review and confirmation.
- Benthic invertebrate community samples were relinquished to Pennington and Associates, Inc., Cookeville, Tennessee.

3.6 VARIATIONS

The proposed scope and procedures for the benthic investigation were outlined in the SAP, QAPP, and applicable TVA TIs and SOPs 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 SAP are described in the following sections. As discussed below, these variations do not impact the overall usability and representativeness of the dataset provided in this SAR for the benthic investigation at the JSF Plant.

3.6.1 Variations in Scope

Variations in scope are provided below.

- Sediment samples were not obtained at nine of the 40 sediment sampling stations proposed in the SAP. As detailed in the sections above, the nine Phase 1 sediment sampling transects on the Holston River were located within a three mile reach extending downstream from John Sevier Dam. Due to high flow velocities in this river reach, depositional areas occurred only at near-shore locations, primarily where bank structures divert enough river flow to reduce velocities enough to allow suspended sediments (silts and clays) to be deposited. The intent of the SAP was to collect samples representative of the sediments at each location. A lack of samples from areas of the river with limited deposition does not affect the ability to characterize the sediments within the JSF Plant study area; thus, the samples collected from 31 stations were sufficient to meet the overall intent of the SAP.

- Adult mayflies were not encountered in adequate numbers to obtain sufficient sample mass for analysis. Adult mayflies were observed emerging in low numbers the week of June 17, 2019. Searches for adult mayflies were conducted each week during the month of June and on July 17 and 18, 2019.

3.6.2 Variations in Procedures

Variations in procedures occurring in the field are provided below.

- Sediment samples collected on the Holston River were composites of several four ounce scoops collected within an approximately 100 foot distance upstream and/or downstream of a sampling transect as necessary to obtain sufficient sample volume for analysis, except as noted for SED-HR01 and SED-HR09.

    - Transect SED-HR01 was moved approximately 200 feet downstream from the proposed location due to high flow velocities in proximity of the John Sevier Dam.

    - Transect SED-HR09 was moved approximately 1500 feet upstream of the proposed location, aligning with the location of surface stream transect STR-HR09 during the February 2019 surface stream sampling event. The shoreline in this area contained riprap that provided crevices that retained sediment deposits.

- Photographs were not available for the following surficial sediment samples that were analyzed: SED-HR03-LB, SED-HR03-RB, SED-HR06-LB, SED-PB06-CC, SED-PB08-CC, and SED-PB09-CC.

- A duplicate sample of depurated mayfly nymphs was not submitted for analysis due to insufficient sample mass. Therefore, rather than submitting one duplicate sample of mayflies per sample type (depurated and non-depurated), two duplicate samples of non-depurated mayfly nymphs were submitted for analysis.

- The Benthic SAP for Phase 1 was written such that sediment and surface stream sampling were anticipated to be conducted during the same sampling event. However, concurrently sampling was not desirable due to the differing logistics for the two sampling methodologies, the difficulty of obtaining depositional sediments in a riverine environment (i.e., mainstream of the Holston River within the JSF Plant study area), the amount of equipment required to sample both matrices concurrently, and the increased potential for cross-contamination. In addition, the goal of surface stream sampling includes collecting samples from a waterbody within as short a timeframe as possible in order to limit potential differences in water quality conditions resulting from day-to-day variances in reservoir operations, runoff, and other climatic conditions. Based on these considerations, TDEC approved sediment and surface stream sampling to be performed at different times.

4.0 SUMMARY

The data presented in this report are from the benthic investigation sampling at the JSF Plant. The scope of work during this investigation included Phase 1 sediment sampling at 11 transect locations and seven single-point locations, benthic invertebrate community sampling at 11 transect locations, and benthic invertebrate (mayfly) bioaccumulation sampling in four river reaches. Sediment, benthic invertebrate community, and mayfly sampling locations are summarized in Tables B.1 through B.3, and depicted on Exhibits A.1 through A.3a, respectively. Phase 2 was not implemented since ash content did not exceed 20 percent in the sediment samples collected within the JSF Plant study area.

A summary of sediment samples collected, including field duplicates, is presented in Table B.5. Sediment field data are presented in Table B.6. Sediment analytical data for CCR Parameters are presented in Table B.7. Analytical data were reported by TestAmerica and RJ Lee, and data verification or validation was performed by EnvStds.

The benthic invertebrate community field data are presented in Table B.8, and the taxonomic dataset is presented in Table B.9. Quantitative benthic invertebrate community data were reported by Pennington and Associates, Inc. and verified by TVA.

A summary of invertebrate bioaccumulation (mayfly) samples collected, including field duplicates, is presented in Table B.10. Mayfly analytical data for percent moisture and CCR Parameters, excluding chloride, fluoride, pH, sulfate, and radium are presented in Table B.11. Analytical data were reported by Pace Analytical, and data verification or validation was performed by EnvStds.

TVA has completed the benthic investigation at the JSF Plant in Rogersville, Tennessee, in accordance with the Benthic SAP and TDEC-approved SAP modifications, as documented herein. The data collected during this 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.

5.0 REFERENCES

Environmental Standards, Inc. 2018. *Quality Assurance Project Plan for the Tennessee Valley Authority John Sevier Fossil Plant Environmental Investigation*. Prepared for Tennessee Valley Authority. Revision 2. October 2018.

Stantec Consulting Services Inc. (Stantec). 2018a. *Benthic Sampling and Analysis Plan (SAP), John Sevier Fossil Plant.* Revision 3. Prepared for Tennessee Valley Authority. October 19, 2018.

Stantec. 2018b. *Environmental Investigation Plan, John Sevier Fossil Plant.* Revision 3. Prepared for Tennessee Valley Authority. October 19, 2018.

Stantec 2018c. *Surface Stream Sampling and Analysis Plan (SAP), John Sevier Fossil Plant.* Revision 3. Prepared for Tennessee Valley Authority. October 19, 2018.

Stantec 2018d. *Fish Tissue Sampling and Analysis Plan (SAP), John Sevier Fossil Plant.* Revision 3. Prepared for Tennessee Valley Authority. October 19, 2018.

Tennessee Department of Environment and Conservation (TDEC). 2015. *Commissioner's Order No. OGC15-0177.* August 6, 2015.

Tennessee Valley Authority (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.*

TVA, TVA-KIF-SOP-29, *Standard Operating Procedure for: Mayfly Sampling*. Revision 1.

TVA, TVA-KIF-SOP-35, *Standard Operating Procedure for: Reservoir Benthic Macroinvertebrate Sampling.* Revision 2.

APPENDIX A - EXHIBITS

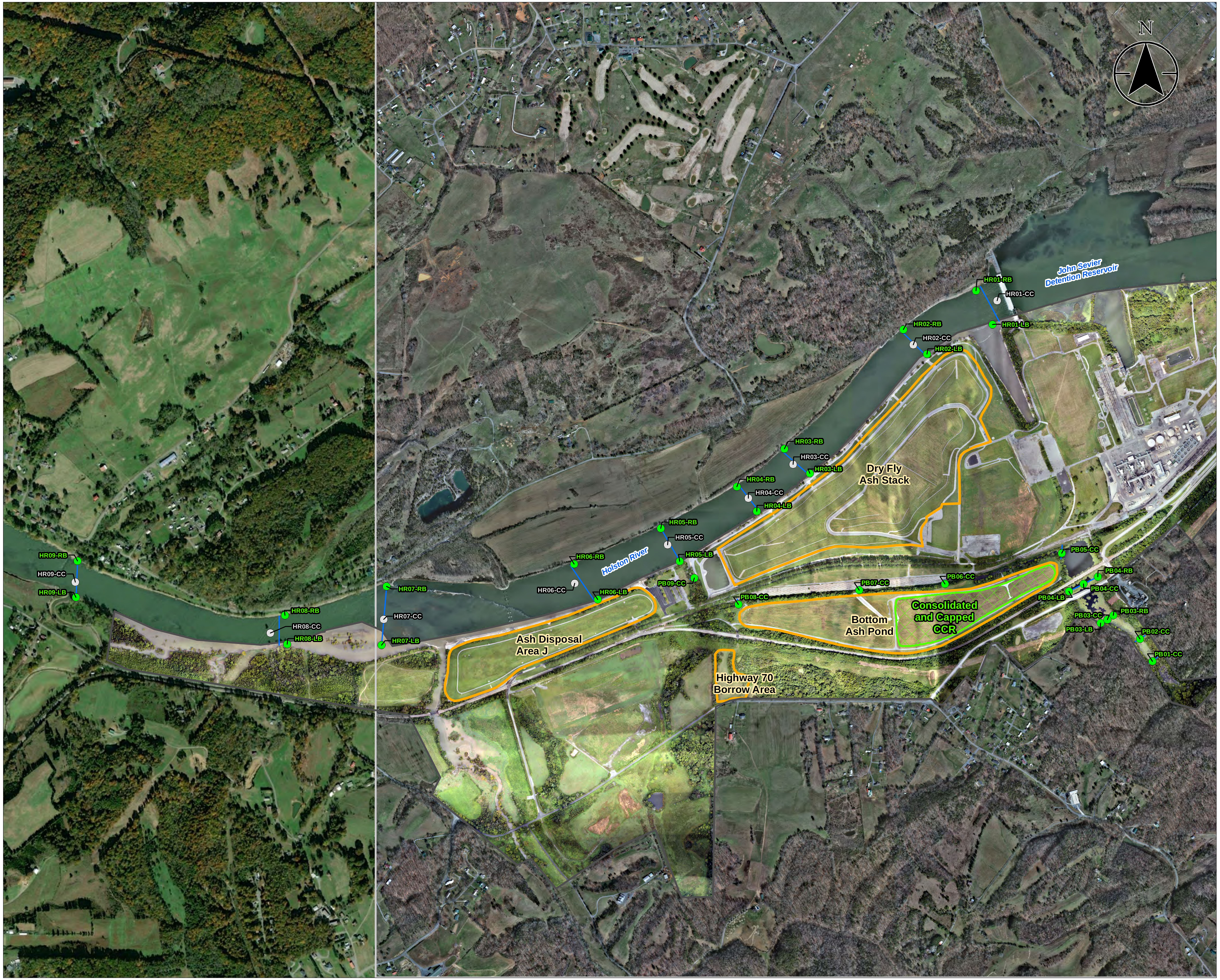


Exhibit No.

A.1

Title

Sediment Sampling Locations

Client/Project

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

Project Location: Rogersville, Tennessee

175568225
Prepared by DMB on 2021-09-08
Technical Review by BL on 2021-09-08

0 600 1,200 1,800 2,400 Feet

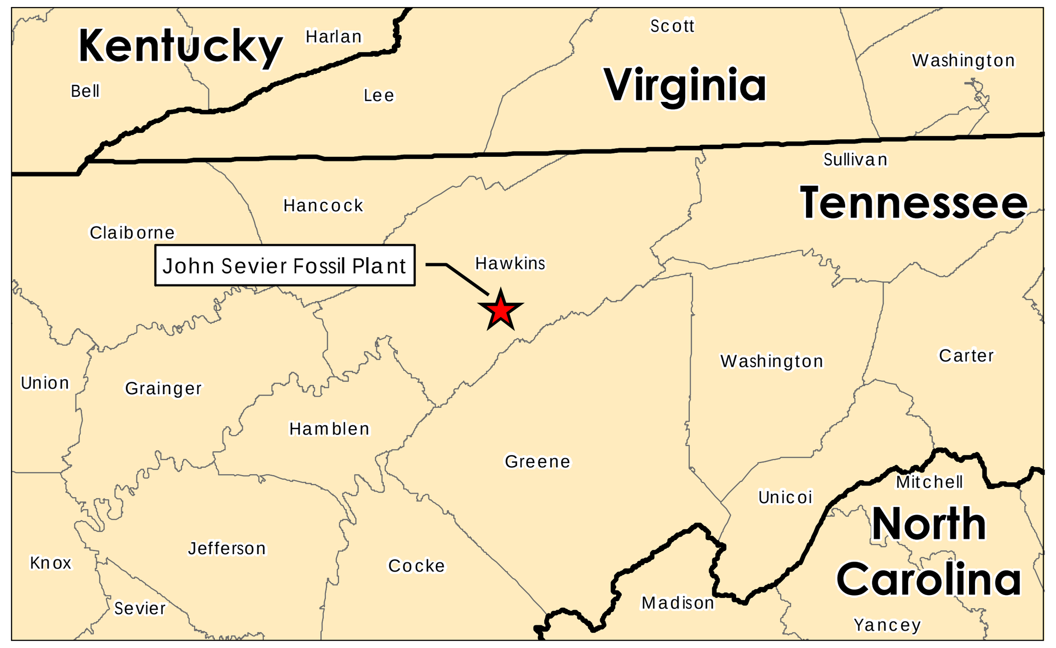
1:7,200 (At original document size of 22x34)

Legend

- Sediment Sampling Locations - Collected
- Sediment Sampling Locations - Attempted: Insufficient Sediment for Sampling
- Sediment Sampling Location Transects
- 2017 Imagery Boundary
- 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), TVA (2018-09-11), and Esri World Imagery



Stantec TVA

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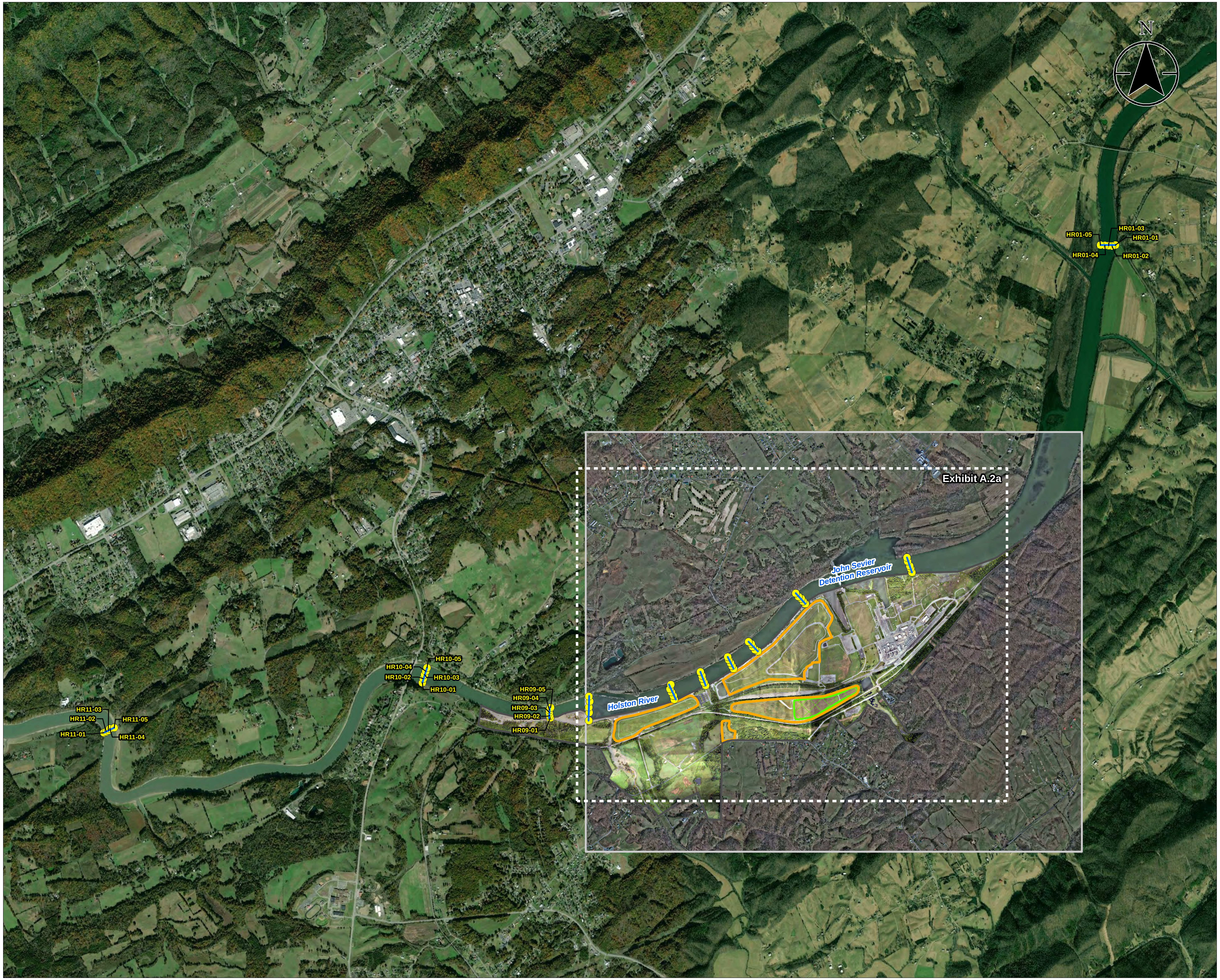

Exhibit No.
A.2

Title
Benthic Invertebrate Community Sampling Locations

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

Project Location
Rogersville, Tennessee

175568225
Prepared by DMB on 2021-09-09
Technical Review by BL on 2021-09-09

0 1,500 3,000 4,500 6,000 Feet
1:18,000 (At original document size of 22x34)

Legend

- Benthic Invertebrate Community Sampling Locations
- Benthic Invertebrate Community Sampling Locations - Transect
- 2017 Imagery Boundary
- 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), TVA (2018-09-11), and Esri World Imagery

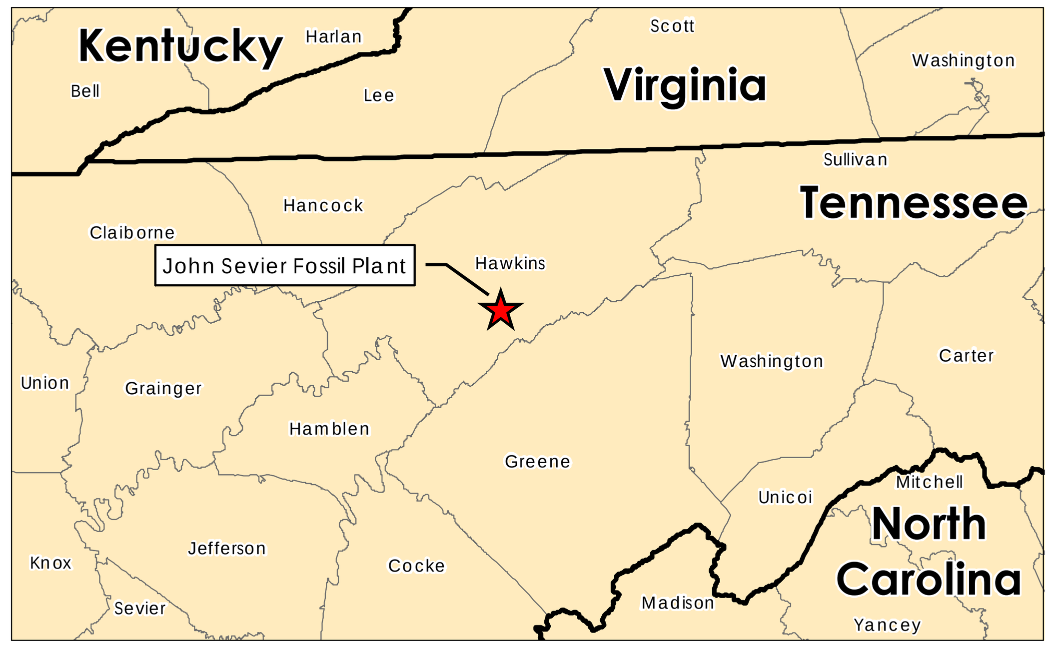

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Exhibit No.
A.2a

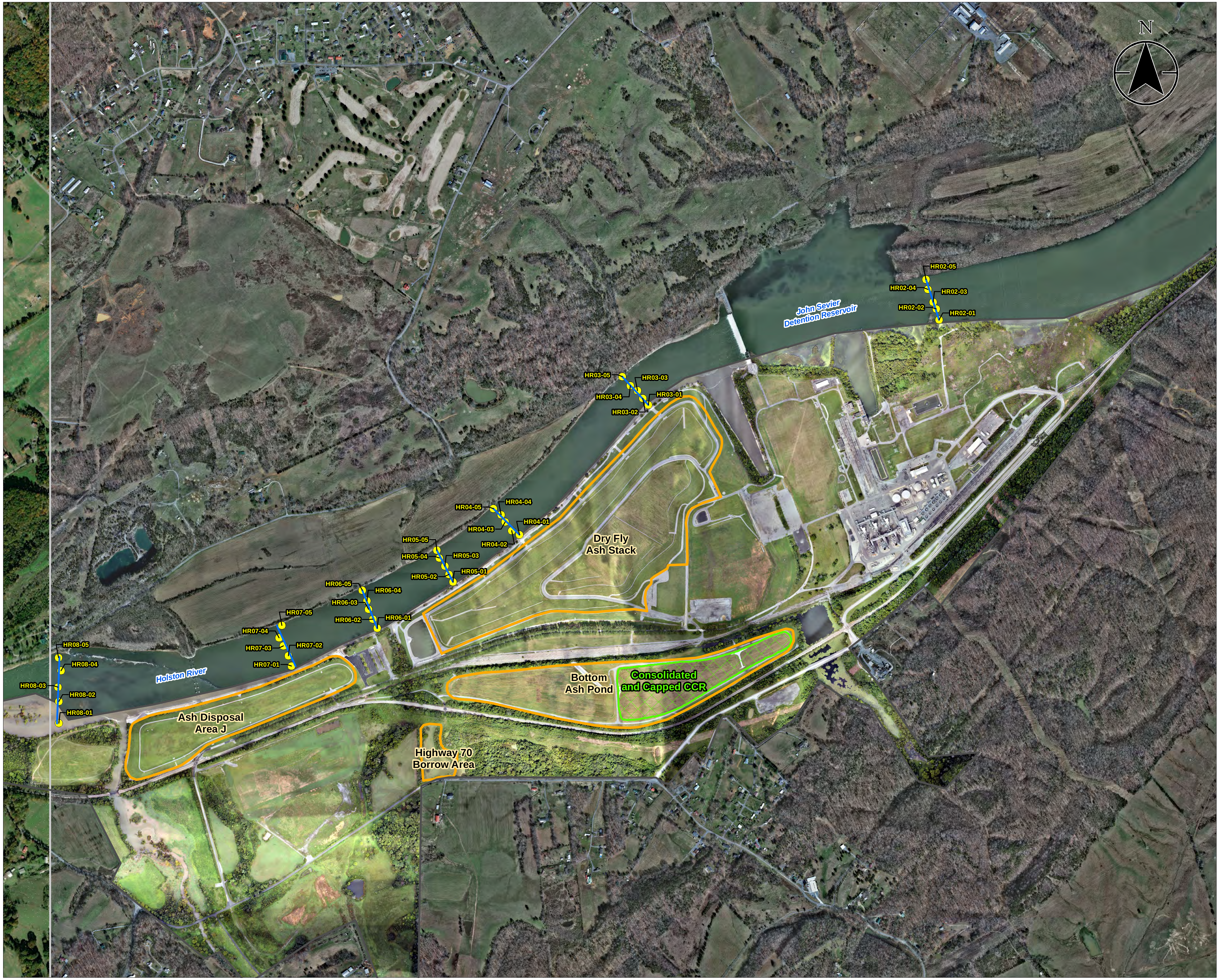
Title
Benthic Invertebrate Community Sampling Locations

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

Project Location
Rogersville, Tennessee

175568225
Prepared by DMB on 2021-09-09
Technical Review by BL on 2021-09-09

0 550 1,100 1,650 2,200 Feet
1:6,600 (At original document size of 22x34)

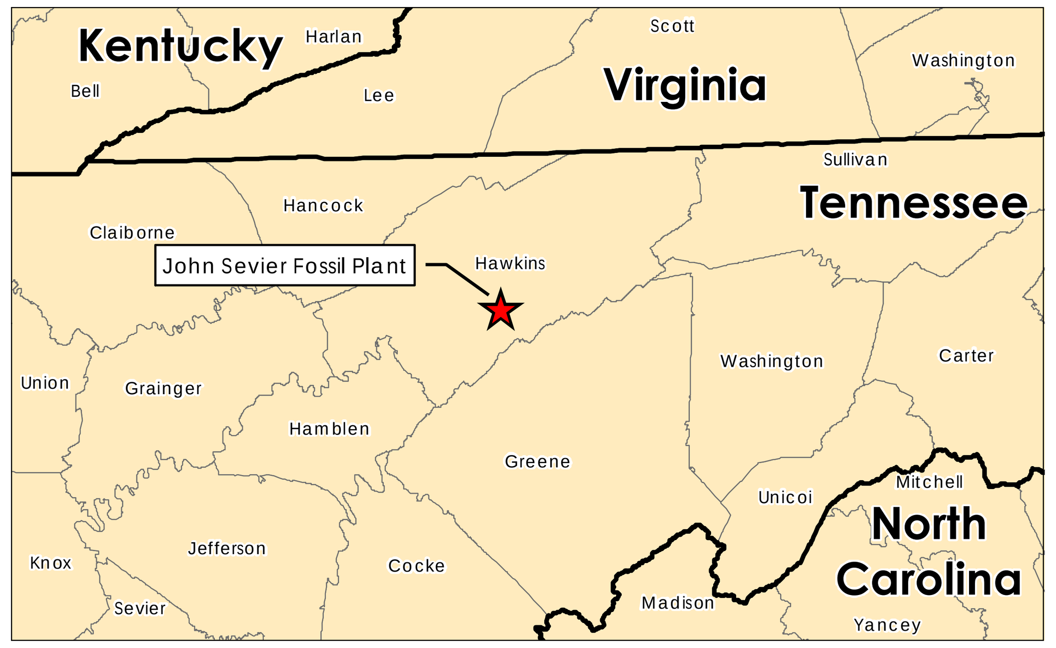


Legend

- Benthic Invertebrate Community Sampling Locations
- Benthic Invertebrate Community Sampling Locations - Transect
- 2017 Imagery Boundary
- 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), TVA (2018-09-11), and Esri World Imagery



Stantec TVA

U:\TVA-EIP\175568225_JSF_Phase2\gis\mxd\Env_SARS\JSF_SARS_ExhA2a_Benthic_October2018.mxd Revised: 2021-09-09 By: mbough

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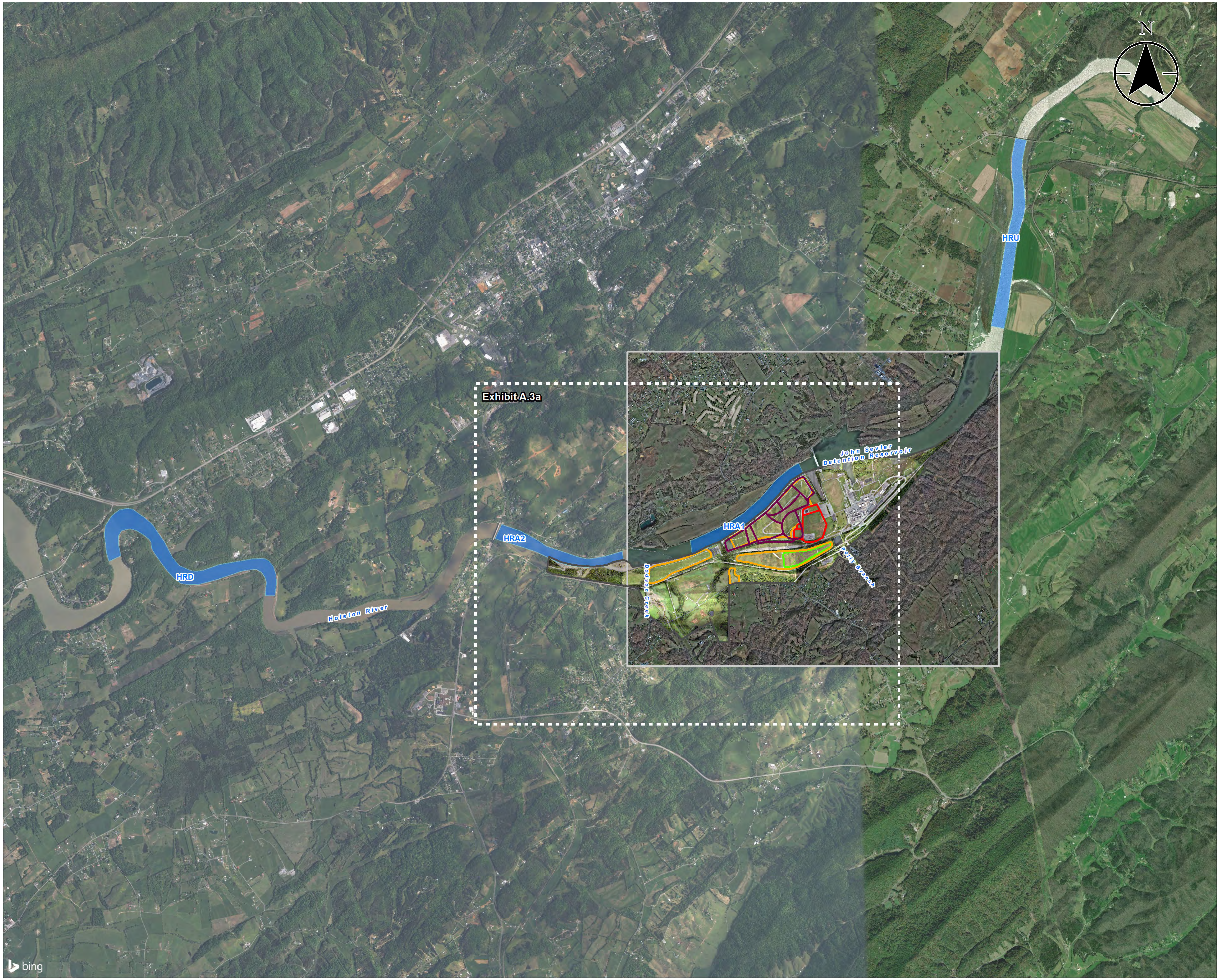


Exhibit No.

A.3

Title

Mayfly Sampling Reaches

Client/Project

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

Project Location

Rogersville, Tennessee

175568225
Prepared by DMB on 2021-09-09
Technical Review by BL on 2021-09-09

0 2,000 4,000 6,000 8,000 Feet

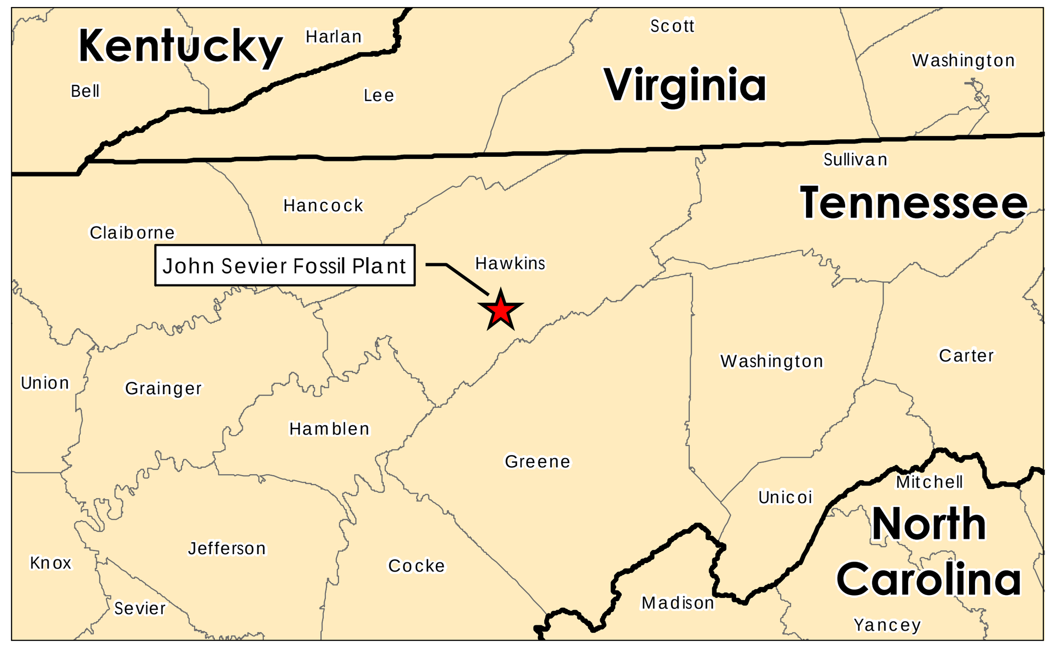
1:24,000 (At original document size of 22x34)

Legend

- Mayfly Sampling Reaches: *HRU – Holston River Upstream; HRA1 – Holston River Adjacent 1; HRA2 – Holston River Adjacent 2; HRD – Holston River Downstream*
- 2017 Imagery Boundary
- 2018 Imagery Boundary
- Limit of Historical Ash Disposal Ponds (Approximate)
- CCR Unit Area (Approximate)
- Closed Coal Yards and Chemical Ponds (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), TVA (2018-09-11), Bing Imagery



Stantec TVA

U:\TVA-EIP\175568225_JSF_Phase2\gis\mxd\Env_SARS\JSF_SARS_ExhA3_Mayfly_Sampling_Reaches.mxd Revised: 2021-09-09 By: mbough

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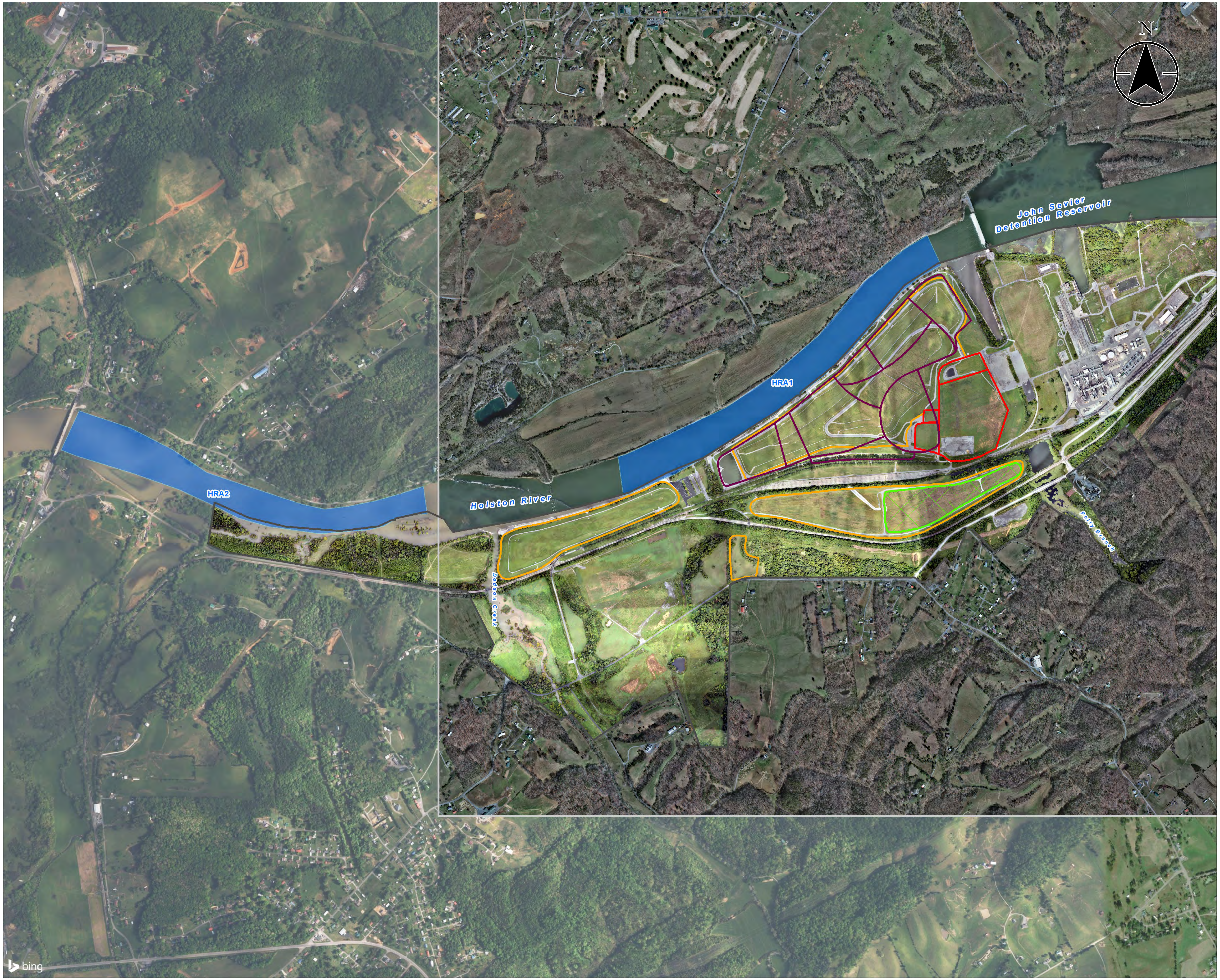


Exhibit No.

A.3a

Title

Mayfly Sampling Reaches

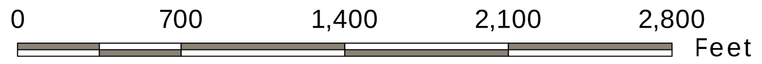
Client/Project

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

Project Location

Rogersville, Tennessee

175568225
Prepared by DMB on 2021-09-09
Technical Review by BL on 2021-09-09



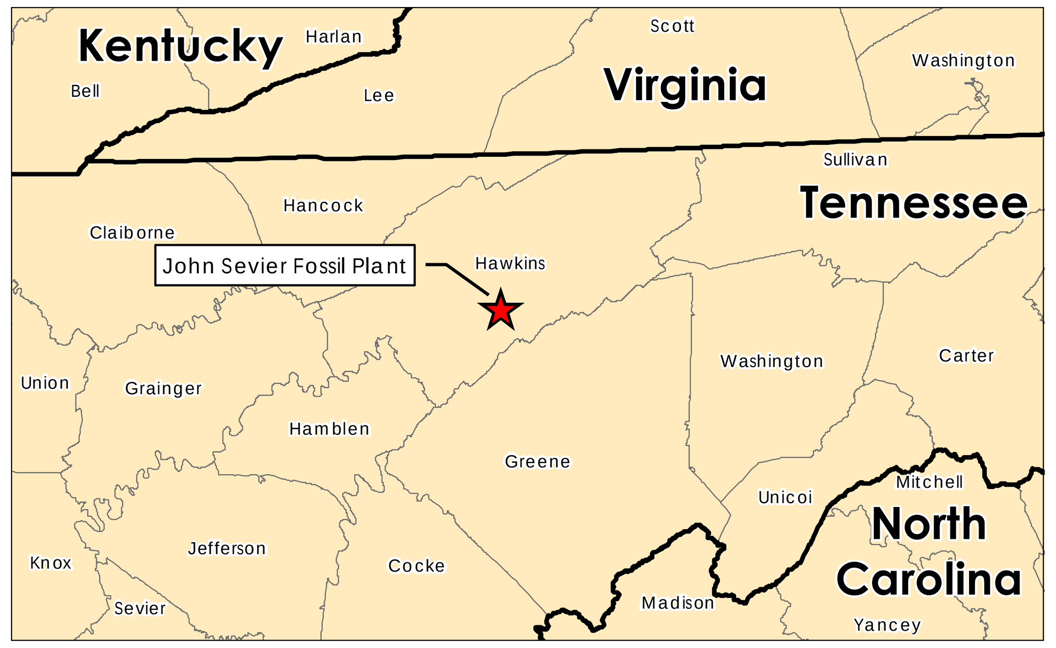
1:8,400 (At original document size of 22x34)

Legend

- Mayfly Sampling Reaches — *HRA1 – Holston River Adjacent 1*, *HRA2 – Holston River Adjacent 2*
- 2017 Imagery Boundary
- 2018 Imagery Boundary
- Limit of Historical Ash Disposal Ponds (Approximate)
- CCR Unit Area (Approximate)
- Closed Coal Yards and Chemical Ponds (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), TVA (2018-09-11), Bing Imagery



Stantec

TVA

U:\TVA-EIP\175568225_JSF_Phase2\gis\mxd\Env_SARS\JSF_SARS_ExhA3a_Mayfly_Sampling_Reaches.mxd Revised: 2021-09-09 By: mbough

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APPENDIX B - TABLES

TABLE B.1 – Sediment Sampling Locations
John Sevier Fossil Plant

Transect Location ID	Description
SED-HR01	Holston River just downstream of the John Sevier Detention Dam
SED-HR02	Holston River Adjacent to Dry Fly Ash Stack
SED-HR03	Holston River Adjacent to Dry Fly Ash Stack at Location of 1973 Dike Failure
SED-HR04	Holston River Adjacent to Dry Fly Ash Stack
SED-HR05	Holston River just downstream of Polly Branch
SED-HR06	Holston River Adjacent to Ash Disposal Area J
SED-HR07	Holston River Downstream of JSF Plant
SED-HR08	Holston River Downstream of JSF Plant
SED-HR09	Holston River Downstream of JSF Plant
SED-PB01*	Polly Branch Upstream of JSF Plant (Background)
SED-PB02*	Polly Branch Upstream of JSF Plant (Background)
SED-PB03	Polly Branch Upstream of Plant JSF (Background)
SED-PB04	Polly Branch Upstream of JSF Plant (Background)
SED-PB05*	Polly Branch at the upstream end of Bottom Ash Pond
SED-PB06*	Polly Branch Adjacent to Bottom Ash Pond
SED-PB07*	Polly Branch Adjacent to Bottom Ash Pond
SED-PB08*	Polly Branch at the downstream end of Bottom Ash Pond
SED-PB09*	Polly Branch just upstream of confluence with the Holston River

Notes:

ID Identification

* Sediment sample point (versus transect)

TABLE B.2 – Benthic Invertebrate Community Sampling Locations
John Sevier Fossil Plant

Transect Location ID	Description
MAC-HR01*	Holston River Upstream of JSF Plant
MAC-HR02*	Holston River Upstream of JSF Plant
MAC-HR03	Holston River Downstream from JSF Plant Outfall No. 002
MAC-HR04	Holston River Adjacent to Dry Fly Ash Stack at Location of 1973 Dike Failure
MAC-HR05*	Holston River Adjacent to Dry Fly Ash Stack
MAC-HR06	Holston River just Downstream of Polly Branch
MAC-HR07	Holston River Adjacent to Ash Disposal Area J
MAC-HR08	Holston River Downstream of JSF Plant
MAC-HR09*	Holston River Downstream of JSF Plant
MAC-HR10	Holston River Downstream of JSF Plant
MAC-HR11*	Holston River Downstream of JSF Plant

Notes:

ID Identification

* Historical benthic invertebrate community sample transect location

TABLE B.3 – Mayfly Sampling Reaches
John Sevier Fossil Plant

Sample Reach ID	Description
HRU	Holston River Upstream of JSF Plant
HRA1	Holston River Adjacent to JSF Plant
HRA2	Holston River Adjacent to JSF Plant
HRD	Holston River Downstream of JSF Plant

Notes:

ID Identification

TABLE B.4 – Corresponding Environmental Sampling Locations
John Sevier Fossil Plant

Corresponding Sampling Locations				
Surface Stream	**Sediment**	**Benthic Community**	**Mayfly**	**Fish Tissue**
–	–	MAC-HR01	HRU	HRU
–	–	MAC-HR02	–	–
STR-HR01	SED-HR01	–	–	–
STR-HR02	SED-HR02	MAC-HR03	HRA1	HRA1
STR-HR03	SED-HR03	MAC-HR04		
STR-HR04	SED-HR04	MAC-HR05		
STR-HR05	SED-HR05	MAC-HR06		
STR-HR06	SED-HR06	MAC-HR07		
STR-HR07	SED-HR07	MAC-HR08	–	–
STR-HR08	SED-HR08	MAC-HR09	HRA2	HRA2
STR-HR09	SED-HR09	MAC-HR10		
STR-PB01	SED-PB01	–	–	–
STR-PB02	SED-PB02	–	–	–
STR-PB03	SED-PB03	–	–	–
STR-PB04	SED-PB04	–	–	–
STR-PB05	SED-PB05	–	–	–
STR-PB06	SED-PB06	–	–	–
STR-PB07	SED-PB07	–	–	–
STR-PB08	SED-PB08	–	–	–
STR-PB09	SED-PB09	–	–	–
–	–	MAC-HR11	HRD	HRD

Notes:

– not applicable

TABLE B.5 – Summary of Sediment Samples
John Sevier Fossil Plant
December 2018 and April 2019

					Analysis Type					
Location ID	**Station ID[1]**	**Sample ID**	**Parent Sample ID**	**Sample Type[2]**	**% ASH**	**Total Metals**	**Total Mercury**	**Anions**	**pH (laboratory)**	**Radium-226, Radium-228, Radium-226+228**
SED-HR01	LB	JSF-SED-HR01-CORLB-0.0/0.5-20190403		N	x	x	x	x	x	x
	RB	JSF-SED-HR01-CORRB-0.0/0.5-20190403		N	x	x	x	x	x	x
SED-HR02	LB	JSF-SED-HR02-CORLB-0.0/0.5-20190403		N	x	x	x	x	x	x
	RB	JSF-SED-HR02-CORRB-0.0/0.5-20190403		N	x	x	x	x	x	x
SED-HR03	LB	JSF-SED-HR03-CORLB-0.0/0.5-20190403		N[3]	x	x	x	x	x	x
	RB	JSF-SED-HR03-CORRB-0.0/0.5-20190403		N[3]	x	x	x	x	x	x
SED-HR04	LB	JSF-SED-HR04-CORLB-0.0/0.5-20190403		N[3]	x	x	x	x	x	x
	RB	JSF-SED-HR04-CORRB-0.0/0.5-20190403		N	x	x	x	x	x	x
SED-HR05	LB	JSF-SED-HR05-CORLB-0.0/0.5-20190403		N	x	x	x	x	x	x
	RB	JSF-SED-HR05-CORRB-0.0/0.5-20190403		N	x	x	x	x	x	x
SED-HR06	LB	JSF-SED-HR06-CORLB-0.0/0.5-20190403		N	x	x	x	x	x	x
	LB	JSF-SED-HR06-DUP01-20190403	JSF-SED-HR06-CORLB-0.0/0.5-20190403	FD	x	x	x	x	x	x
	RB	JSF-SED-HR06-CORRB-0.0/0.5-20190403		N	x	x	x	x	x	x
SED-HR07	LB	JSF-SED-HR07-CORLB-0.0/0.5-20190403		N	x	x	x	x	x	x
	RB	JSF-SED-HR07-CORRB-0.0/0.5-20190403		N	x	x	x	x	x	x
SED-HR08	LB	JSF-SED-HR08-CORLB-0.0/0.5-20190403		N	x	x	x	x	x	x
	RB	JSF-SED-HR08-CORRB-0.0/0.5-20190403		N	x	x	x	x	x	x
SED-HR09	LB	JSF-SED-HR09-CORLB-0.0/0.5-20190403		N	x	x	x	x	x	x
	RB	JSF-SED-HR09-CORRB-0.0/0.5-20190403		N	x	x	x	x	x	x
SED-PB01	CC	JSF-SED-PB01-CORCC-0.0/0.5-20181218		N	x	x	x	x	x	x
SED-PB02	CC	JSF-SED-PB02-CORCC-0.0/0.5-20181218		N	x	x	x	x	x	x
	CC	JSF-SED-PB02-CORCC-0.5/2.5-20181218		N	x					
SED-PB03	LB	JSF-SED-PB03-CORLB-0.0/0.5-20181218		N	x	x	x	x	x	x
	LB	JSF-SED-PB03-CORLB-0.5/1.4-20181218		N	x					
	CC	JSF-SED-PB03-CORCC-0.0/0.5-20181218		N	x	x	x	x	x	x
	CC	JSF-SED-PB03-CORCC-0.5/1.2-20181218		N	x					
	RB	JSF-SED-PB03-CORRB-0.0/0.5-20181218		N	x	x	x	x	x	x
	RB	JSF-SED-PB03-DUP01-20181218	JSF-SED-PB03-CORRB-0.0/0.5-20181218	FD	x	x	x	x	x	x
	RB	JSF-SED-PB03-CORRB-0.5/1.6-20181218		N	x					
SED-PB04	LB	JSF-SED-PB04-CORLB-0.0/0.5-20181218		N[3]	x	x	x	x	x	x
	LB	JSF-SED-PB04-CORLB-0.5/1.0-20181218		N	x					
	CC	JSF-SED-PB04-CORCC-0.0/0.5-20181218		N[3]	x	x	x	x	x	x
	CC	JSF-SED-PB04-CORCC-0.5/1.8-20181218		N	x					
	RB	JSF-SED-PB04-CORRB-0.0/0.5-20181218		N[3]	x	x	x	x	x	x
	RB	JSF-SED-PB04-CORRB-0.5/1.2-20181218		N	x					

See notes on last page.

TABLE B.5 – Summary of Sediment Samples
John Sevier Fossil Plant
December 2018 and April 2019

Location ID	Station ID[1]	Sample ID	Parent Sample ID	Sample Type[2]	% ASH	Total Metals	Total Mercury	Anions	pH (laboratory)	Radium-226, Radium-228, Radium-226+228
					Analysis Type					
SED-PB05	CC	JSF-SED-PB05-CORCC-0.0/0.5-20181219		N	x	x	x	x	x	x
	CC	JSF-SED-PB05-CORCC-0.5/0.9-20181219		N	x					
SED-PB06	CC	JSF-SED-PB06-CORCC-0.0/0.5-20181219		N	x	x	x	x	x	x
SED-PB07	CC	JSF-SED-PB07-CORCC-0.0/0.5-20181219		N	x	x	x	x	x	x
SED-PB08	CC	JSF-SED-PB08-CORCC-0.0/0.5-20181219		N	x	x	x	x	x	x
SED-PB09	CC	JSF-SED-PB09-CORCC-0.0/0.5-20181219		N	x	x	x	x	x	x

Notes:

% Ash	Polarized Light Microscopy (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. Station ID: LB=Left Bank, CC=Center Channel, RB=Right Bank (left bank and right bank determined with a downstream-facing orientation)
2. Sample Type: N=Normal Environmental Sample, FD=Field Duplicate
3. Civil & Environmental Consultants, Inc. (CEC) obtained split samples from surficial sediments collected at SED-HR03-LB, SED-HR03-RB, SED-HR04-LB, SED-PB04-LB, SED-PB04-CC, and SED-PB04-RB.

TABLE B.6 – Sediment Sampling Field Data
John Sevier Fossil Plant
December 2018 and April 2019

Location ID	Sample Date	Water Depth (ft)	Gear Type	Core Depth (ft)	Sample ID	Horizon (ft)	Photograph ID	Sediment/Sampling Description
SED-HR01-LB	4/3/2019	<3	Scoop	–	JSF-SED-HR01-CORLB-0.0/0.5-20190403	0.0 – 0.5	1	Brown fines (silts/clays) and sand
SED-HR01-RB	4/3/2019	<3	Scoop	–	JSF-SED-HR01-CORRB-0.0/0.5-20190403	0.0 – 0.5	2	Brown fines (silts/clays) and sand
SED-HR02-LB	4/3/2019	<3	Scoop	–	JSF-SED-HR02-CORLB-0.0/0.5-20190403	0.0 – 0.5	3	Brown fines (silts/clays) and sand
SED-HR02-RB	4/3/2019	<3	Scoop	–	JSF-SED-HR02-CORRB-0.0/0.5-20190403	0.0 – 0.5	4	Brown fines (silts/clays) and sand
SED-HR03-LB	4/3/2019	<3	Scoop	–	JSF-SED-HR03-CORLB-0.0/0.5-20190403	0.0 – 0.5	N/A	Brown fines (silts/clays) and sand
SED-HR03-RB	4/3/2019	<3	Scoop	–	JSF-SED-HR03-CORRB-0.0/0.5-20190403	0.0 – 0.5	N/A	Brown fines (silts/clays) and sand
SED-HR04-LB	4/3/2019	<3	Scoop	–	JSF-SED-HR04-CORLB-0.0/0.5-20190403	0.0 – 0.5	8	Brown fines (silts/clays) and sand
SED-HR04-RB	4/3/2019	<3	Scoop	–	JSF-SED-HR04-CORRB-0.0/0.5-20190403	0.0 – 0.5	9	Brown fines (silts/clays) and sand
SED-HR05-LB	4/3/2019	<3	Scoop	–	JSF-SED-HR05-CORLB-0.0/0.5-20190403	0.0 – 0.5	10	Brown fines (silts/clays) and sand
SED-HR05-RB	4/3/2019	<3	Scoop	–	JSF-SED-HR05-CORRB-0.0/0.5-20190403	0.0 – 0.5	11 - 12	Brown fines (silts/clays) and sand
SED-HR06-LB	4/3/2019	<3	Scoop	–	JSF-SED-HR06-CORLB-0.0/0.5-20190403	0.0 – 0.5	N/A	Brown fines (silts/clays) and sand
SED-HR06-RB	4/3/2019	<3	Scoop	–	JSF-SED-HR06-CORRB-0.0/0.5-20190403	0.0 – 0.5	15	Brown fines (silts/clays) and sand
SED-HR07-LB	4/3/2019	<3	Scoop	–	JSF-SED-HR07-CORLB-0.0/0.5-20190403	0.0 – 0.5	16	Brown fines (silts/clays) and sand
SED-HR07-RB	4/3/2019	<3	Scoop	–	JSF-SED-HR07-CORRB-0.0/0.5-20190403	0.0 – 0.5	20	Brown fines (silts/clays) and sand
SED-HR08-LB	4/3/2019	<3	Scoop	–	JSF-SED-HR08-CORLB-0.0/0.5-20190403	0.0 – 0.5	23	Brown fines (silts/clays) and sand
SED-HR08-RB	4/3/2019	<3	Scoop	–	JSF-SED-HR08-CORRB-0.0/0.5-20190403	0.0 – 0.5	25	Brown fines (silts/clays) and sand
SED-HR09-LB	4/3/2019	<3	Scoop	–	JSF-SED-HR09-CORLB-0.0/0.5-20190403	0.0 – 0.5	28	Brown fines (silts/clays) and sand
SED-HR09-RB	4/3/2019	<3	Scoop	–	JSF-SED-HR09-CORRB-0.0/0.5-20190403	0.0 – 0.5	29	Brown fines (silts/clays) and sand
SED-PB01-CC	12/18/2018	<3	Vibecore	1.1 / 0.5*	JSF-SED-PB01-CORCC-0.0/0.5-20181218	0.0 – 0.5	31 - 32	*Core contained 1.1 ft of material. Upper 0.6 ft of core (aqueous organic matter) discarded, and core depth (0.5 ft) determined from the remaining substrates. Sampled material: dark fines (silts/clays) and organics.
SED-PB02-CC	12/18/2018	4.0	Vibecore	2.5	JSF-SED-PB02-CORCC-0.0/0.5-20181218	0.0 – 0.5	33 - 35	Dark gray to black fines (silts/clays) and organics
					JSF-SED-PB02-CORCC-0.5/2.5-20181218	0.5 – 2.5		Dark gray to black fines (silts/clays) and organics

See notes on last page.

TABLE B.6 – Sediment Sampling Field Data
John Sevier Fossil Plant
December 2018 and April 2019

Location ID	Sample Date	Water Depth (ft)	Gear Type	Core Depth (ft)	Sample ID	Horizon (ft)	Photograph ID	Sediment/Sampling Description
SED-PB03-LB	12/18/2018	N/A	Vibecore	2.65	JSF-SED-PB03-CORLB-0.0/0.5-20181218	0.0 – 0.5	36 - 38	Dark gray to black fines (silts/clays)
					JSF-SED-PB03-CORLB-0.5/1.4-20181218	0.5 – 1.4		Dark gray to black fines (silts/clays)
					–	1.4 – 2.65		Parent material
SED-PB03-CC	12/18/2018	5.0	Vibecore	1.7	JSF-SED-PB03-CORCC-0.0/0.5-20181218	0.0 – 0.5	39 - 41	Dark fines (silts/clays) and organics
					JSF-SED-PB03-CORCC-0.5/1.2-20181218	0.5 – 1.2		Gray fines (silts/clays)
					–	1.2 –1.7		Parent material
SED-PB03-RB	12/18/2018	4.0	Vibecore	2.8	JSF-SED-PB03-CORRB-0.0/0.5-20181218	0.0 – 0.5	42 - 44	Dark gray to black fines (silts/clays) and organics
					JSF-SED-PB03-DUP01-20181218	0.0 – 0.5		Duplicate
					JSF-SED-PB03-CORRB-0.5/1.6-20181218	0.5 – 1.6		Dark gray to black fines (silts/clays) and organics
					–	1.6 – 2.8		Parent material
SED-PB04-LB	12/18/2018	5.0	Vibecore	1.5	JSF-SED-PB04-CORLB-0.0/0.5-20181218	0.0 – 0.5	45 - 46	Dark gray to black fines (silts/clays), organics, and sand
					JSF-SED-PB04-CORLB-0.5/1.0-20181218	0.5 – 1.0		Sand mixed with fines (silts/clays)
					–	1.0 – 1.5		Parent material
SED-PB04-CC	12/18/2018	13.0	Vibecore	2.3	JSF-SED-PB04-CORCC-0.0/0.5-20181218	0.0 – 0.5	47 - 48	Dark gray to black fines (silts/clays) and organics
					JSF-SED-PB04-CORCC-0.5/1.8-20181218	0.5 – 1.8		Gray-brown fines, more consolidated
					–	1.8 – 2.3		Parent material
SED-PB04-RB	12/18/2018	6.0	Vibecore	1.35	JSF-SED-PB04-CORRB-0.0/0.5-20181218	0.0 – 0.5	49 - 51	Dark gray to black fines (silts/clays) and organics
					JSF-SED-PB04-CORRB-0.5/1.2-20181218	0.5 – 1.2		Gray fines (silts/clays)
					–	1.2 – 1.35		Parent Material
SED-PB05-CC	12/19/2018	7.0	Vibecore	1.7 / 1.6*			52 - 54	*Core contained 1.7 ft of material. Upper 0.1 ft of core (aqueous organic matter) discarded, and core depth (1.6 ft) determined from the remaining substrates.
					JSF-SED-PB05-CORCC-0.0/0.5-20181219	0.0 – 0.5		Dark gray to black fines (silts/clays) and organics
					JSF-SED-PB05-CORCC-0.5/0.9-20181219	0.5 – 0.9		Dark gray to black fines (silts/clays) and organics, more consolidated than surficial sediments
					–	0.9 – 1.6		Parent material
SED-PB06-CC	12/19/2018	<1	Scoop	–	JSF-SED-PB06-CORCC-0.0/0.5-20181219	0.0 – 0.5	N/A	Dark gray to black fines about 6 inches deep at center channel
SED-PB07-CC	12/19/2018	<1	Scoop	–	JSF-SED-PB07-CORCC-0.0/0.5-20181219	0.0 – 0.5	58	Dark gray to black fines (silts/clays) and organics

See notes on last page.

TABLE B.6 – Sediment Sampling Field Data
John Sevier Fossil Plant
December 2018 and April 2019

Location ID	Sample Date	Water Depth (ft)	Gear Type	Core Depth (ft)	Sample ID	Horizon (ft)	Photograph ID	Sediment/Sampling Description
SED-PB08-CC	12/19/2018	<1	Scoop	–	JSF-SED-PB08-CORCC-0.0/0.5-20181219	0.0 – 0.5	N/A	Limited depositional sediments. Collected fines (silts /clays) mixed with some hydrated clay. Portions of the streambed composed of limestone cobble and boulder, and portions predominantly clay.
SED-PB09-CC	12/19/2018	<1	Scoop	–	JSF-SED-PB09-CORCC-0.0/0.5-20181219	0.0 – 0.5	N/A	Cobble-gravel streambed. Collected fines (silts/clays) from interstitial space between rocks and near the edge of the stream. Sample area is inundated when Cherokee Reservoir is at summer pool elevations.

Notes:

<	less than
–	not applicable
ft	feet
ID	Identification
N/A	not available

1. See Photographic Logs of Sediment Samples, Attachment C.1 in Appendix C.

2. TVA conducted reconnaissance of the substrates within the Holston River study area on April 2, 2019. The substrates were predominantly composed of varying proportions of bedrock, cobble, gravel, sands, and/or mollusk shells. Depositional areas occurred only at near-shore locations; therefore, no sediment samples were obtained mid-channel within the Holston River.

TABLE B.7 – Sediment Analytical Results
John Sevier Fossil Plant
December 2018 and April 2019

Sample Location		SED-HR01-LB	SED-HR01-RB	SED-HR02-LB	SED-HR02-RB	SED-HR03-LB	SED-HR03-RB	SED-HR04-LB	SED-HR04-RB	SED-HR05-LB	SED-HR05-RB	SED-HR06-LB
Sample Date		3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19	3-Apr-19
Sample ID		JSF-SED-HR01-CORLB-0.0/0.5-20190403	JSF-SED-HR01-CORRB-0.0/0.5-20190403	JSF-SED-HR02-CORLB-0.0/0.5-20190403	JSF-SED-HR02-CORRB-0.0/0.5-20190403	JSF-SED-HR03-CORLB-0.0/0.5-20190403	JSF-SED-HR03-CORRB-0.0/0.5-20190403	JSF-SED-HR04-CORLB-0.0/0.5-20190403	JSF-SED-HR04-CORRB-0.0/0.5-20190403	JSF-SED-HR05-CORLB-0.0/0.5-20190403	JSF-SED-HR05-CORRB-0.0/0.5-20190403	JSF-SED-HR06-CORLB-0.0/0.5-20190403
Parent Sample ID												
Sample Depth (ft)		0.0 – 0.5	0.0 – 0.5	0.0 – 0.5	0.0 – 0.5	0.0 – 0.5	0.0 – 0.5	0.0 – 0.5	0.0 – 0.5	0.0 – 0.5	0.0 – 0.5	0.0 – 0.5
Sample Type [1]		N	N	N	N	N	N	N	N	N	N	N
Level of Review [2, 3]	Units	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified	Final-Verified
PLM												
% ASH [4]	%	8	4	4	6	4	2	6	1	8	3	6 J
Total Metals												
Antimony	mg/kg	0.154 J	0.0905 J	0.104 J	0.107 J	0.115 J	0.0865 J	0.0820 J	0.0983 J	0.0924 J	0.229 J	0.0800 J
Arsenic	mg/kg	3.12 J	2.86 J	2.47 J	3.12 J	2.76 J	2.65 J	1.92 J	2.34 J	2.84 J	1.83 J	2.01 J
Barium	mg/kg	48.2	81.3	44.7	44.7	57.2	71.9	37.2	59.9	46.2	35.3	36.0
Beryllium	mg/kg	0.380	0.685	0.403	0.422	0.444	0.657	0.319	0.582	0.411	0.348	0.317
Boron	mg/kg	2.86 J	1.96 J	2.08 J	2.37 J	3.19 J	1.69 J	2.15 J	1.36 J	2.72 J	1.28 J	1.58 J
Cadmium	mg/kg	0.146	0.186	0.202	0.123	0.165	0.121	0.118	0.0932	0.130	0.0732	0.0891
Calcium	mg/kg	7,700 J	2,590 J	4,540 J	6,610 J	10,900 J	1,610 J	3,710 J	1,660 J	5,130 J	1,870 J	3,910 J
Chromium	mg/kg	11.1 J	10.9 J	12.4 J	10.6 J	19.4 J	10.6 J	8.95 J	10.2 J	10.7 J	7.92 J	8.49 J
Cobalt	mg/kg	20.2	10.6	16.1	13.9	19.3	9.25	13.4	7.52	13.3	8.38	12.2
Copper	mg/kg	16.9 J	10.3 J	12.1 J	15.5 J	18.0 J	10.7 J	10.8 J	15.6 J	14.0 J	7.37 J	11.2 J
Lead	mg/kg	16.5	11.2	9.49	10.2	11.0	9.56	8.02	10.1	9.38	6.33	11.0
Lithium	mg/kg	6.84 J	10.7 J	5.78 J	7.16 J	8.10 J	10.7 J	6.46 J	8.83 J	7.92 J	5.56 J	6.12 J
Mercury	mg/kg	0.179	0.0336	0.125	0.142	0.145	0.0296	0.191	0.0617	0.160	0.0562	0.124 J
Molybdenum	mg/kg	0.417	0.448	0.327 J	0.448	0.466	0.431	0.302 J	0.345	0.583	0.251 J	0.330 J
Nickel	mg/kg	8.55	10.6	6.76	8.04	8.57	9.18	6.26	7.62	8.37	5.30	6.28
Selenium	mg/kg	0.395 J	0.684 J	0.445 J	0.486 J	0.462 J	0.776 J	0.403 J	0.477 J	0.491 J	0.322 J	0.367 J
Silver	mg/kg	<0.0232	<0.0219	0.0352 J	<0.0232	<0.0225	<0.0195	<0.0217	0.0236 J	<0.0216	<0.0194	0.226 J
Strontium	mg/kg	20.2	11.4	12.7	12.9	20.5	9.18	10.5	8.08	12.5	6.76	10.4
Thallium	mg/kg	0.0937	0.0959	0.0848	0.0875	0.112	0.0941	0.0768 J	0.0808	0.0802	0.0553 J	0.0688 J
Vanadium	mg/kg	7.79	14.2	7.25	9.15	9.49	13.0	7.28	11.5	8.96	7.78	7.56
Zinc	mg/kg	68.4 J	36.4 J	56.5 J	55.6 J	70.6 J	38.5 J	50.2 J	38.1 J	52.9 J	31.1 J	45.9 J
Anions												
Chloride	mg/kg	8.86 J	6.61 J	5.55 J	7.14 J	7.75 J	5.37 J	7.66 J	<5.28	<6.05	7.55 J	5.90 J
Fluoride	mg/kg	<1.11	1.09 J	<0.900	<1.10	<1.08	1.29 J	<1.02	<0.926	<1.06	<0.946	<0.945
Sulfate	mg/kg	30.3	17.4	37.3	34.9	57.4	15.7	33.2	13.5 J	42.6	14.8	29.6
Radiological Parameters												
Radium-226	pCi/G	0.953 +/-(0.213)	0.703 +/-(0.216)	0.665 +/-(0.164)	0.752 +/-(0.198)	0.819 +/-(0.208)	0.999 +/-(0.280)	0.841 +/-(0.203)	1.01 +/-(0.212)	0.644 +/-(0.176)	0.807 +/-(0.231)	0.848 +/-(0.239)
Radium-228	pCi/G	1.02 +/-(0.286)	1.21 +/-(0.340)	0.657 +/-(0.200)	1.02 +/-(0.260)	1.05 +/-(0.321)	0.285 +/-(0.360) U	0.654 +/-(0.283)	1.49 +/-(0.306)	1.06 +/-(0.254)	0.978 +/-(0.277)	0.523 +/-(0.421)
Radium-226+228	pCi/G	1.97 +/-(0.357)	1.91 +/-(0.403)	1.32 +/-(0.259)	1.77 +/-(0.327)	1.87 +/-(0.382)	1.28 +/-(0.456) J	1.50 +/-(0.348)	2.50 +/-(0.372)	1.70 +/-(0.309)	1.79 +/-(0.361)	1.37 +/-(0.484)
General Chemisty												
pH (lab)	SU	7.2	7.8	7.8	7.6	7.6	7.9	7.7	7.7	7.4	7.8	7.8

See notes on last page.

TABLE B.7 – Sediment Analytical Results
John Sevier Fossil Plant
December 2018 and April 2019

Sample Location		**SED-HR06-LB**	**SED-HR06-RB**	**SED-HR07-LB**	**SED-HR07-RB**	**SED-HR08-LB**	**SED-HR08-RB**	**SED-HR09-LB**	**SED-HR09-RB**	**SED-PB01-CC**	**SED-PB02-CC**	
Sample Date		**3-Apr-19**	**3-Apr-19**	**3-Apr-19**	**3-Apr-19**	**3-Apr-19**	**3-Apr-19**	**3-Apr-19**	**3-Apr-19**	**18-Dec-18**	**18-Dec-18**	
Sample ID		**JSF-SED-HR06-DUP01-20190403**	**JSF-SED-HR06-CORRB-0.0/0.5-20190403**	**JSF-SED-HR07-CORLB-0.0/0.5-20190403**	**JSF-SED-HR07-CORRB-0.0/0.5-20190403**	**JSF-SED-HR08-CORLB-0.0/0.5-20190403**	**JSF-SED-HR08-CORRB-0.0/0.5-20190403**	**JSF-SED-HR09-CORLB-0.0/0.5-20190403**	**JSF-SED-HR09-CORRB-0.0/0.5-20190403**	**JSF-SED-PB01-CORCC-0.0/0.5-20181218**	**JSF-SED-PB02-CORCC-0.0/0.5-20181218**	**JSF-SED-PB02-CORCC-0.5/2.5-20181218**
Parent Sample ID		**JSF-SED-HR06-CORLB-0.0/0.5-20190403**										
Sample Depth (ft)		**0.0 – 0.5**	**0.0 – 0.5**	**0.0 – 0.5**	**0.0 – 0.5**	**0.0 – 0.5**	**0.0 – 0.5**	**0.0 – 0.5**	**0.0 – 0.5**	**0.0 – 0.5**	**0.0 – 0.5**	**0.5 – 2.5**
Sample Type [1]		**FD**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Level of Review [2, 3]		**Final-Verified**	**Final-Verified**	**Final-Verified**	**Final-Verified**	**Final-Verified**	**Final-Verified**	**Final-Verified**	**Final-Verified**	**Validated**	**Validated**	**Final-Verified**
	Units											
PLM												
% ASH [4]	%	2 J	5	6	3	2	5	5	7	<1	1	1
Total Metals												
Antimony	mg/kg	0.0793 J	0.103 J	0.128 J	0.173 J	0.126 J	0.166 J	0.232 J	0.191 J	0.0944 J	0.111 J	–
Arsenic	mg/kg	2.26 J	2.53 J	3.42 J	3.23 J	2.63 J	5.05 J	4.47 J	2.67 J	3.34 J	3.37 J	–
Barium	mg/kg	41.6	52.2	48.3	57.5	51.7	58.5	92.2	44.6	99.6 J	79.9 J	–
Beryllium	mg/kg	0.380	0.521	0.423	0.490	0.448	0.527	0.681	0.513	0.866 J	0.847 J	–
Boron	mg/kg	1.75 J	2.17 J	1.69 J	2.87 J	2.19 J	2.60 J	2.77 J	2.09 J	2.88 J	2.68 J	–
Cadmium	mg/kg	0.101	0.120	0.122	0.187	0.126	0.198	0.281	0.107	0.128 J	0.115 J	–
Calcium	mg/kg	4,530 J	3,350 J	4,020 J	7,350 J	2,520 J	6,960 J	4,020 J	2,790 J	14,900 J	20,500 J	–
Chromium	mg/kg	9.16 J	11.8 J	11.2 J	13.9 J	10.0 J	13.9 J	17.3 J	10.8 J	12.7 J	13.5 J	–
Cobalt	mg/kg	13.4	14.1	9.08	18.9	9.66	16.3	15.3	11.4	8.51 J	9.36 J	–
Copper	mg/kg	11.2 J	13.6 J	24.9 J	25.2 J	12.5 J	23.9 J	35.9 J	18.1 J	10.1 J	12.1 J	–
Lead	mg/kg	7.98	13.7	10.2	14.1	9.37	14.0	17.3	10.3	17.3 J	17.9 J	–
Lithium	mg/kg	6.75 J	8.11 J	6.64 J	8.86 J	8.45 J	8.95 J	12.3 J	7.92 J	21.9 J	21.3 J	–
Mercury	mg/kg	0.109	0.0606 J	0.216 J	0.296 J	0.170 J	0.346 J	0.550 J	0.140	0.0337 J	0.0423 J	–
Molybdenum	mg/kg	0.325 J	0.345 J	0.355 J	0.431 J	0.373	0.509	0.555	0.342 J	0.287 J	0.278 J	–
Nickel	mg/kg	6.93	8.35	7.07	10.4	7.93	9.78	12.2	7.56	11.3 J	12.3 J	–
Selenium	mg/kg	0.496 J	0.501 J	0.513 J	0.696 J	0.586 J	0.718 J	0.709 J	0.545 J	0.468 J	0.477 J	–
Silver	mg/kg	0.0200 UJ	<0.0207	0.0215 J	0.0302 J	<0.0202	0.0282 J	0.0880	0.0368 J	0.0170 UJ	0.0205 UJ	–
Strontium	mg/kg	11.6	10.5	15.6	18.1	9.54	15.9	19.2	7.72	43.2 J	53.1 J	–
Thallium	mg/kg	0.0771	0.0991	0.0759 J	0.126	0.0779	0.123	0.147	0.0816	0.123 J	0.114 J	–
Vanadium	mg/kg	8.60	9.92	8.55	11.1	10.5	11.5	14.2	11.4	12.0 J	12.1 J	–
Zinc	mg/kg	50.8 J	48.4 J	56.4 J	80.3 J	44.1 J	75.3 J	121 J	42.7 J	42.6 J	49.7 J	–
Anions												
Chloride	mg/kg	5.96 J	5.59 J	<5.81	8.59 J	<5.37	10.4 J	6.52 J	<5.62	9.36 UJ	18.5 J	–
Fluoride	mg/kg	<0.961	<0.964	<1.02	<1.12	1.22 J	<1.24	<1.10	0.995 J	2.94 J	1.86 UJ	–
Sulfate	mg/kg	24.9	16.7	24.0	50.5	19.9	14.9 J	26.9	12.0 J	391 J	597 J	–
Radiological Parameters												
Radium-226	pCi/G	0.853 +/-(0.193)	0.613 +/-(0.198)	0.667 +/-(0.166)	0.829 +/-(0.233)	0.651 +/-(0.154)	0.431 +/-(0.178) U	1.04 +/-(0.289)	0.622 +/-(0.206)	1.37 +/-(0.393) J	1.05 +/-(0.364) J	–
Radium-228	pCi/G	0.811 +/-(0.249)	0.770 +/-(0.258)	1.01 +/-(0.226)	0.501 +/-(0.246)	1.11 +/-(0.240)	1.24 +/-(0.278)	0.786 +/-(0.504)	0.818 +/-(0.273)	1.80 +/-(0.468)	1.89 +/-(0.492)	–
Radium-226+228	pCi/G	1.66 +/-(0.315)	1.38 +/-(0.325)	1.68 +/-(0.280)	1.33 +/-(0.339)	1.76 +/-(0.285)	1.67 +/-(0.330) J	1.83 +/-(0.581)	1.44 +/-(0.342)	3.17 +/-(0.611) J	2.94 +/-(0.612) J	–
General Chemisty												
pH (lab)	SU	7.8	7.6	7.6	7.5	7.7	7.5	7.5	7.6	6.9	6.8	–

See notes on last page.

TABLE B.7 – Sediment Analytical Results
John Sevier Fossil Plant
December 2018 and April 2019

Sample Location		SED-PB03-LB		SED-PB03-CC		SED-PB03-RB			SED-PB04-LB		SED-PB04-CC	
Sample Date		18-Dec-18		18-Dec-18		18-Dec-18			18-Dec-18		18-Dec-18	
Sample ID		JSF-SED-PB03-CORLB-0.0/0.5-20181218	JSF-SED-PB03-CORLB-0.5/1.4-20181218	JSF-SED-PB03-CORCC-0.0/0.5-20181218	JSF-SED-PB03-CORCC-0.5/1.2-20181218	JSF-SED-PB03-CORRB-0.0/0.5-20181218	JSF-SED-PB03-DUP01-20181218	JSF-SED-PB03-CORRB-0.5/1.6-20181218	JSF-SED-PB04-CORLB-0.0/0.5-20181218	JSF-SED-PB04-CORLB-0.5/1.0-20181218	JSF-SED-PB04-CORCC-0.0/0.5-20181218	JSF-SED-PB04-CORCC-0.5/1.8-20181218
Parent Sample ID							JSF-SED-PB03-CORRB-0.0/0.5-20181218					
Sample Depth (ft)		0.0 – 0.5	0.5 – 1.4	0.0 – 0.5	0.5 – 1.2	0.0 – 0.5	0.0 – 0.5	0.5 – 1.6	0.0 – 0.5	0.5 – 1.0	0.0 – 0.5	0.5 – 0.8
Sample Type [1]		N	N	N	N	N	FD	N	N	N	N	N
Level of Review [2, 3]	Units	Validated	Final-Verified	Validated	Final-Verified	Validated	Validated	Final-Verified	Validated	Final-Verified	Validated	Final-Verified
PLM												
% ASH [4]	%	2	<1	2	2	<1	<1	<1	<1	2	<1	1
Total Metals												
Antimony	mg/kg	0.0602 UJ	–	0.125 J	–	0.137 J	0.194 J	–	0.101 J	–	0.225 J	–
Arsenic	mg/kg	2.25	–	4.29 J	–	3.94 J	4.34 J	–	2.96 J	–	5.77 J	–
Barium	mg/kg	41.8	–	74.3 J	–	73.0 J	80.3 J	–	26.7 J	–	98.3 J	–
Beryllium	mg/kg	0.484 J	–	0.959 J	–	0.953 J	1.01 J	–	0.379 J	–	1.04 J	–
Boron	mg/kg	1.30 J	–	2.15 J	–	2.64 J	3.39 J	–	1.60 J	–	4.91 J	–
Cadmium	mg/kg	0.0641 J	–	0.0937 J	–	0.163 J	0.131 J	–	0.0486 J	–	0.166 J	–
Calcium	mg/kg	12,900 J	–	13,300 J	–	11,900 J	13,500 J	–	1,900 J	–	8,210 J	–
Chromium	mg/kg	7.28 J	–	15.8 J	–	14.2 J	15.6 J	–	7.87 J	–	17.9 J	–
Cobalt	mg/kg	5.92 J	–	11.0 J	–	9.15 J	10.4 J	–	4.64 J	–	9.69 J	–
Copper	mg/kg	5.51 J	–	11.6 J	–	13.4 J	14.2 J	–	6.00 J	–	16.9 J	–
Lead	mg/kg	10.4	–	18.8 J	–	19.5 J	19.8 J	–	8.25 J	–	24.1 J	–
Lithium	mg/kg	10.6 J	–	25.0 J	–	22.0 J	24.4 J	–	6.59 J	–	27.4 J	–
Mercury	mg/kg	0.0189 J	–	0.0275 J	–	0.0441 J	0.0437 J	–	0.0179 UJ	–	0.0666 J	–
Molybdenum	mg/kg	0.149 J	–	0.297 J	–	0.338 J	0.377 J	–	0.354 J	–	0.661 J	–
Nickel	mg/kg	6.53 J	–	14.0 J	–	12.7 J	14.3 J	–	4.77 J	–	14.2 J	–
Selenium	mg/kg	0.177 J	–	0.339 J	–	0.449 J	0.537 J	–	0.260 J	–	0.538 J	–
Silver	mg/kg	<0.0136	–	0.0165 UJ	–	0.0226 UJ	0.0231 UJ	–	0.0173 UJ	–	0.0224 UJ	–
Strontium	mg/kg	29.5	–	35.7 J	–	35.8 J	37.4 J	–	5.51 J	–	21.1 J	–
Thallium	mg/kg	0.0693 J	–	0.102 J	–	0.131 J	0.144 J	–	0.0646 J	–	0.196 J	–
Vanadium	mg/kg	6.70 J	–	14.4 J	–	14.0 J	15.5 J	–	8.01 J	–	20.0 J	–
Zinc	mg/kg	24.8 J	–	50.3 J	–	54.7 J	60.3 J	–	19.5 J	–	59.8 J	–
Anions												
Chloride	mg/kg	12.3 J	–	9.21 UJ	–	12.1 UJ	12.3 UJ	–	15.8 J	–	12.5 UJ	–
Fluoride	mg/kg	<1.32	–	1.61 UJ	–	2.11 UJ	2.16 UJ	–	1.65 UJ	–	2.19 UJ	–
Sulfate	mg/kg	289	–	408 J	–	1,910 J	592 J	–	451 J	–	1,380 J	–
Radiological Parameters												
Radium-226	pCi/G	1.08 +/-(0.328) J	–	0.990 +/-(0.278)	–	1.14 +/-(0.370) J	1.14 +/-(0.277) J	–	0.635 +/-(0.439) J	–	1.13 +/-(0.458) J	–
Radium-228	pCi/G	1.51 +/-(0.460)	–	1.48 +/-(0.375)	–	1.91 +/-(0.432)	1.45 +/-(0.475)	–	0.587 +/-(0.339) U	–	2.51 +/-(0.628)	–
Radium-226+228	pCi/G	2.59 +/-(0.565) J	–	2.47 +/-(0.467)	–	3.05 +/-(0.569) J	2.59 +/-(0.550) J	–	1.22 +/-(0.555) J	–	3.64 +/-(0.777) J	–
General Chemisty												
pH (lab)	SU	6.9	–	6.9	–	6.9	6.9	–	6.4	–	6.9	–

See notes on last page.

TABLE B.7 – Sediment Analytical Results
John Sevier Fossil Plant
December 2018 and April 2019

Sample Location		SED-PB04-RB		SED-PB05-CC		SED-PB06-CC	SED-PB07-CC	SED-PB08-CC	SED-PB09-CC
Sample Date		18-Dec-18		19-Dec-18		19-Dec-18	19-Dec-18	19-Dec-18	19-Dec-18
Sample ID		JSF-SED-PB04-CORRB-0.0/0.5-20181218	JSF-SED-PB04-CORRB-0.5/1.2-20181218	JSF-SED-PB05-CORCC-0.0/0.5-20181219	JSF-SED-PB05-CORCC-0.5/0.9-20181219	JSF-SED-PB06-CORCC-0.0/0.5-20181219	JSF-SED-PB07-CORCC-0.0/0.5-20181219	JSF-SED-PB08-CORCC-0.0/0.5-20181219	JSF-SED-PB09-CORCC-0.0/0.5-20181219
Parent Sample ID									
Sample Depth (ft)		0.0 – 0.5	0.5 – 1.2	0.0 – 0.5	0.5 – 0.9	0.0 – 0.5	0.0 – 0.5	0.0 – 0.5	0.0 – 0.5
Sample Type [1]		N	N	N	N	N	N	N	N
Level of Review [2, 3]		Validated	Final-Verified	Validated	Final-Verified	Validated	Validated	Validated	Validated
	Units								
PLM									
% ASH [4]	%	<1	<1	<1	4	7	5	2	<1
Total Metals									
Antimony	mg/kg	0.162 J	–	0.280 J	–	0.292 J	0.469 J	0.106 J	0.152 J
Arsenic	mg/kg	4.21 J	–	5.04 J	–	12.9 J	20.7 J	5.20	6.33
Barium	mg/kg	58.8 J	–	73.5 J	–	88.9 J	107 J	38.7	46.2
Beryllium	mg/kg	0.746 J	–	1.01 J	–	1.47 J	1.59 J	0.605 J	0.655 J
Boron	mg/kg	3.24 J	–	5.47 J	–	6.31 J	8.96 J	1.50 J	3.19 J
Cadmium	mg/kg	0.123 J	–	0.137 J	–	0.151 J	0.347 J	0.0352 J	0.212
Calcium	mg/kg	31,000 J	–	11,400 J	–	29,400 J	8,340 J	2,600 J	5,810 J
Chromium	mg/kg	12.4 J	–	14.0 J	–	15.9 J	20.0 J	15.1 J	9.27 J
Cobalt	mg/kg	7.05 J	–	12.5 J	–	13.5 J	17.6 J	4.90 J	7.28 J
Copper	mg/kg	11.5 J	–	18.8 J	–	17.3 J	22.5 J	6.43 J	10.8 J
Lead	mg/kg	20.8 J	–	20.7 J	–	17.2 J	19.1 J	11.2	10.6
Lithium	mg/kg	16.8 J	–	24.0 J	–	28.0 J	34.4 J	11.0 J	14.5 J
Mercury	mg/kg	0.0570 J	–	0.107 J	–	0.0508 J	0.0604 J	0.0389	0.0677
Molybdenum	mg/kg	0.427 J	–	0.590 J	–	5.67 J	14.3 J	0.777	1.07
Nickel	mg/kg	9.40 J	–	14.4 J	–	20.6 J	24.5 J	7.04 J	8.94 J
Selenium	mg/kg	0.511 J	–	0.612 J	–	0.795 J	1.06 J	0.332 J	0.426 J
Silver	mg/kg	0.0166 UJ	–	0.0386 J	–	0.0224 UJ	0.0343 J	0.0136 J	0.0183 J
Strontium	mg/kg	58.0 J	–	19.2 J	–	47.6 J	30.4 J	8.61	15.9
Thallium	mg/kg	0.156 J	–	0.174 J	–	0.349 J	0.409 J	0.137	0.174
Vanadium	mg/kg	13.6 J	–	16.5 J	–	17.5 J	20.7 J	16.2 J	9.95 J
Zinc	mg/kg	42.1 J	–	66.9 J	–	66.3 J	86.2 J	21.5 J	38.2 J
Anions									
Chloride	mg/kg	9.40 J	–	10.2 UJ	–	12.0 UJ	11.4 J	<6.09	<5.86
Fluoride	mg/kg	2.00 J	–	1.79 UJ	–	2.10 UJ	2.16 J	1.16 J	<1.03
Sulfate	mg/kg	674 J	–	236 J	–	384 J	364 J	79.3	88.4
Radiological Parameters									
Radium-226	pCi/G	1.30 +/-(0.348) J	–	1.12 +/-(0.290) J	–	1.24 +/-(0.320) J	1.36 +/-(0.415) J	0.935 +/-(0.241)	0.974 +/-(0.223)
Radium-228	pCi/G	1.61 +/-(0.666)	–	1.60 +/-(0.466)	–	1.16 +/-(0.399)	2.24 +/-(0.586)	1.37 +/-(0.493)	1.24 +/-(0.266)
Radium-226+228	pCi/G	2.91 +/-(0.751) J	–	2.72 +/-(0.549) J	–	2.40 +/-(0.511) J	3.60 +/-(0.718) J	2.31 +/-(0.549)	2.21 +/-(0.347)
General Chemisty									
pH (lab)	SU	7.2	–	7.3	–	7.2	7.2	7.2	7.3

Notes:

<	analyte was not detected at a concentration greater than the Method Detection Limit
–	parameter not analyzed / not available
%	percent
ft	feet
ID	Identification
J	quantitation is approximate due to limitations identified during data validation
mg/kg	milligrams per kilogram
pCi/g	picoCurie per gram
PLM	Polarized Light Microscopy - analysis for % ash
SU	Standard Unit
UJ	this compound was not detected, but the reporting or detection limit should be considered estimated due to a bias identified during data validation

1. Sample Type: N=Normal Environmental Sample, FD=Field Duplicate
2. Level of review is defined in the Quality Assurance Project Plan.
3. Level of review for % ash samples is Final-Verified.
4. Non-detect (ND) results reported by RJ Lee Group for percent (%) ash expressed as <1 in table.

TABLE B.8 – Benthic Invertebrate Community Field Data
John Sevier Fossil Plant
October 2019

Transect ID	Station ID	Sample Date	Sample ID	Gear	Water Depth (ft)	% Dredge Full	Substrate Percentages[1]							
							Fines (Silts & Clays)	Detritus	Sand	Mollusk Shell	Gravel	Cobble	Woody Debris	Hardpan Clay
MAC-HR01	1	10/3/2019	JSF-MAC-HR01-BEN01-20191003	PO	8.4	90	85	15	–	–	–	–	–	–
MAC-HR01	2	10/3/2019	JSF-MAC-HR01-BEN02-20191003	PO	12.3	90	60	10	30	–	–	–	–	–
MAC-HR01	3	10/3/2019	JSF-MAC-HR01-BEN03-20191003	PO	11.0	60	5	5	90	–	–	–	–	–
MAC-HR01	4	10/3/2019	JSF-MAC-HR01-BEN04-20191003	PO	11.0	80	5	5	90	–	–	–	–	–
MAC-HR01	5	10/3/2019	JSF-MAC-HR01-BEN05-20191003	PO	7.5	100	80	5	15	–	–	–	–	–
MAC-HR02	1	10/3/2019	JSF-MAC-HR02-BEN01-20191003	PO	8.5	100	90	10	–	–	–	–	–	–
MAC-HR02	2	10/3/2019	JSF-MAC-HR02-BEN02-20191003	PO	20.7	90	80	–	15	–	5	–	–	–
MAC-HR02	3	10/3/2019	JSF-MAC-HR02-BEN03-20191003	PO	21.8	50	20	10	70	–	–	–	–	–
MAC-HR02	4	10/3/2019	JSF-MAC-HR02-BEN04-20191003	PO	13.1	100	75	20	5	–	–	–	–	–
MAC-HR02	5	10/3/2019	JSF-MAC-HR02-BEN05-20191003	PO	10.0	100	80	20	–	–	–	–	–	–
MAC-HR03	1	10/2/2019	JSF-MAC-HR03-BEN01-20191002	PO	1.5	20	–	–	5	–	50	45	–	–
MAC-HR03	2	10/2/2019	JSF-MAC-HR03-BEN02-20191002	PO	3.6	20	–	–	–	–	30	70	–	–
MAC-HR03	3	10/2/2019	JSF-MAC-HR03-BEN03-20191002	PO	3.7	20	–	–	–	–	–	100	–	–
MAC-HR03	4	10/2/2019	JSF-MAC-HR03-BEN04-20191002	PO	5.7	15	–	–	–	–	10	90	–	–
MAC-HR03	5	10/2/2019	JSF-MAC-HR03-BEN05-20191002	PO	1.9	50	80	5	15	–	–	–	–	–
MAC-HR04	1	10/2/2019	JSF-MAC-HR04-BEN01-20191002	PO	2.2	35	30	–	10	–	30	30	–	–
MAC-HR04	2	10/2/2019	JSF-MAC-HR04-BEN02-20191002	PO	5.0	20	–	–	–	–	–	100	–	–
MAC-HR04	3	10/2/2019	JSF-MAC-HR04-BEN03-20191002	PO	6.0	80	–	–	–	–	–	100	–	–
MAC-HR04	4	10/2/2019	JSF-MAC-HR04-BEN04-20191002	PO	4.3	40	–	–	–	–	80	20	–	–
MAC-HR04	5	10/2/2019	JSF-MAC-HR04-BEN05-20191002	PO	2.2	35	–	5	80	–	–	–	–	15
MAC-HR05	1	10/2/2019	JSF-MAC-HR05-BEN01-20191002	PO	2.2	30	30	10	–	–	60	–	–	–
MAC-HR05	2	10/2/2019	JSF-MAC-HR05-BEN02-20191002	PO	3.7	80	–	–	–	–	–	100	–	–
MAC-HR05	3	10/2/2019	JSF-MAC-HR05-BEN03-20191002	PO	6.6	20	–	–	–	–	50	50	–	–
MAC-HR05	4	10/2/2019	JSF-MAC-HR05-BEN04-20191002	PO	3.0	30	–	–	–	–	30	70	–	–
MAC-HR05	5	10/2/2019	JSF-MAC-HR05-BEN05-20191002	PO	2.3	40	60	–	–	–	–	–	–	40
MAC-HR06	1	10/2/2019	JSF-MAC-HR06-BEN01-20191002	PO	1.9	35	–	–	–	10	90	–	–	–
MAC-HR06	2	10/2/2019	JSF-MAC-HR06-BEN02-20191002	PO	3.7	30	–	–	–	5	30	65	–	–
MAC-HR06	3	10/2/2019	JSF-MAC-HR06-BEN03-20191002	PO	4.2	70	–	–	–	–	–	100	–	–
MAC-HR06	4	10/2/2019	JSF-MAC-HR06-BEN04-20191002	PO	4.1	30	–	–	–	–	10	90	–	–
MAC-HR06	5	10/2/2019	JSF-MAC-HR06-BEN05-20191002	PO	1.5	20	–	5	–	–	15	80	–	–

See notes on last page.

TABLE B.8 – Benthic Invertebrate Community Field Data
John Sevier Fossil Plant
October 2019

Transect ID	Station ID	Sample Date	Sample ID	Gear	Water Depth (ft)	% Dredge Full	Substrate Percentages[1]							
							Fines (Silts & Clays)	Detritus	Sand	Mollusk Shell	Gravel	Cobble	Woody Debris	Hardpan Clay
MAC-HR07	1	10/2/2019	JSF-MAC-HR07-BEN01-20191002	PO	1.5	40	–	–	–	–	40	60	–	–
MAC-HR07	2	10/2/2019	JSF-MAC-HR07-BEN02-20191002	PO	2.8	50	–	–	–	–	2	98	–	–
MAC-HR07	3	10/2/2019	JSF-MAC-HR07-BEN03-20191002	PO	2.9	50	–	–	–	–	–	100	–	–
MAC-HR07	4	10/2/2019	JSF-MAC-HR07-BEN04-20191002	PO	2.7	30	–	–	–	–	60	40	–	–
MAC-HR07	5	10/2/2019	JSF-MAC-HR07-BEN05-20191002	PO	1.7	30	–	–	–	–	60	40	–	–
MAC-HR08	1	10/1/2019	JSF-MAC-HR08-BEN01-20191001	PO	≈1	40	–	–	30	10	60	–	–	–
MAC-HR08	2	10/1/2019	JSF-MAC-HR08-BEN02-20191001	PO	≈1	25	–	–	10	–	40	50	–	–
MAC-HR08	3	10/1/2019	JSF-MAC-HR08-BEN03-20191001	PO	1.1	20	–	–	–	5	35	60	–	–
MAC-HR08	4	10/1/2019	JSF-MAC-HR08-BEN04-20191001	PO	1.0	30	–	–	–	5	60	35	–	–
MAC-HR08	5	10/1/2019	JSF-MAC-HR08-BEN05-20191001	PO	2.0	80	70	–	–	5	25	–	–	–
MAC-HR09	1	10/1/2019	JSF-MAC-HR09-BEN01-20191001	PO	2.5	20	–	–	–	–	40	60	–	–
MAC-HR09	2	10/1/2019	JSF-MAC-HR09-BEN02-20191001	PO	7.2	20	–	–	–	5	50	45	–	–
MAC-HR09	3	10/1/2019	JSF-MAC-HR09-BEN03-20191001	PO	8.9	10	–	–	80	5	15	–	–	–
MAC-HR09	4	10/1/2019	JSF-MAC-HR09-BEN04-20191001	PO	5.4	10	95	3	2	–	–	–	–	–
MAC-HR09	5	10/1/2019	JSF-MAC-HR09-BEN05-20191001	PO	3.3	20	95	3	2	–	–	–	–	–
MAC-HR10	1	10/1/2019	JSF-MAC-HR10-BEN01-20191001	PO	3.6	50	80	2	–	–	18	–	–	–
MAC-HR10	2	10/1/2019	JSF-MAC-HR10-BEN02-20191001	PO	5.3	35	70	–	–	–	15	15	–	–
MAC-HR10	3	10/1/2019	JSF-MAC-HR10-BEN03-20191001	PO	5.2	30	90	5	–	5	–	–	–	–
MAC-HR10	4	10/1/2019	JSF-MAC-HR10-BEN04-20191001	PO	6.5	30	60	–	–	10	–	30	–	–
MAC-HR10	5	10/1/2019	JSF-MAC-HR10-BEN05-20191001	PO	3.8	60	95	–	–	–	5	–	–	–
MAC-HR11	1	10/1/2019	JSF-MAC-HR11-BEN01-20191001	PO	13.3	40	20	–	–	–	–	–	–	80
MAC-HR11	2	10/1/2019	JSF-MAC-HR11-BEN02-20191001	PO	22.0	80	50	–	–	5	45	–	–	–
MAC-HR11	3	10/1/2019	JSF-MAC-HR11-BEN03-20191001	PO	23.8	80	70	–	–	5	25	–	–	–
MAC-HR11	4	10/1/2019	JSF-MAC-HR11-BEN04-20191001	PO	18.6	90	90	10	–	–	–	–	–	–
MAC-HR11	5	10/1/2019	JSF-MAC-HR11-BEN05-20191001	PO	7.1	80	95	5	–	–	–	–	–	–

Notes:

–	not applicable
≈	approximately
% Dredge Full	estimate of the volume of dredge filled with substrate
PO	Ponar Dredge (Wildco™)
ID	Identification

1. Visual assessment of substrate composition conducted in the field.

TABLE B.9 – Benthic Invertebrate Taxonomic Dataset
John Sevier Fossil Plant
October 2019

River	Holson River																								
Transect ID	MAC-HR01					MAC-HR02					MAC-HR03					MAC-HR04					MAC-HR05				
Collection Date	10/3/2019					10/3/2019					10/2/2019					10/2/2019					10/2/2019				
Station ID[1]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Gear	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO
Taxa	Number of Organisms																								
ANNELIDA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
HIRUDINEA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Glossiphoniidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Helobdella elongata	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Helobdella stagnalis	·	·	2	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·
OLIGOCHAETA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Lumbriculidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·	·
TUBIFICIDA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Naididae	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Arcteonais lomondi	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Aulodrilus limnobius	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Aulodrilus pigueti	·	·	·	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·	·	·	·	·	·	·	·
Branchiura sowerbyi	·	·	·	·	·	·	·	·	·	·	·	2	·	·	1	·	·	·	·	·	4	·	·	·	3
Dero trifida	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	·	·	·	·	·	·	·	·
Limnodrilus hoffmeisteri	·	1	·	·	·	·	·	1	·	·	·	·	·	·	1	·	·	·	·	1	1	·	·	·	·
Limnodrilus sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Naidinae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Nais sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	5	·	1	·	·	1	·	·	·
Pristina leidyi	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Slavina appendiculata	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Tubificinae w/ hair chaetae	1	·	·	·	1	·	·	1	·	3	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·
Tubificinae w/out hair chaetae	4	6	1	·	1	·	·	14	5	4	·	1	·	·	6	2	·	·	·	·	3	·	·	·	1
INSECTA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
COLEOPTERA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Dytiscidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Uvarus sp.	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Elmidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Dubiraphia sp.	5	6	1	2	1	·	1	3	·	2	5	1	2	·	11	·	·	2	·	·	·	·	·	·	·
Stenelmis sp.	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	1	·	·	1	·	1	·
Staphylinidae	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
DIPTERA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Ceratopogonidae	·	1	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Probezzia sp.	5	·	1	·	·	1	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Chironomidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Ablabesmyia annulata	30	3	2	2	7	2	3	2	·	6	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Ablabesmyia mallochi	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	1	3	·	·	·	·	1
Ablabesmyia rhamphe gp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Axarus sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Chironomus sp.	·	8	2	11	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	1	·	·	·	·
Cladotanytarsus sp.	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·	·	·	·	·	·	·	·	1	1	·
Coelotanypus sp.	·	·	·	1	·	3	15	1	1	3	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·
Conchapelopia sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·
Corynoneura sp.	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Cricotopus (isocladius) sp. "Ozarks"	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Cricotopus bicinctus	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Cricotopus sp.	·	·	·	·	·	·	·	·	·	·	15	·	1	7	·	·	27	32	11	·	·	10	21	·	·
Cryptochironomus sp.	·	1	3	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Dicrotendipes neomodestus	·	·	·	·	·	·	·	·	·	·	109	2	6	11	2	·	95	29	34	5	1	23	75	9	3
Dicrotendipes simpsoni	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·
Dicrotendipes sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·	·	·	·	·	·
Epoicocladius flavens	1	·	·	·	·	1	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Nanocladius distinctus	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	4	·	·	·	·	·	·	·	·
Neostempellina sp.	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Parachironomus sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Paracladopelma undine	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·
Parakiefferiella sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·
Paralauterborniella nigrohalteralis	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Polypedilum flavum	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	4	·	·	·

River	Holson River																													
Transect ID	MAC-HR06					MAC-HR07					MAC-HR08					MAC-HR09					MAC-HR10					MAC-HR11				
Collection Date	10/2/2019					10/2/2019					10/1/2019					10/1/2019					10/1/2019					10/1/2019				
Station ID[1]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Gear	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO
Taxa	Number of Organisms																													
ANNELIDA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
HIRUDINEA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Glossiphoniidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Helobdella elongata	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·
Helobdella stagnalis	3	·	·	·	·	3	·	·	·	·	3	1	·	·	·	·	·	·	·	·	·	7	·	·	·	·	7	5	·	1
OLIGOCHAETA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Lumbriculidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
TUBIFICIDA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Naididae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Arcteonais lomondi	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·
Aulodrilus limnobius	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Aulodrilus pigueti	3	·	·	·	·	·	·	·	·	2	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	3	9	18	·	·
Branchiura sowerbyi	5	·	·	·	·	·	·	·	·	3	1	1	·	·	·	·	·	·	·	·	·	1	1	·	·	2	6	·	·	·
Dero trifida	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Limnodrilus hoffmeisteri	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·
Limnodrilus sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·
Naidinae	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Nais sp.	·	·	2	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Pristina leidyi	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Slavina appendiculata	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·
Tubificinae w/ hair chaetae	9	·	·	·	·	·	·	·	·	1	·	·	·	·	2	·	·	·	·	·	·	·	·	·	·	1	9	·	·	·
Tubificinae w/out hair chaetae	2	·	·	·	1	·	·	·	·	2	2	2	·	·	4	·	·	·	·	·	1	1	·	1	·	·	10	7	9	5
INSECTA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
COLEOPTERA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Dytiscidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Uvarus sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Elmidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Dubiraphia sp.	2	·	·	·	1	·	·	·	·	4	1	·	·	·	·	·	·	2	·	·	·	·	·	·	2	·	·	·	·	·
Stenelmis sp.	·	1	1	·	·	2	·	·	2	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·
Staphylinidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
DIPTERA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Ceratopogonidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·
Probezzia sp.	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1
Chironomidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Ablabesmyia annulata	·	·	·	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·	·	1	1	·	·	·	·	2	8	1	8	4
Ablabesmyia mallochi	3	·	·	·	·	·	·	·	·	1	·	2	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·
Ablabesmyia rhamphe gp.	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Axarus sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·
Chironomus sp.	23	·	·	·	·	·	·	·	·	·	9	3	·	2	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·
Cladotanytarsus sp.	1	·	·	·	·	1	·	·	4	·	1	·	·	6	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Coelotanypus sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·	2	16	2	4	6	11	18	10	4	3	6	9
Conchapelopia sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Corynoneura sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Cricotopus (isocladius) sp. "Ozarks"	·	·	·	·	·	·	·	·	6	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Cricotopus bicinctus	·	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Cricotopus sp.	1	19	24	57	3	11	25	32	186	6	·	·	144	2	·	·	4	·	3	·	·	·	·	·	·	·	·	·	·	·
Cryptochironomus sp.	1	·	·	·	1	2	·	·	·	4	1	·	·	2	·	1	·	·	2	2	1	·	·	1	·	·	·	1	·	·
Dicrotendipes neomodestus	46	62	32	82	28	54	34	46	88	5	19	·	39	3	·	2	2	2	·	·	·	·	·	1	·	·	·	·	·	·
Dicrotendipes simpsoni	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Dicrotendipes sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·
Epoicocladius flavens	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	3	·	·	·	·	·
Nanocladius distinctus	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	1	·	·	·	·	·	·	·	·	·	·	·
Neostempellina sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Parachironomus sp.	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·
Paracladopelma undine	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Parakiefferiella sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Paralauterborniella nigrohalteralis	2	·	·	·	·	·	·	·	·	1	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Polypedilum flavum	·	9	37	5	1	1	15	15	24	1	·	·	23	4	·	·	·	3	2	·	·	·	·	·	·	2	·	·	·	·

See notes on last page.

TABLE B.9 – Benthic Invertebrate Taxonomic Dataset
John Sevier Fossil Plant
October 2019

River	Holson River																																																	
Transect ID	MAC-HR01					MAC-HR02					MAC-HR03					MAC-HR04					MAC-HR05					MAC-HR06					MAC-HR07					MAC-HR08					MAC-HR09					MAC-HR10					MAC-HR11				
Collection Date	10/3/2019					10/3/2019					10/2/2019					10/2/2019					10/2/2019					10/2/2019					10/2/2019					10/1/2019					10/1/2019					10/1/2019					10/1/2019				
Station ID[1]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Gear	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO
Taxa	Number of Organisms																																																	
INSECTA (continued)	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Chironomidae (continued)	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Polypedilum halterale gp.	·	·	2	3	3	·	·	2	·	23	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	9	·	·	·	5	1	·	·	·	1	6	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1
Polypedilum scalaenum gp.	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Polypedilum sp.	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	2	2	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Polypedilum tritum	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Procladius sp.	·	·	2	·	·	·	·	4	·	2	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	1	·	·	·
Pseudochironomus sp.	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	2	·	·	·	·	7	2	2	·	·	3	7	11	4	·	8	3	18	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Rheotanytarsus exiguus gp.	·	·	·	·	·	·	·	·	·	·	·	·	·	6	·	·	4	·	·	·	·	·	·	·	·	·	·	4	13	·	·	·	1	24	·	·	·	·	·	·	·	2	·	·	·	·	·	·	·	·	·	·	·	·	·
Rheotanytarsus sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Stempellina sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·
Synorthocladius semivirens	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	1	·	·	·	·	4	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Tanytarsus sp.	·	·	·	1	·	·	·	·	·	·	4	1	·	3	16	·	9	2	1	1	·	2	5	1	1	110	11	1	2	11	11	·	4	12	25	17	3	6	12	·	1	3	·	4	·	·	·	·	1	·	·	1	2	·	·
Thienemanniella sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Thienemanniella xena	·	·	·	·	·	·	·	·	·	·	13	·	·	3	·	·	20	·	14	·	·	1	25	·	·	·	15	1	65	19	14	·	·	78	·	·	·	14	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Empididae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Hemerodromia *sp.*	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Tabanidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Chrysops *sp.*	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Tipulidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Antocha *sp.*	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
EPHEMEROPTERA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Baetidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Baetis intercalaris	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Caenidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Caenis hilaris	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	4	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Caenis sp.	·	·	·	·	·	·	·	·	·	·	3	1	·	·	·	·	·	·	1	·	·	·	·	·	·	5	2	·	·	·	·	·	·	2	1	·	·	2	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	1
Ephemerellidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Eurylophella sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Ephemeridae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Hexagenia sp. <10mm	20	6	7	5	4	3	39	5	·	18	·	·	·	·	·	·	·	·	·	·	3	·	·	·	·	1	·	·	·	1	·	·	·	·	·	1	1	2	·	1	1	·	1	25	20	4	13	11	20	28	9	4	3	7	6
Hexagenia sp. >10mm	13	7	·	1	5	17	2	2	8	23	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	3	·	2	·	4	6	2	·	8	13
Heptageniidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	3	12	·	·	·	1	·	·	·	·	1	·	·	·	1	2	·	·	·	·	·	2	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·
Maccaffertium sp.	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	4	·	·	·	1	·	·	·	·	·	·	·	·	·	·	4	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Stenacron interpunctatum	·	·	·	·	·	·	·	·	·	·	·	·	·	4	·	·	2	3	·	·	·	1	·	1	·	1	2	1	·	·	·	·	1	·	1	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·
Stenonema femoratum	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Leptohyphidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Tricorythodes sp.	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	2	·	·	·	·	1	2	·	·	·	2	1	·	·	·	·	1	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Potamanthidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Anthopotamus myops	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Anthopotamus sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	4	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
ODONATA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Coenagrionidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Argia sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Gomphidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·
PLECOPTERA	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
TRICHOPTERA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Hydropsychidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Cheumatopsych e sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	4	1	·	·	2	·	·	1	1	10	1	·	1	1	2	8	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Hydropsyche sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	1	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Hydroptilidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Hydroptila sp.	·	·	·	·	·	·	·	·	·	·	2	·	·	1	·	·	·	·	·	·	·	·	·	1	·	·	3	3	1	2	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Orthotrichia sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Leptoceridae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Nectopsyche pavida	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Nectopsyche sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Oecetis sp.	·	·	·	·	·	·	·	·	·	·	2	·	·	·	·	·	·	1	1	·	·	·	·	·	·	2	·	·	·	2	·	·	·	·	1	1	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·
Polycentropodidae	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Cyrnellus fraternus	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	1	·	·	·	1	·	2	·	·	·	·	·	·	5	·	·	·	·

See notes on last page.

TABLE B.9 – Benthic Invertebrate Taxonomic Dataset
John Sevier Fossil Plant
October 2019

River: Holson River — Number of Organisms

Transect ID	MAC-HR01					MAC-HR02					MAC-HR03					MAC-HR04				
Collection Date	10/3/2019					10/3/2019					10/2/2019					10/2/2019				
Station ID[1]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Gear	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO
MOLLUSCA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
BIVALVIA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Corbiculidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Corbicula fluminea <10mm	·	2	8	6	2	2	8	2	·	1	24	5	10	3	10	6	·	1	8	3
Corbicula fluminea >10mm	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·
Sphaeriidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
GASTROPODA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Ancylidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Ferrissia rivularis	·	·	·	·	·	·	·	·	·	·	2	1	·	2	·	·	·	·	1	·
Pleuroceridae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1
Leptoxis praerosa	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·
Pleurocera unciale	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·
NEMATODA	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
PLATYHELMINTHES	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Planariidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Girardia tigrina	·	·	·	·	·	·	·	·	·	·	2	·	1	·	·	·	2	2	·	·
CRUSTACEA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
OSTRACODA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
BRANCHIOPODA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Cladocera	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Sididae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Sida crystallina	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
ARACHNIDA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Acariformes	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·
Sarcoptiformes	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Oribatida	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Trombidiformes	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Arrenuridae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Arrenurus sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Lebertiidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Lebertia sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Limnesiidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Limnesia sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Unionicolidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Neumania sp.	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Unionicola sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·

Transect ID	MAC-HR05					MAC-HR06					MAC-HR07					MAC-HR08				
Collection Date	10/2/2019					10/2/2019					10/2/2019					10/1/2019				
Station ID[1]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Gear	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO
MOLLUSCA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
BIVALVIA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Corbiculidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Corbicula fluminea <10mm	1	1	1	1	1	10	10	·	·	2	4	·	1	4	4	2	·	2	2	·
Corbicula fluminea >10mm	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Sphaeriidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
GASTROPODA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Ancylidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Ferrissia rivularis	1	·	1	3	·	1	4	·	1	·	1	·	2	2	·	·	·	·	·	·
Pleuroceridae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Leptoxis praerosa	·	·	·	·	·	·	·	·	1	·	·	·	1	2	·	·	·	·	·	·
Pleurocera unciale	·	·	·	·	·	·	·	·	·	·	·	·	·	·	4	·	·	·	·	·
NEMATODA	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·
PLATYHELMINTHES	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Planariidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Girardia tigrina	·	·	1	·	·	·	5	·	·	·	3	·	1	·	·	·	·	1	·	·
CRUSTACEA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
OSTRACODA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
BRANCHIOPODA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Cladocera	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Sididae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Sida crystallina	·	·	·	·	·	·	·	1	·	·	1	·	·	·	·	·	·	·	·	·
ARACHNIDA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Acariformes	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Sarcoptiformes	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Oribatida	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·
Trombidiformes	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Arrenuridae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Arrenurus sp.	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·
Lebertiidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Lebertia sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·	·	·	·
Limnesiidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Limnesia sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Unionicolidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Neumania sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Unionicola sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·

Transect ID	MAC-HR09					MAC-HR10					MAC-HR11				
Collection Date	10/1/2019					10/1/2019					10/1/2019				
Station ID[1]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Gear	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO
MOLLUSCA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
BIVALVIA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Corbiculidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Corbicula fluminea <10mm	2	1	·	4	2	·	·	·	·	·	·	·	·	2	·
Corbicula fluminea >10mm	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Sphaeriidae	·	·	·	·	·	·	·	·	·	6	·	·	·	·	·
GASTROPODA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Ancylidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Ferrissia rivularis	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Pleuroceridae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Leptoxis praerosa	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·
Pleurocera unciale	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
NEMATODA	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·
PLATYHELMINTHES	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Planariidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Girardia tigrina	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
CRUSTACEA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
OSTRACODA	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·
BRANCHIOPODA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Cladocera	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Sididae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Sida crystallina	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
ARACHNIDA	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Acariformes	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Sarcoptiformes	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Oribatida	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Trombidiformes	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Arrenuridae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Arrenurus sp.	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Lebertiidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Lebertia sp.	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·
Limnesiidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Limnesia sp.	·	·	·	·	·	1	·	·	·	2	·	·	·	·	1
Unionicolidae	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Neumania sp.	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·
Unionicola sp.	·	·	·	3	·	·	·	·	·	·	·	·	·	·	·

Notes:

PO Ponar Dredge (Wildco™)
ID Identification

1. Station IDs 1 through 5 correspond with approximately 5, 25, 50, 75, and 95 percent across the channel, respectively, from left bank to right bank. "Left bank" and "right bank" were determined with a downstream-facing orientation.

TABLE B.10 – Summary of Mayfly Samples
John Sevier Fossil Plant
September 2019

Sampling Reach	Composite Type	Sample ID[1]	Parent Sample ID	Sample Type[2]	Sample Date	Laboratory Analysis: Total Metals	Total Mercury	% Moisture
Holston River Upstream (HRU)	Nymph Non-Depurated	JSF-MFN-HRU-20190927		N	9/27/2019	x	x	x
	Nymph Depurated	JSF-MFP-HRU-20190927		N	9/27/2019	x	x	x
Holston River Adjacent Reach 1 (HRA1)	Nymph Non-Depurated	JSF-MFN-HRA1-20190926		N	9/26/2019	x	x	x
	Nymph Depurated	JSF-MFP-HRA1-20190926		N	9/26/2019	x	x	x
Holston River Adjacent Reach 2 (HRA2)	Nymph Non-Depurated	JSF-MFN-HRA2-20190926		N	9/26/2019	x	x	x
	Nymph Non-Depurated	JSF-MFN-DUP01-20190926	JSF-MFN-HRA2-20190926	FD	9/26/2019	x	x	x
	Nymph Depurated	JSF-MFP-HRA2-20190926		N	9/26/2019	x	x	x
Holston River Downstream (HRD)	Nymph Non-Depurated	JSF-MFN-HRD-20190927		N	9/27/2019	x	x	x
	Nymph Non-Depurated	JSF-MFN-DUP02-20190927	JSF-MFN-HRD-20190927	FD	9/27/2019	x	x	x
	Nymph Depurated	JSF-MFP-HRD-20190927		N	9/27/2019	x	x	x

Notes:

Total Metals	SW-846 Method 6020A
Total Mercury	SW-846 Method 7473
% Moisture	ASTM D2974-87
ID	Identification

1. Sample Nomenclature
   Sample Naming Convention for mayfly nymphs: Plant Acronym - Matrix Acronym - Sampling Reach Identifier - Sample Date
   Sample Naming Convention for Duplicate Samples: Plant Acronym - Matrix Acronym - Duplicate Number - Sample Date
   Matrix Acronym: MFN=Mayfly Nymph Non-Depurated, MFP=Mayfly Nymph Purged (Depurated)
2. Sample Type: N=Normal Environmental Sample, FD=Field Duplicate

TABLE B.11 – Mayfly Analytical Results
John Sevier Fossil Plant
September 2019

Sample Location		JSF-HRU		JSF-HRA1		JSF-HRA2			JSF-HRD		
Sample Date		27-Sep-19	27-Sep-19	26-Sep-19	26-Sep-19	26-Sep-19	26-Sep-19	26-Sep-19	27-Sep-19	27-Sep-19	27-Sep-19
Sample ID		JSF-MFN-HRU-20190927	JSF-MFP-HRU-20190927	JSF-MFN-HRA1-20190926	JSF-MFP-HRA1-20190926	JSF-MFN-HRA2-20190926	JSF-MFN-DUP01-20190926	JSF-MFP-HRA2-20190926	JSF-MFN-HRD-20190927	JSF-MFN-DUP02-20190927	JSF-MFP-HRD-20190927
Sample Type[1]		N	N	N	N	N	FD	N	N	FD	N
Parent Sample ID							JSF-MFN-HRA2-20190926			JSF-MFN-HRD-20190927	
Level of Review[2]	Units	Validated	Validated	Validated	Validated	Validated	Validated	Validated	Validated	Validated	Validated
Percent Moisture											
% Moisture	%	81.3	84.7	83.2	86.3	84.4	83.3	86.5	80.7	81.2	85.1
Total Metals											
Antimony	mg/kg	0.027 J	<0.019	<0.019	<0.021	<0.021	<0.020	<0.020	<0.020	<0.020	<0.020
Arsenic	mg/kg	0.71	0.19	0.39	0.18	0.45	0.43	0.13	0.62	0.55	0.14
Barium	mg/kg	9.9	2.1	5.0	1.3	6.0	5.5	0.95	9.9	8.0	1.7
Beryllium	mg/kg	0.057 J	<0.031	<0.030	<0.033	0.035 J	0.039 J	<0.032	0.058 J	0.046 J	<0.031
Boron	mg/kg	<0.65	<0.65	<0.64	<0.70	<0.68	<0.67	<0.68	<0.66	<0.67	<0.65
Cadmium	mg/kg	0.022 J	0.018 J	0.017 J	0.029 J	0.020 J	0.025 J	0.015 J	0.035 J	0.024 J	0.022 J
Calcium	mg/kg	1,030	421	577	343	643	565	300	878	773	368
Chromium	mg/kg	1.9	0.35	0.78	0.16 J	1.1	0.98	0.11 J	1.6	1.4	0.19 J
Cobalt	mg/kg	2.6	0.52	1.0	0.32	1.2	1.1	0.22	1.7	1.5	0.27
Copper	mg/kg	4.8	2.2	2.7	1.9	3.5	3.3	1.7	4.4	3.9	1.9
Lead	mg/kg	1.8	0.29	0.75	0.14	1.0	0.89	0.091 J	1.6	1.3	0.16
Lithium	mg/kg	1.6	0.28	0.70	0.10	0.86	0.82	0.053 J	1.5	1.3	0.15
Mercury	mg/kg	0.039 J	<0.0074	0.032 J	0.025 J	0.052 J	0.044 J	0.018 J	0.055 J	0.050 J	0.018 J
Molybdenum	mg/kg	0.16	0.18	0.22	0.25	0.20	0.20	0.16	0.19 J	0.19	0.14
Nickel	mg/kg	1.6	0.37	0.75	0.21	0.93	0.90	0.18	1.5	1.2	0.22
Selenium	mg/kg	0.51	0.43	0.46	0.39	0.60	0.59	0.40	0.49	0.60	0.42
Silver	mg/kg	<0.010	<0.010	<0.010	<0.011	<0.011	<0.011	<0.011	<0.021	<0.011	<0.010
Strontium	mg/kg	3.0	1.4	2.1	1.2	2.2	2.0	1.0	2.6	2.4	1.3
Thallium	mg/kg	<0.012	<0.012	<0.012	<0.013	<0.013	<0.012	<0.013	<0.012	<0.012	<0.012
Vanadium	mg/kg	1.8	0.29	0.76	0.15	0.97	0.92	0.093 J	1.8	1.5	0.18
Zinc	mg/kg	39.5	34.9	32.0	31.5	35.9	32.8	29.9	34.4	37.1	29.6

Notes:

<	analyte was not detected at a concentration greater than the Method Detection Limit
%	percent
ID	Identification
J	quantitation is approximate due to limitations identified during data validation
mg/kg	milligrams per kilogram

1. Sample Type: N=Normal Environmental Sample, FD=Field Duplicate
2. Level of review is defined in the Quality Assurance Project Plan.

APPENDIX C - PHOTOGRAPHIC LOGS

ATTACHMENT C.1 -
Photographic Logs of Sediment Samples

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 1

Photo Location:
SED-HR01-LB

Survey Date:
4/3/2019

Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Aliquot from homogenized sample.

Photograph ID: 2

Photo Location:
SED-HR01-RB

Survey Date:
4/3/2019

Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Aliquot from homogenized sample.

Tennessee Valley Authority

Photographic Log

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 3

Photo Location:
SED-HR02-LB

Survey Date:
4/3/2019

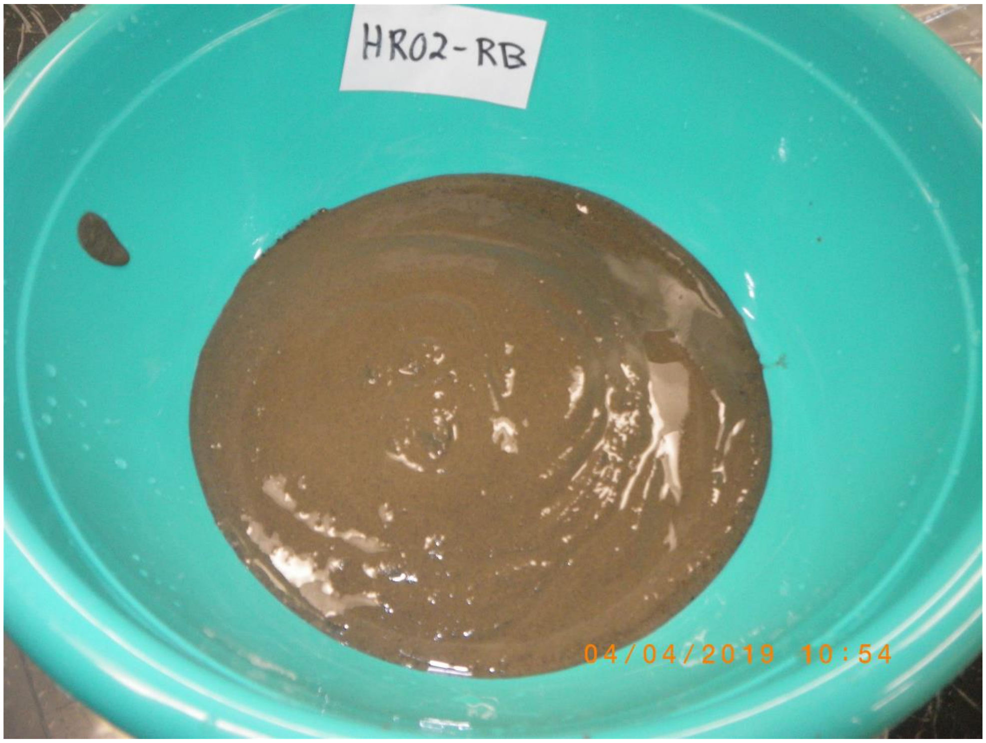
Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Aliquot from homogenized sample.

Photograph ID: 4

Photo Location:
SED-HR02-RB

Survey Date:
4/3/2019

Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Aliquot from homogenized sample.



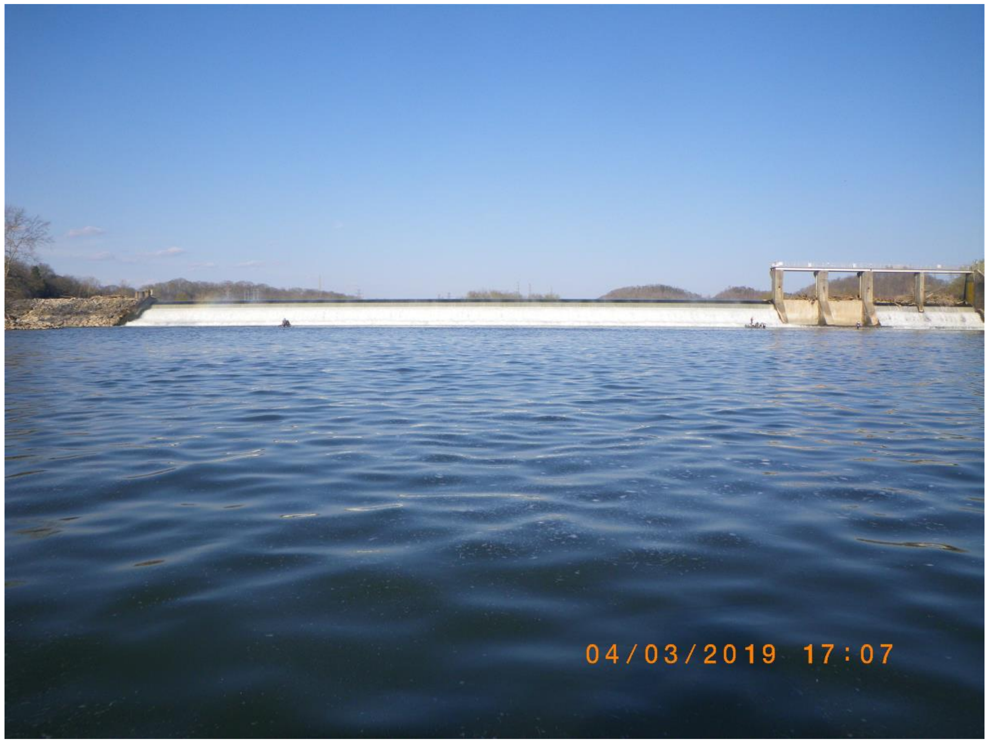
Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 5

Photo Location: SED-HR02

Survey Date: 4/3/2019

Comments: Transect SED-HR02: facing upstream



Photograph ID: 6

Photo Location: SED-HR03-LB

Survey Date: 4/3/2019

Comments: Photo of sampled material not available. Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands.

PHOTOGRAPH NOT AVAILABLE

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 7

Photo Location:
SED-HR03-RB

Survey Date:
4/3/2019

Comments:
Photo of sampled material not available. Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands.

PHOTOGRAPH NOT AVAILABLE

Photograph ID: 8

Photo Location:
SED-HR04-LB

Survey Date:
4/3/2019

Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands; sample processing.

Tennessee Valley Authority

Photographic Log

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 9

Photo Location:
SED-HR04-RB

Survey Date:
4/3/2019

Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Aliquot from homogenized sample.

Photograph ID: 10

Photo Location:
SED-HR05-LB

Survey Date:
4/3/2019

Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Aliquot from homogenized sample.

Tennessee Valley Authority

Photographic Log

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 11

Photo Location:
SED-HR05-RB

Survey Date:
4/3/2019

Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands.

Photograph ID: 12

Photo Location:
SED-HR05-RB

Survey Date:
4/3/2019

Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Aliquot from homogenized sample.

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 13

Photo Location: SED-HR06-LB

Survey Date: 4/3/2019

Comments: Photo of sampled material not available. Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands.

PHOTOGRAPH NOT AVAILABLE

Photograph ID: 14

Photo Location: SED-HR06-LB

Survey Date: 4/3/2019

Comments: SED-HR06-LB site photo: sediment sample collection

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 15

Photo Location:
SED-HR06-RB

Survey Date:
4/3/2019

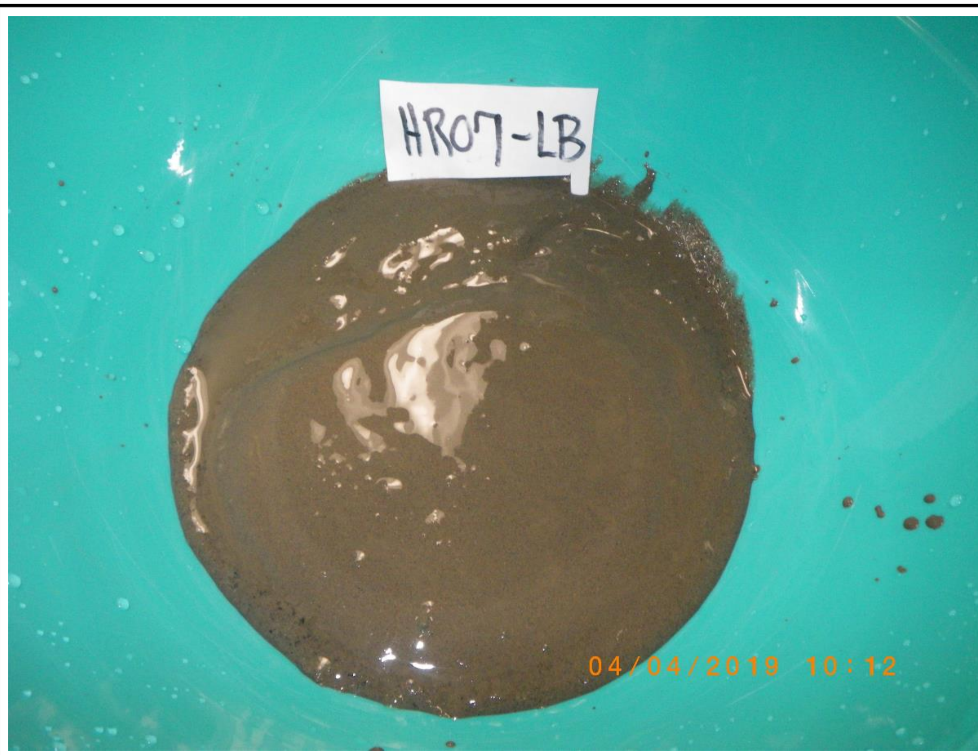
Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Processed Sample.

Photograph ID: 16

Photo Location:
SED-HR07-LB

Survey Date:
4/3/2019

Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Aliquot from homogenized sample.



Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 17

Photo Location:
Transect SED-HR07

Survey Date:
4/3/2019

Comments:
Transect HR07 site photo: facing upstream

Photograph ID: 18

Photo Location:
Transect SED-HR07

Survey Date:
4/3/2019

Comments:
Transect HR07 site photo: substrate approximately mid-channel

Tennessee Valley Authority

Photographic Log

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 19

Photo Location:
Transect SED-HR07

Survey Date:
4/3/2019

Comments:
Transect HR07 site photo from mid-channel to right bank

Photograph ID: 20

Photo Location:
SED-HR07-RB

Survey Date:
4/3/2019

Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands.

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 21 **Photo Location:** SED-HR07-RB **Survey Date:** 4/3/2019 **Comments:** SED-HR07-RB site photo: facing upstream	
Photograph ID: 22 **Photo Location:** SED-HR07-RB **Survey Date:** 4/3/2019 **Comments:** SED-HR07-RB site photo: facing downstream	

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 23 **Photo Location:** SED-HR08-LB **Survey Date:** 4/3/2019 **Comments:** Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Aliquot from homogenized sample.	
Photograph ID: 24 **Photo Location:** SED-HR08-LB **Survey Date:** 4/3/2019 **Comments:** SED-HR08-LB site photo: facing downstream	

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 25

Photo Location: SED-HR08-RB

Survey Date: 4/3/2019

Comments: Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Aliquot from homogenized sample.

Photograph ID: 26

Photo Location: SED-HR08-RB

Survey Date: 4/3/2019

Comments: SED-HR08-RB site photo: facing downstream

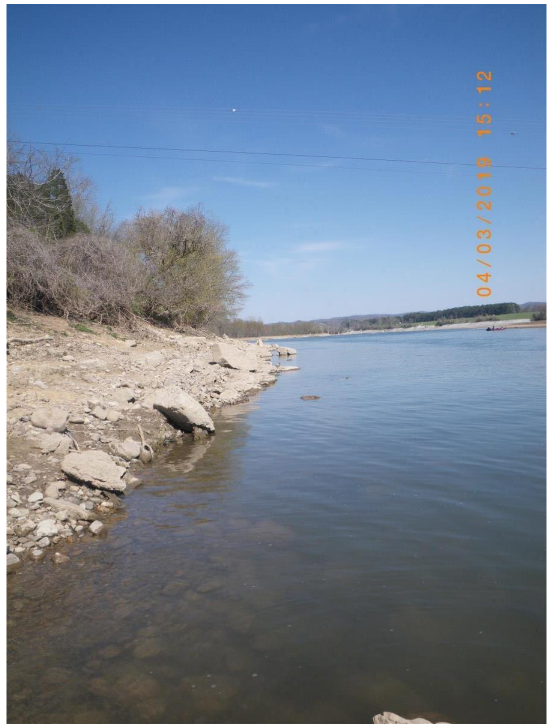
Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 27

Photo Location:
SED-HR08-RB

Survey Date:
4/3/2019

Comments:
SED-HR08-RB site photo: facing upstream



Photograph ID: 28

Photo Location:
SED-HR09-LB

Survey Date:
4/3/2019

Comments:
Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Aliquot from homogenized sample.

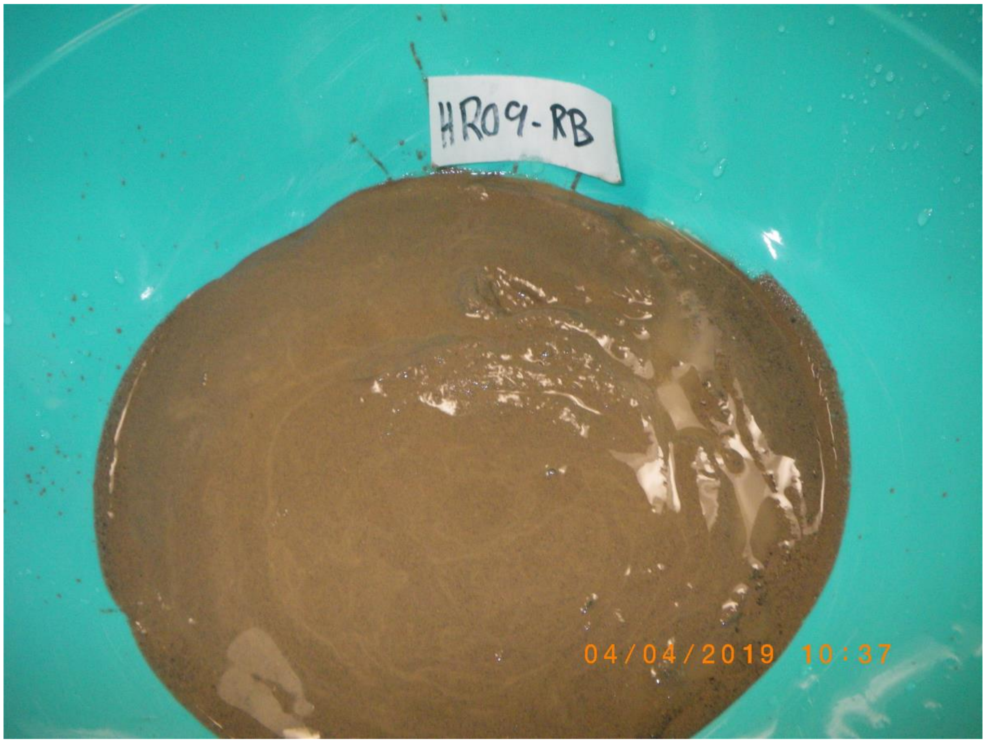
Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 29

Photo Location: SED-HR09-RB

Survey Date: 4/3/2019

Comments: Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands. Aliquot from homogenized sample.



Photograph ID: 30

Photo Location: SED-PB01-CC

Survey Date: 12/18/2018

Comments: SED-PB01 site photo: beaver dam

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 31

Photo Location:
SED-PB01-CC

Survey Date:
12/18/2018

Comments:
Core depth 1.1 feet. Upper 0.6 feet of core (aqueous organic matter) discarded, and core depth (0.5 feet) determined from the remaining substrates. Sample interval (feet): 0.0-0.5.

Photograph ID: 32

Photo Location:
SED-PB01-CC

Survey Date:
12/18/2018

Comments:
Core depth 1.1 feet. Upper 0.6 feet of core (aqueous organic matter) discarded, and core depth (0.5 feet) determined from the remaining substrates. Sample interval (feet): 0.0-0.5.

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 33

Photo Location:
SED-PB02-CC

Survey Date:
12/18/2018

Comments:
Core depth 2.5 feet.
Sample intervals (feet):
0.0-0.5 and 0.5-2.5.

Photograph ID: 34

Photo Location:
SED-PB02-CC

Survey Date:
12/18/2018

Comments:
Core depth 2.5 feet.
Sample intervals (feet):
0.0-0.5 and 0.5-2.5.

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 35

Photo Location: SED-PB02-CC

Survey Date: 12/18/2018

Comments: Core depth 2.5 feet. Sample intervals (feet): 0.0-0.5 and 0.5-2.5.

Photograph ID: 36

Photo Location: SED-PB03-LB

Survey Date: 12/18/2018

Comments: Core depth 2.65 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.4. Parent material 1.4-2.65 feet.

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 37

Photo Location:
SED-PB03-LB

Survey Date:
12/18/2018

Comments:
Core depth 2.65 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.4. Parent material 1.4-2.65 feet.

Photograph ID: 38

Photo Location:
SED-PB03-LB

Survey Date:
12/18/2018

Comments:
Core depth 2.65 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.4. Parent material 1.4-2.65 feet.

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 39 **Photo Location:** SED-PB03-CC **Survey Date:** 12/18/2018 **Comments:** Core depth 1.7 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.2. Parent material 1.2-1.7 feet.	
Photograph ID: 40 **Photo Location:** SED-PB03-CC **Survey Date:** 12/18/2018 **Comments:** Core depth 1.7 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.2. Parent material 1.2-1.7 feet.	

Tennessee Valley Authority

Photographic Log

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 41

Photo Location:
SED-PB03-CC

Survey Date:
12/18/2018

Comments:
Core depth 1.7 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.2. Parent material 1.2-1.7 feet.

Photograph ID: 42

Photo Location:
SED-PB03-RB

Survey Date:
12/18/2018

Comments:
Core depth 2.8 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.6. Parent material 1.6-2.8 feet

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 43

Photo Location:
SED-PB03-RB

Survey Date:
12/18/2018

Comments:
Core depth 2.8 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.6. Parent material 1.6-2.8 feet

Photograph ID: 44

Photo Location:
SED-PB03-RB

Survey Date:
12/18/2018

Comments:
Core depth 2.8 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.6. Parent material 1.6-2.8 feet

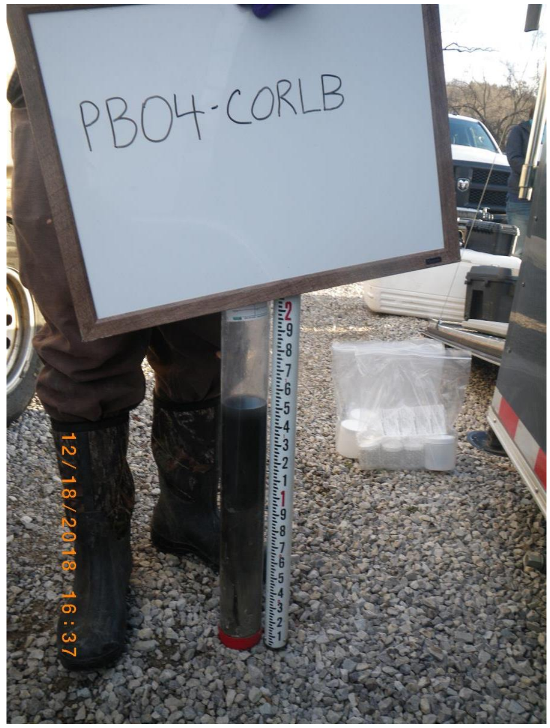
Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 45

Photo Location:
SED-PB04-LB

Survey Date:
12/18/2018

Comments:
Core depth 1.5 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.0. Parent material 1.0-1.5 feet.



Photograph ID: 46

Photo Location:
SED-PB04-LB

Survey Date:
12/18/2018

Comments:
Core depth 1.5 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.0. Parent material 1.0-1.5 feet.

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 47

Photo Location: SED-PB04-CC

Survey Date: 12/18/2018

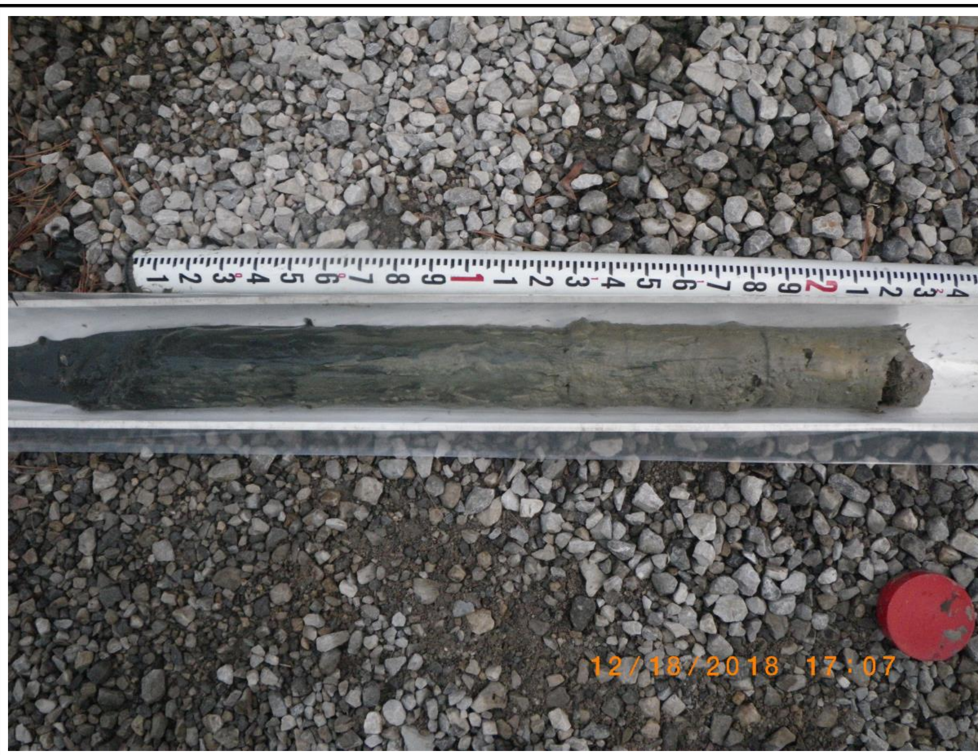
Comments: Core depth 2.3 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.8. Parent material 1.8-2.3 feet.

Photograph ID: 48

Photo Location: SED-PB04-CC

Survey Date: 12/18/2018

Comments: Core depth 2.3 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.8. Parent material 1.8-2.3 feet.



Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 49

Photo Location:
SED-PB04-RB

Survey Date:
12/18/2018

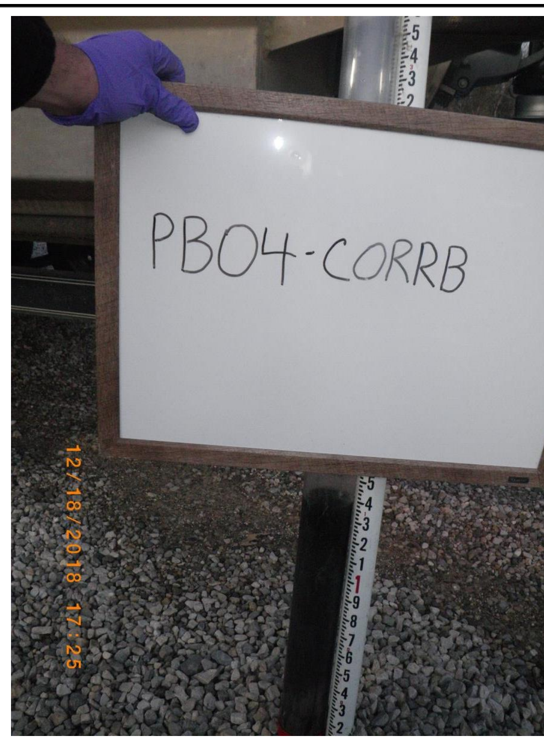
Comments:
Core depth 1.35 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.2. Parent material 1.2-1.35 feet.

Photograph ID: 50

Photo Location:
SED-PB04-RB

Survey Date:
12/18/2018

Comments:
Core depth 1.35 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.2. Parent material 1.2-1.35 feet.



Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 51

Photo Location: SED-PB04-RB

Survey Date: 12/18/2018

Comments: Core depth 1.35 feet. Sample intervals (feet): 0.0-0.5 and 0.5-1.2. Parent material 1.2-1.35 feet.

Photograph ID: 52

Photo Location: SED-PB05-CC

Survey Date: 12/19/2018

Comments: Core depth 1.7 feet. Upper 0.1 feet of core (aqueous organic matter) discarded, and core depth (1.6 feet) determined from the remaining substrates. Sample intervals (feet): 0.0-0.5 and 0.5-0.9. Parent material 0.9-1.6 feet.

Tennessee Valley Authority

Photographic Log

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 53

Photo Location:
SED-PB05-CC

Survey Date:
12/19/2018

Comments:
Core depth 1.7 feet. Upper 0.1 feet of core (aqueous organic matter) discarded, and core depth (1.6 feet) determined from the remaining substrates. Sample intervals (feet): 0.0-0.5 and 0.5-0.9. Parent material 0.9-1.6 feet.

Photograph ID: 54

Photo Location:
SED-PB05-CC

Survey Date:
12/19/2018

Comments:
Core depth 1.7 feet. Upper 0.1 feet of core (aqueous organic matter) discarded, and core depth (1.6 feet) determined from the remaining substrates. Sample intervals (feet): 0.0-0.5 and 0.5-0.9. Parent material 0.9-1.6 feet.

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 55 **Photo Location:** SED-PB06-CC **Survey Date:** 12/19/2018 **Comments:** Photo of sampled material not available. Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands.	PHOTOGRAPH NOT AVAILABLE
Photograph ID: 56 **Photo Location:** SED-PB06-CC **Survey Date:** 12/19/2018 **Comments:** SED-PB06 site photo: facing upstream	

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 57 **Photo Location:** SED-PB06-CC **Survey Date:** 12/19/2018 **Comments:** SED-PB06 site photo: facing downstream.	
Photograph ID: 58 **Photo Location:** SED-PB07-CC **Survey Date:** 12/19/2018 **Comments:** Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands.	

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 59

Photo Location:
SED-PB08-CC

Survey Date:
12/19/2018

Comments:
Photo of sampled material not available. Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands.

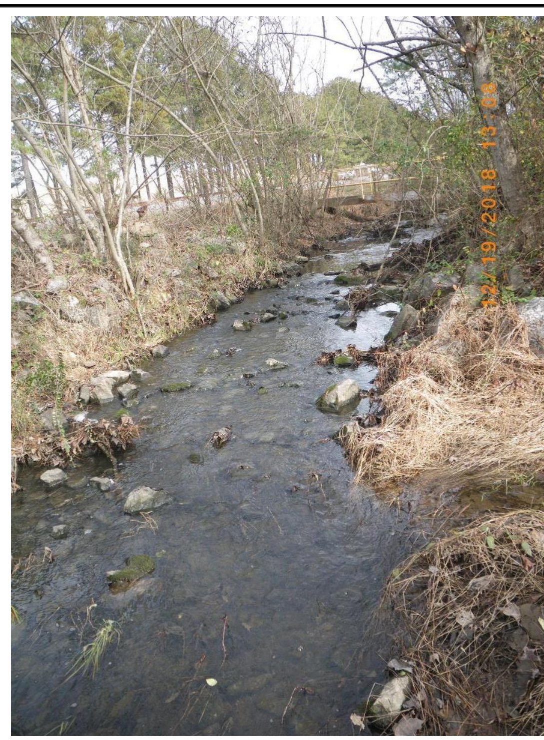
PHOTOGRAPH NOT AVAILABLE

Photograph ID: 60

Photo Location:
SED-PB08-CC

Survey Date:
12/19/2018

Comments:
SED-PB08 site photo: facing upstream



Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 61

Photo Location:
SED-PB08-CC

Survey Date:
12/19/2018

Comments:
SED-PB08 site photo: facing downstream

Photograph ID: 62

Photo Location:
SED-PB09-CC

Survey Date:
12/19/2018

Comments:
Photo of sampled material not available. Surficial (0.0-0.5 feet) sediment sample collected using scoops and gloved hands.

PHOTOGRAPH NOT AVAILABLE

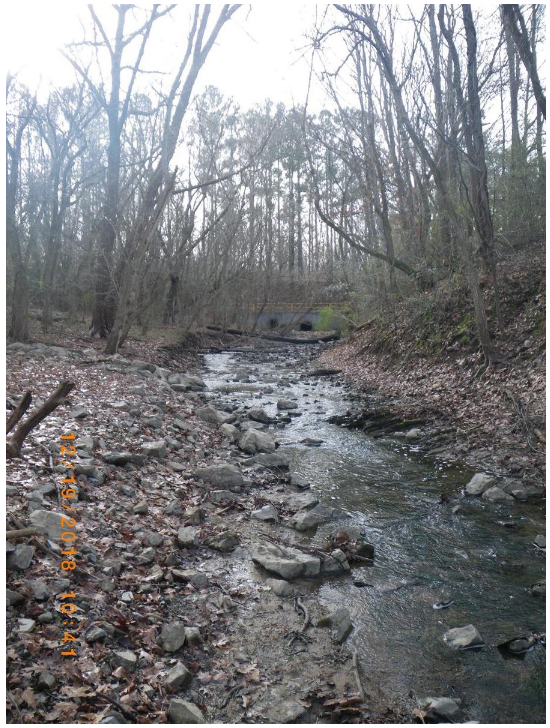
Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 63

Photo Location:
SED-PB09-CC

Survey Date:
12/19/2018

Comments:
SED-PB09 site photo: facing upstream



Photograph ID: 64

Photo Location:
SED-PB09-CC

Survey Date:
12/19/2018

Comments:
SED-PB09 site photo: depositional sediments along edge of stream

Tennessee Valley Authority

Photographic Log

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 65

Photo Location:
SED-PB09-CC

Survey Date:
12/19/2018

Comments:
SED-PB09 site photo: facing downstream; Holston River confluence in background

ATTACHMENT C.2 -

Photographic Logs of Benthic Invertebrate Community Substrate Samples

Tennessee Valley Authority

Photographic Log

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

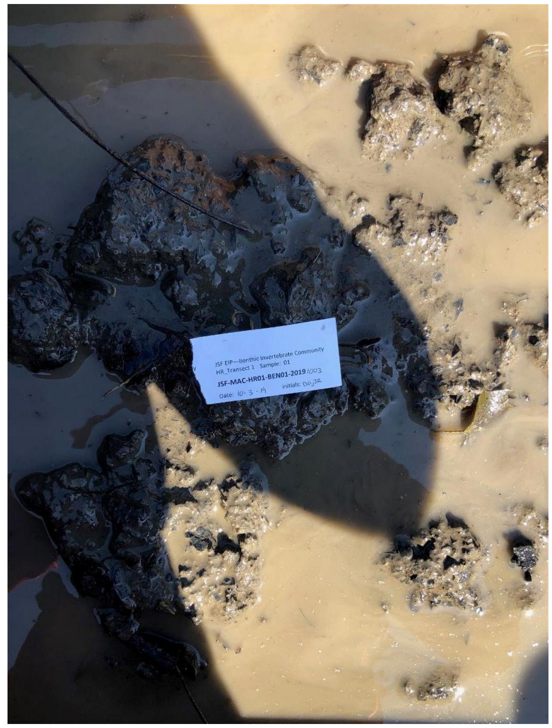
Photograph ID: 1

Photo Location:
MAC-HR01-BEN01

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR01-BEN01-20191003

Comments:
Pre-washdown



Photograph ID: 2

Photo Location:
MAC-HR01-BEN01

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR01-BEN01-20191003

Comments:
Post-washdown

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 3

Photo Location:
MAC-HR01-BEN02

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR01-BEN02-20191003

Comments:
Post-washdown

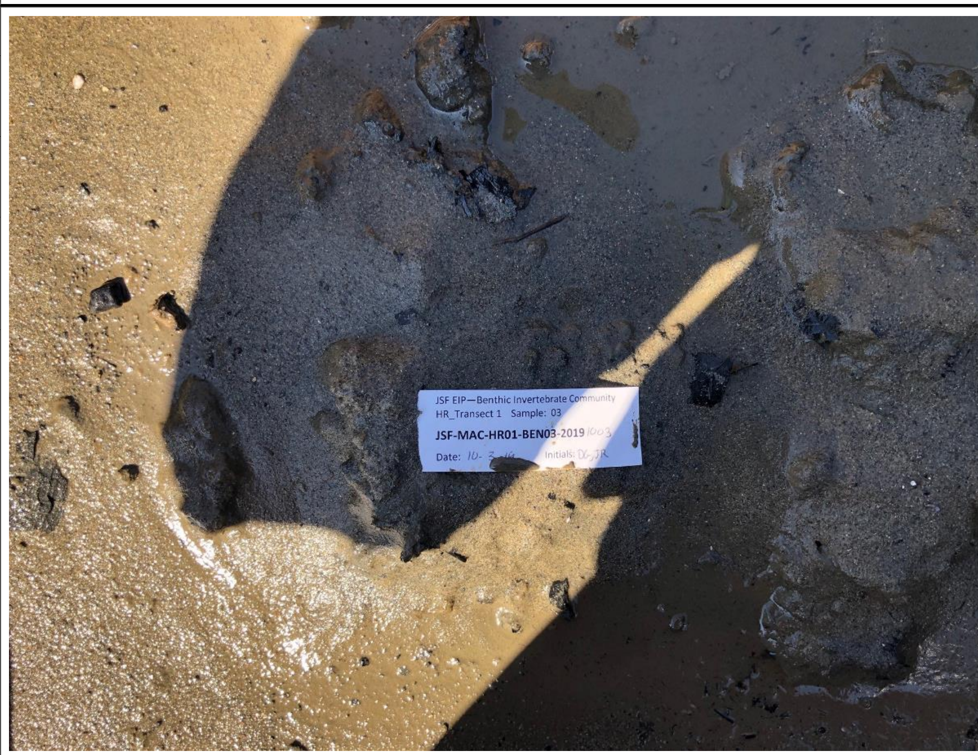
Photograph ID: 4

Photo Location:
MAC-HR01-BEN03

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR01-BEN03-20191003

Comments:
Pre-washdown



Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 5 **Photo Location:** MAC-HR01-BEN03 **Survey Date:** 10/3/2019 **Sample ID:** JSF-MAC-HR01-BEN03-20191003 **Comments:** Post-washdown	
Photograph ID: 6 **Photo Location:** MAC-HR01-BEN04 **Survey Date:** 10/3/2019 **Sample ID:** JSF-MAC-HR01-BEN04-20191003 **Comments:** Pre-washdown	

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 7

Photo Location:
MAC-HR01-BEN04

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR01-BEN04-20191003

Comments:
Post-washdown

Photograph ID: 8

Photo Location:
MAC-HR01-BEN05

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR01-BEN05-20191003

Comments:
Pre-washdown

Tennessee Valley Authority

Photographic Log

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 9

Photo Location:
MAC-HR01-BEN05

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR01-BEN05-20191003

Comments:
Post-washdown

Photograph ID: 10

Photo Location:
MAC-HR02-BEN01

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR02-BEN01-20191003

Comments:
Pre-washdown

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 11 **Photo Location:** MAC-HR02-BEN01 **Survey Date:** 10/3/2019 **Sample ID:** JSF-MAC-HR02-BEN01-20191003 **Comments:** Post-washdown	
Photograph ID: 12 **Photo Location:** MAC-HR02-BEN02 **Survey Date:** 10/3/2019 **Sample ID:** JSF-MAC-HR02-BEN02-20191003 **Comments:** Pre-washdown	

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 13

Photo Location: MAC-HR02-BEN02

Survey Date: 10/3/2019

Sample ID: JSF-MAC-HR02-BEN02-20191003

Comments: Post-washdown

Photograph ID: 14

Photo Location: MAC-HR02-BEN03

Survey Date: 10/3/2019

Sample ID: JSF-MAC-HR02-BEN03-20191003

Comments: Pre-washdown

Tennessee Valley Authority

Photographic Log

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 15

Photo Location:
MAC-HR02-BEN03

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR02-BEN03-20191003

Comments:
Post-washdown

Photograph ID: 16

Photo Location:
MAC-HR02-BEN04

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR02-BEN04-20191003

Comments:
Pre-washdown

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 17

Photo Location:
MAC-HR02-BEN04

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR02-BEN04-20191003

Comments:
Post-washdown

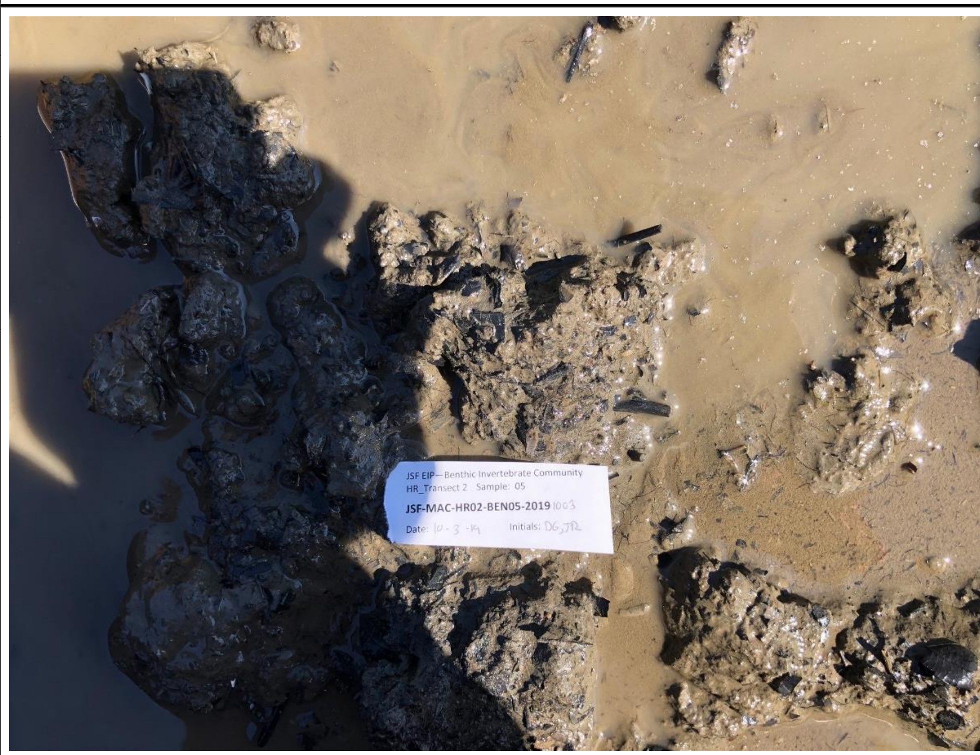
Photograph ID: 18

Photo Location:
MAC-HR02-BEN05

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR02-BEN05-20191003

Comments:
Pre-washdown



Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 19

Photo Location:
MAC-HR02-BEN05

Survey Date:
10/3/2019

Sample ID:
JSF-MAC-HR02-BEN05-20191003

Comments:
Post-washdown

Photograph ID: 20

Photo Location:
MAC-HR03-BEN01

Survey Date:
10/2/2019

Sample ID:
JSF-MAC-HR03-BEN01-20191002

Comments:
Pre-washdown

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 21 **Photo Location:** MAC-HR03-BEN02 **Survey Date:** 10/2/2019 **Sample ID:** JSF-MAC-HR03-BEN02-20191002 **Comments:** Pre-washdown	
Photograph ID: 22 **Photo Location:** MAC-HR03-BEN03 **Survey Date:** 10/2/2019 **Sample ID:** JSF-MAC-HR03-BEN03-20191002 **Comments:** Pre-washdown	

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 23 **Photo Location:** MAC-HR03-BEN04 **Survey Date:** 10/2/2019 **Sample ID:** JSF-MAC-HR03-BEN04-20191002 **Comments:** Pre-washdown	
Photograph ID: 24 **Photo Location:** MAC-HR03-BEN05 **Survey Date:** 10/2/2019 **Sample ID:** JSF-MAC-HR03-BEN05-20191002 **Comments:** Pre-washdown	

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 25

Photo Location: MAC-HR04-BEN01

Survey Date: 10/2/2019

Sample ID: JSF-MAC-HR04-BEN01-20191002

Comments: Pre-washdown

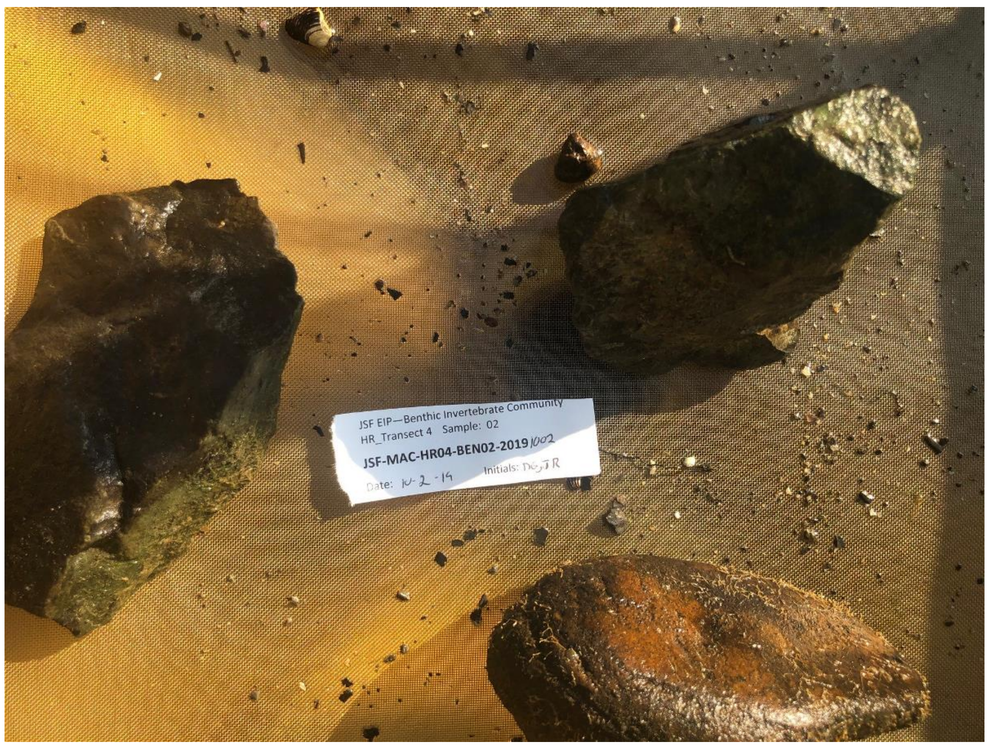
Photograph ID: 26

Photo Location: MAC-HR04-BEN02

Survey Date: 10/2/2019

Sample ID: JSF-MAC-HR04-BEN02-20191002

Comments: Pre-washdown



Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 27 **Photo Location:** MAC-HR04-BEN03 **Survey Date:** 10/2/2019 **Sample ID:** JSF-MAC-HR04-BEN03-20191002 **Comments:** Pre-washdown	
Photograph ID: 28 **Photo Location:** MAC-HR04-BEN04 **Survey Date:** 10/2/2019 **Sample ID:** JSF-MAC-HR04-BEN04-20191002 **Comments:** Pre-washdown	

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 29

Photo Location:
MAC-HR04-BEN05

Survey Date:
10/2/2019

Sample ID:
JSF-MAC-HR04-BEN05-20191002

Comments:
Pre-washdown

Photograph ID: 30

Photo Location:
MAC-HR05-BEN01

Survey Date:
10/2/2019

Sample ID:
JSF-MAC-HR05-BEN01-20191002

Comments:
Pre-washdown

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 31

Photo Location: MAC-HR05-BEN02

Survey Date: 10/2/2019

Sample ID: JSF-MAC-HR05-BEN02-20191002

Comments: Pre-washdown

Photograph ID: 32

Photo Location: MAC-HR05-BEN03

Survey Date: 10/2/2019

Sample ID: JSF-MAC-HR05-BEN03-20191002

Comments: Pre-washdown

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 33

Photo Location:
MAC-HR05-BEN04

Survey Date:
10/2/2019

Sample ID:
JSF-MAC-HR05-BEN04-20191002

Comments:
Pre-washdown

Photograph ID: 34

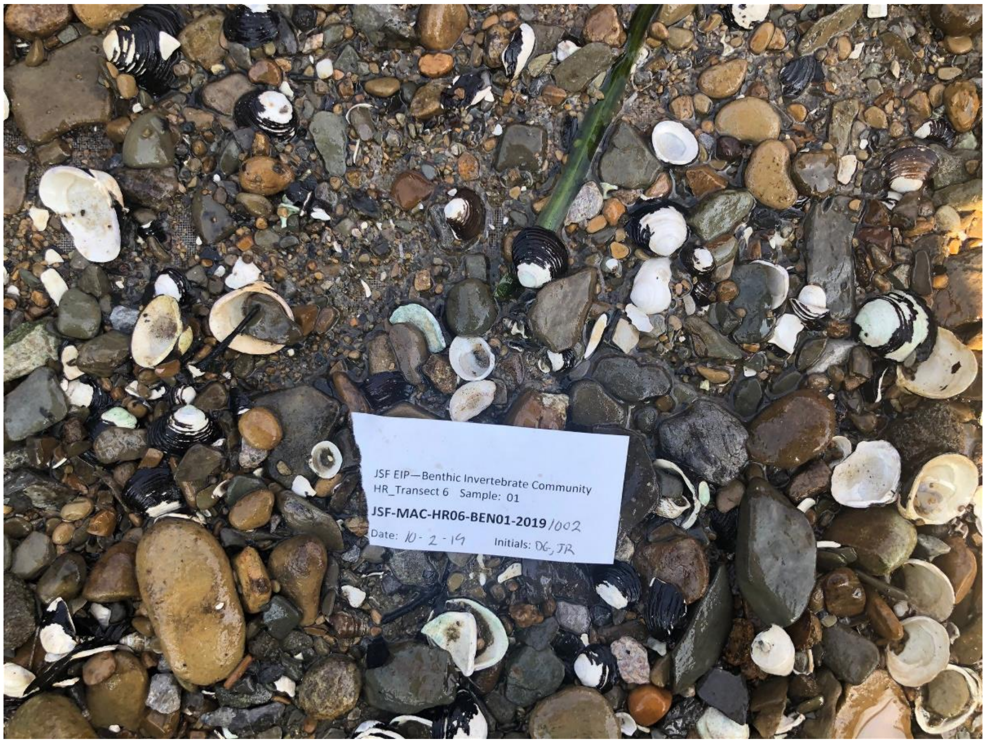
Photo Location:
MAC-HR05-BEN05

Survey Date:
10/2/2019

Sample ID:
JSF-MAC-HR05-BEN05-20191002

Comments:
Pre-washdown

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 35 **Photo Location:** MAC-HR06-BEN01 **Survey Date:** 10/2/2019 **Sample ID:** JSF-MAC-HR06-BEN01-20191002 **Comments:** Pre-washdown	
Photograph ID: 36 **Photo Location:** MAC-HR06-BEN02 **Survey Date:** 10/2/2019 **Sample ID:** JSF-MAC-HR06-BEN02-20191002 **Comments:** Pre-washdown	

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 37

Photo Location:
MAC-HR06-BEN03

Survey Date:
10/2/2019

Sample ID:
JSF-MAC-HR06-BEN03-20191002

Comments:
Pre-washdown

Photograph ID: 38

Photo Location:
MAC-HR06-BEN04

Survey Date:
10/2/2019

Sample ID:
JSF-MAC-HR06-BEN04-20191002

Comments:
Pre-washdown

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 39

Photo Location: MAC-HR06-BEN05

Survey Date: 10/2/2019

Sample ID: JSF-MAC-HR06-BEN05-20191002

Comments: Pre-washdown

Photograph ID: 40

Photo Location: MAC-HR07-BEN01

Survey Date: 10/2/2019

Sample ID: JSF-MAC-HR07-BEN01-20191002

Comments: Pre-washdown

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 41

Photo Location: MAC-HR07-BEN02

Survey Date: 10/2/2019

Sample ID: JSF-MAC-HR07-BEN02-20191002

Comments: Pre-washdown

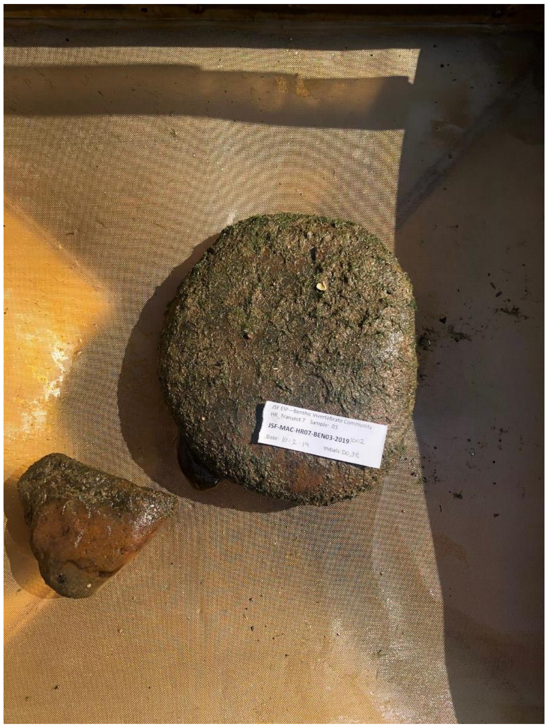
Photograph ID: 42

Photo Location: MAC-HR07-BEN03

Survey Date: 10/2/2019

Sample ID: JSF-MAC-HR07-BEN03-20191002

Comments: Pre-washdown



Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 43

Photo Location: MAC-HR07-BEN04

Survey Date: 10/2/2019

Sample ID: JSF-MAC-HR07-BEN04-20191002

Comments: Pre-washdown

Photograph ID: 44

Photo Location: MAC-HR07-BEN05

Survey Date: 10/2/2019

Sample ID: JSF-MAC-HR07-BEN05-20191002

Comments: Pre-washdown

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 45

Photo Location:
MAC-HR08-BEN01

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR08-BEN01-20191001

Comments:
Pre-washdown

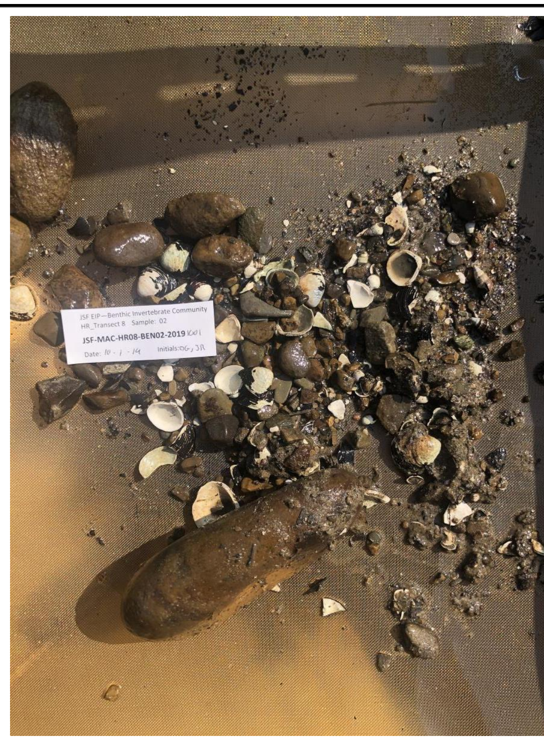
Photograph ID: 46

Photo Location:
MAC-HR08-BEN02

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR08-BEN02-20191001

Comments:
Pre-washdown



Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 47

Photo Location: MAC-HR08-BEN03

Survey Date: 10/1/2019

Sample ID: JSF-MAC-HR08-BEN03-20191001

Comments: Pre-washdown

Photograph ID: 48

Photo Location: MAC-HR08-BEN04

Survey Date: 10/1/2019

Sample ID: JSF-MAC-HR08-BEN04-20191001

Comments: Pre-washdown

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 49

Photo Location:
MAC-HR08-BEN05

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR08-BEN05-20191001

Comments:
Pre-washdown

Photograph ID: 50

Photo Location:
MAC-HR08-BEN05

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR08-BEN05-20191001

Comments:
Post-washdown

Tennessee Valley Authority

Photographic Log

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 51

Photo Location: MAC-HR09-BEN01

Survey Date: 10/1/2019

Sample ID: JSF-MAC-HR09-BEN01-20191001

Comments: Pre-washdown

Photograph ID: 52

Photo Location: MAC-HR09-BEN02

Survey Date: 10/1/2019

Sample ID: JSF-MAC-HR09-BEN02-20191001

Comments: Pre-washdown

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 53

Photo Location: MAC-HR09-BEN03

Survey Date: 10/1/2019

Sample ID: JSF-MAC-HR09-BEN03-20191001

Comments: Pre-washdown

Photograph ID: 54

Photo Location: MAC-HR09-BEN04

Survey Date: 10/1/2019

Sample ID: JSF-MAC-HR09-BEN04-20191001

Comments: Pre-washdown

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 55

Photo Location:
MAC-HR09-BEN05

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR09-BEN05-20191001

Comments:
Pre-washdown

Photograph ID: 56

Photo Location:
MAC-HR10-BEN01

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR10-BEN01-20191001

Comments:
Pre-washdown

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 57

Photo Location:
MAC-HR10-BEN02

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR10-BEN02-20191001

Comments:
Pre-washdown

Photograph ID: 58

Photo Location:
MAC-HR10-BEN03

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR10-BEN03-20191001

Comments:
Pre-washdown

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

Photograph ID: 59

Photo Location:
MAC-HR10-BEN04

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR10-BEN04-20191001

Comments:
Pre-washdown

Photograph ID: 60

Photo Location:
MAC-HR10-BEN05

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR10-BEN05-20191001

Comments:
Pre-washdown

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

Photograph ID: 61	
Photo Location: MAC-HR11-BEN01	
Survey Date: 10/1/2019	
Sample ID: JSF-MAC-HR11-BEN01-20191001	
Comments: Pre-washdown	
Photograph ID: 62	
Photo Location: MAC-HR11-BEN02	
Survey Date: 10/1/2019	
Sample ID: JSF-MAC-HR11-BEN02-20191001	
Comments: Pre-washdown	

Client:	Tennessee Valley Authority	Project:	TDEC Order
Site Name:	John Sevier Fossil (JSF) Plant	Site Location:	Rogersville, Tennessee

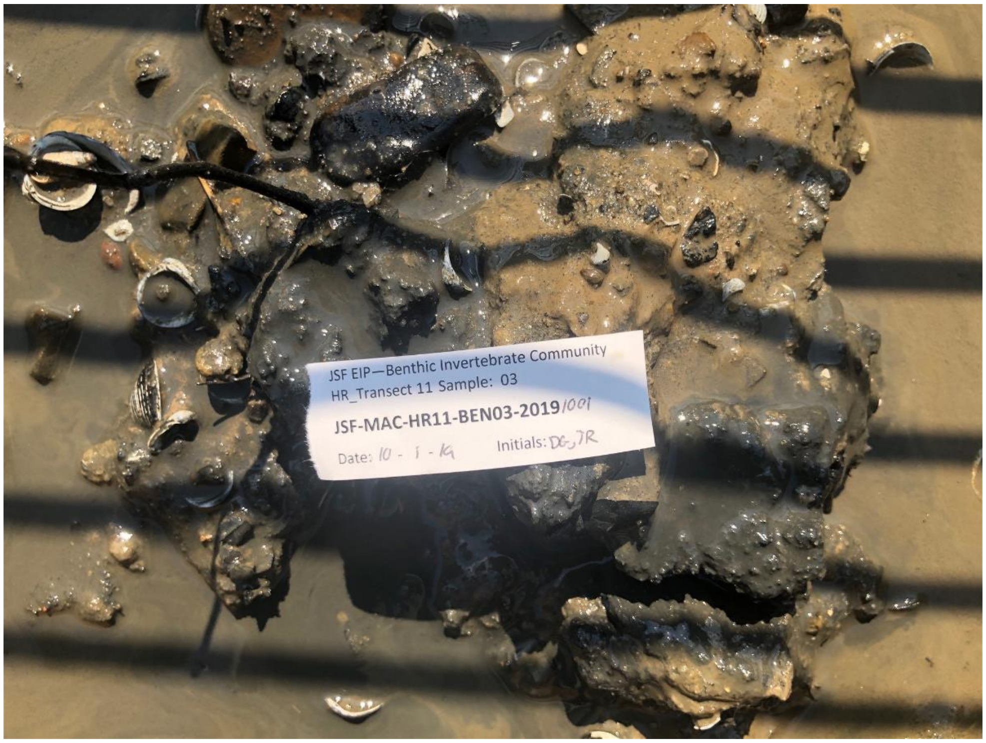
Photograph ID: 63

Photo Location:
MAC-HR11-BEN03

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR11-BEN03-20191001

Comments:
Pre-washdown



Photograph ID: 64

Photo Location:
MAC-HR11-BEN04

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR11-BEN04-20191001

Comments:
Pre-washdown

Tennessee Valley Authority

Photographic Log

Client:	**Tennessee Valley Authority**	**Project:**	**TDEC Order**
Site Name:	**John Sevier Fossil (JSF) Plant**	**Site Location:**	**Rogersville, Tennessee**

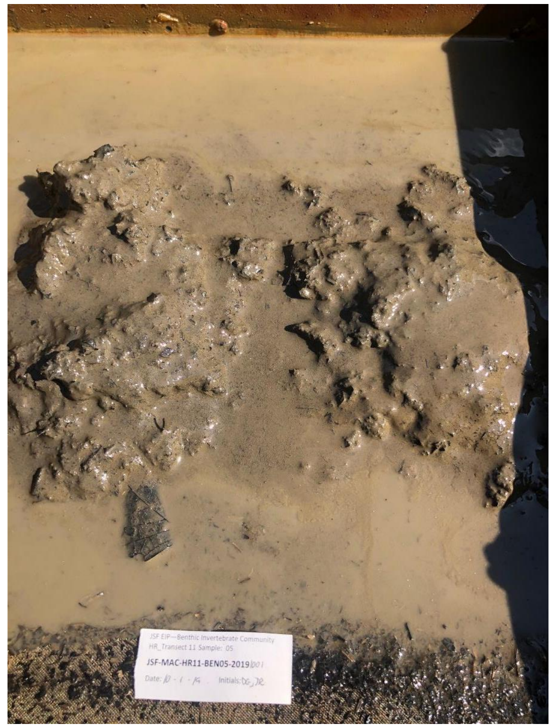
Photograph ID: 65

Photo Location:
MAC-HR11-BEN05

Survey Date:
10/1/2019

Sample ID:
JSF-MAC-HR11-BEN05-20191001

Comments:
Pre-washdown



APPENDIX J.5

TECHNICAL EVALUATION OF FISH TISSUE DATA

TENNESSEE
VALLEY
AUTHORITY

Appendix J.5 - Technical Evaluation of Fish Community and Fish Tissue Data

John Sevier Fossil Plant
Rogersville, Tennessee
Tennessee Valley Authority

TVA

Title and Approval Page

Title of Document: Appendix J.5 – Technical Evaluation of Fish Tissue Data
John Sevier Fossil Plant
Tennessee Valley Authority
Rogersville, Tennessee

Prepared By: Tennessee Valley Authority

Effective Date: July 3, 2023 Revision: 1

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TVA Technical Point of Contact	Date
Tyler Baker	6/21/23
TVA Limnologist, Fisheries & Aquatic Monitoring	Date
[signature]	6/21/23
QA Oversight Manager	Date

TVA

Revision Log

Revision	Date	Description
0	January 10, 2023	Submittal to TDEC
1	July 3, 2023	Addresses April 4, 2023 TDEC Review Comments and Issued for TDEC

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LIST OF EXHIBITS

Acronyms and Abbreviations

ATL	Alternative Thermal Limit
BIP	Balanced Indigenous Population
CBR	Critical Body Residue
CCR	Coal Combustion Residuals
CCR Parameters	Constituents listed in Appendices III and IV of 40 CFR 257 and five organic constituents included in Appendix I of Tennessee Rule 0400-11-01.04
CFR	Code of Federal Regulations
CWA	Clean Water Act
EAR	Environmental Assessment Report
EI	Environmental Investigation
EIP	Environmental Investigation Plan
ESV	Ecological Screening Values
HRM	Holston River Mile
JCC	John Sevier Combined Cycle
JSF Plant	John Sevier Fossil Plant
LOAEL	Lowest Observed Adverse Effects Level
NOAEL	No Observed Adverse Effects Level
NPDES	National Pollutant Discharge Elimination System
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RFAI	Reservoir Fish Assemblage Index
SAP	Sample and Analysis Plan
SAR	Sampling and Analysis Report
SFI	Sport Fishing Index
Stantec	Stantec Consulting Services Inc.
TDEC	Tennessee Department of Environment and Conservation
TDEC Order	Commissioner’s Order No. OGC15-0177
TVA	Tennessee Valley Authority
USEPA	US Environmental Protection Agency
VS	Vital Signs

Chapter 1 Introduction

The Tennessee Valley Authority (TVA) has prepared this technical evaluation appendix to summarize historical fish studies and recent fish tissue sampling data at TVA's John Sevier Fossil Plant (JSF Plant) in Rogersville, Tennessee. Since the 1970s, various fishery studies have been conducted in Cherokee Reservoir in the vicinity of the JSF Plant, including fish population studies, sport fish surveys, impingement and entrainment monitoring, and fish tissue collection. This technical appendix provides a detailed evaluation of those studies and their supporting data for the Environmental Assessment Report (EAR) to fulfill the requirements for the Tennessee Department of Environment and Conservation-issued Commissioner's Order No. OGC15-0177 (TDEC Order) Program (TDEC 2015).

Chapter 2 Fish Tissue Investigation

The purpose of the fish tissue investigation was to characterize concentrations of Coal Combustion Residuals (CCR)-related constituents in fish tissue in the vicinity of the CCR management units at the JSF Plant.

For this investigation, TVA reviewed available historical fishery study data from streams and rivers adjacent to the JSF Plant. The primary focus of the recent TDEC Order Environmental Investigation (EI) was to collect and analyze fish tissue samples from upstream reference locations for comparison to samples collected in the immediate vicinity and downstream of the JSF Plant CCR management units and to provide data to evaluate potential bioaccumulation of CCR-related constituents.

The following chapters summarize the previous studies and present overall fish tissue investigation and evaluation findings based on data obtained during previous studies and the EI for the JSF Plant.

2.1 Historical Studies

Historically, TVA has conducted biological assessments by periodically monitoring aquatic communities (fish and benthic invertebrates) near the JSF Plant to evaluate their status upstream and downstream of the plant's thermal discharge. This monitoring was conducted in support of continuance of the JSF Plant Alternative Thermal Limit (ATL) site discharge National Pollutant Discharge Elimination System (NPDES) permit for the facility (NPDES Permit No.TN0005436; [TDEC 2020b]). Renewal of the permit was based on successful demonstration, in accordance with Section 316(a)[1] of the federal Clean Water Act (CWA), that a balanced indigenous population (BIP[2]) of fish and wildlife is present and being maintained in the Holston River (Cherokee Reservoir) downstream of the JSF Plant. The primary focus of the biological assessments conducted by TVA in accordance with the CWA consists of analyzing data to characterize the compositions of fish and benthic invertebrate communities upstream and downstream of the JSF Plant. Benthic invertebrate community information is provided in Appendix J.3.

Historical fish population assessments were completed in the 1970s through 2012, as detailed in Chapter 2.1.1 below. Separate spring sportfish surveys conducted from 2003 to 2009 are discussed in Chapter 2.1.2. Fish impingement monitoring and entrainment studies were also conducted as detailed in Chapters 2.1.3 and 2.1.4. Historical fish tissue sampling to support reservoir fish use suitability and state fish consumption advisories under the CWA is discussed in Chapter 2.1.5. The historical fish tissue data were limited, so a more comprehensive collection and analyses of fish and associated fish tissue were conducted as part of the TDEC Order EI, as summarized in Chapter 2.2. The results and discussion of the fish tissue sample data are presented in Chapter 3.0.

2.1.1 Fish Population Monitoring

Between 1973 and 1981, TVA conducted biological studies to evaluate potential aquatic environmental effects of thermal discharge at the JSF Plant. These evaluations were performed to demonstrate compliance with Sections 316(a) and 316(b) of the CWA and to support establishment of ATLs for thermal discharge at the JSF Plant as part of the JSF Plant

[1] Section 316(a) of the CWA authorizes ATLs for the control of the thermal component of a point source discharge so long as the NPDES permit ATLs assure the protection of a BIP of aquatic life.
[2] 40 C.F.R. § 125.71(c) (2021).

NPDES permit renewal requirements (TVA 1977, 1979a, 1979b, and 1984). These studies were conducted in general accordance with the United States Environmental Protection Agency's (USEPA) Interagency Section 316(a) technical guidance manual (USEPA 1977) and included evaluation of the impacts of the thermal discharge on phytoplankton and zooplankton, periphyton, benthic macroinvertebrates and fish at Holston River locations upstream of and adjacent to the JSF Plant as well as measurement of water quality parameters. Initial 316(a) and 316(b) studies stated that the Cherokee Reservoir fish assemblage was not balanced or indigenous but found no significant adverse impact on fish assemblage associated with JSF Plant operations (TVA 1977). On July 23, 1977, when total river flow was passing through the JSF Plant cooling system, an estimated 150 to 200 fish died overnight due to high temperatures and chlorine concentrations in the JSF Plant discharge. Due in part to this fish kill, TVA conducted additional fish community studies, which found no long-term trends in rough or prey fish standing stocks (TVA 1984). Additionally, those studies concluded that while no significant impacts were identified on the riffle-inhabiting fish assemblage, the JSF Plant thermal effluent could not be ruled out as a factor in the absence of banded sculpin downstream.

In 1986, an evaluation of the responses of four representative fish species (paddlefish, sauger, striped bass, and smallmouth bass) to JSF Plant thermal discharges was conducted to demonstrate compliance with the NPDES requirement for a minimum bypass flow past the facility (TVA 1986). The study examined "worst case" conditions during which the JSF Plant was at maximum operation and minimum bypass flow. Temperatures were measured in the Holston River both upstream of JSF Plant and in the downstream mixing area. Results were compared to identified acceptable temperature ranges for each of the fish species and life stages.

From 1991 through 2000, TVA collected data to evaluate the fish community in Cherokee Reservoir as part of the TVA Vital Signs (VS) program. During that time, the fish community evaluations evolved into an approach known as the Reservoir Fish Assemblage Index (RFAI) methodology[3], which uses twelve fish community metrics from four general categories, as detailed in TVA (2011). Fish community data collected for the VS program and Aquatic Ecological Health Determinations are available in reports found at TVA (1992, 1993, 1994a-b, 1995, 1996, 1997a, 1998a, 1999a-b, 2001, 2002, 2003b, 2004, 2005, and 2006).

In 2003, fish community surveys were performed in the Holston River (within the Cherokee Reservoir) to demonstrate compliance with the CWA 316(a) thermal variance in support of the 2004 NPDES permit renewal (TVA 2003a). Data collected as part of these surveys were evaluated following the multi-metric approach used for TVA's valley-wide reservoir ecological health monitoring program. The evaluation concluded that the 2003 RFAI results rated "Good", and the river met BIP criteria at all three downstream locations (Holston River Miles [HRMs] 100, 102.5, and 105.5). RFAI scores at these locations were equal to or higher than the downstream Cherokee Reservoir transition (HRM 76) and forebay (HRM 53) locations.

Pre- and post-operational biological monitoring of the Holston River was performed in summer and autumn 2011 and 2012 to determine if ATLs established for the JSF Plant and JCC Plant thermal discharge were protective of a BIP of aquatic life (TVA 2012, 2013a, and 2013b). Samples were collected from Holston River transects upstream and downstream of the John Sevier detention dam to evaluate fish, benthic macroinvertebrate, plankton, and shoreline wildlife communities; shoreline aquatic and river bottom habitats; thermal plume intensity and extent; and general water quality parameters. The aquatic community data were evaluated using community characteristics/metrics and statistical diversity

[3] RFAI has been thoroughly tested on TVA and other reservoirs and published in peer-reviewed literature (Jennings et al. 1995; Hickman and McDonough 1996; McDonough and Hickman 1999).

comparisons. TVA found that comparisons between sampling sites were difficult due to differences in flows, depths, and substrate types; the John Sevier detention dam creates more reservoir-like upstream conditions, while downstream conditions are more riverine (TVA 2012, 2013a, and 2013b). These studies found that downstream aquatic communities near the JSF and JCC Plants were ecologically similar to their upstream control sites. As such, TVA concluded that thermal effluent from the JSF Plant was not adversely affecting downstream biological communities, and water quality was satisfactory for aquatic life use.

Data collected from the historical fish population monitoring events were used solely to determine maintenance of a BIP and did not include collecting fish tissue. However, evaluation of these historical data served as the foundation to support the TDEC Order EI activities summarized in Chapter 2.2 and in the JSF Plant EAR Chapter 7.1.3

2.1.2 Sport Fish Surveys

In 1995, TVA biologists and state fishery resource agencies in the Tennessee River Valley developed the Sport Fishing Index (SFI) to quantify sport fishing quality for individual sport fish species (Hickman 2000). The sport fish surveys used the calculated SFI to:

- Provide the public with information that will assist them in selecting locations that have the best potential for a successful fishing experience for the species they prefer, and
- Provide TVA and state biologists with a reference point and subsequent measure of the quality of that fishery over time.

The sport fish surveys were typically performed in the spring, but not every TVA reservoir was surveyed each year. The surveys included electrofishing to collect data on fish abundance, species distribution, length, weight, relative stock density, and proportional stock density (TVA 2007a). Data were collected on habitat type to determine the multi-metric Shoreline Aquatic Habitat Index, which measures existing fish habitat quality (TVA 2013a).

The SFI incorporates measurements of quantity (fish species population) and quality aspects of potential for angler success. TVA reported SFI findings on its website for use by anglers and other members of the public (TVA 2019b).

The SFI and sport fish surveys were discontinued on most tributary reservoirs in approximately 2009 and on mainstream Tennessee River reservoirs in 2014, with the exception of the Watts Bar Reservoir, which was last surveyed in 2017.

2.1.3 Fish Impingement Monitoring

In 1974 and 1975, TVA conducted fish impingement[4] investigations at the JSF Plant to evaluate the effects of the plant's cooling water intake on the aquatic community (TVA 1984).

Between 2005 and 2007, TVA conducted impingement monitoring at the JSF Plant to assess the effects of impingement on the aquatic community of Holston River/Cherokee Reservoir. This study was conducted to support compliance with CWA Section 316(b) and NPDES Permit No. TN0005436 (TVA 2007b). TVA was required by Section 316(b) of the CWA

[4] Impingement is a component of Section 316(b) of the CWA and refers to an adverse environmental impact (i.e., death or injury) in which aquatic organisms are pinned (or impinged) against a screen or other parts of a cooling water intake structure.

to demonstrate that the condenser cooling water withdrawal at the JSF Plant had no significant impact on the aquatic community. The 2004 EPA impingement monitoring rule subsequently was suspended in 2007.

Data collected from the fish impingement monitoring did not include collecting fish tissue for analysis of CCR Parameters (defined for this investigation in Chapter 3.1 below). However, evaluation of these historical data served as a foundation to support the TDEC Order EI activities summarized below in Chapter 2.2 and in the JSF Plant EAR Chapter 7.1.3.

2.1.4 Fish Entrainment Monitoring

In 1975 and 1976, TVA conducted fish entrainment[5] studies at the JSF Plant to evaluate the effects of the plant's cooling water intake on the aquatic community (TVA 1977 and 1984).

Between 2005 and 2007, TVA conducted fish entrainment monitoring to support compliance with CWA Section 316(b), which requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology for minimizing environmental impacts (TVA 2007b). Study results were also compared to historical 1974 to 1976 entrainment data as well as data reported in TVA (1979b) as part of a larval fish investigation in the vicinity of John Sevier detention dam. Results of the 2005-2007 fish entrainment and impingement studies indicated no adverse impacts on the Holston River Fish community.

Data collected from the historical fish entrainment study did not include collecting fish tissue for analysis of CCR Parameters (see Chapter 3.1 below). However, the evaluation of these historical data served as a foundation to support the TDEC Order investigation activities summarized in Chapter 2.2 below and in the JSF Plant EAR Chapter 7.1.3.

2.1.5 Fish Tissue Monitoring

To meet CWA "fishable" goals, fish tissue samples were collected from the Cherokee Reservoir from the 1980s through the present. TVA, in cooperation with TDEC, analyzed fillets of indicator fish species (primarily catfish and largemouth bass) to inform human health fish consumption advisories and identify reservoirs for further intensive study (TVA 1992). Screening-level samples were collected and composited by TVA from the Cherokee Reservoir forebay, transition zone, and inflow downstream from the JSF Plant. Tissue samples were analyzed for EPA Priority Pollutants including metals, polychlorinated biphenyls, and pesticides. Screening-level fish tissue study result summaries can be found in annual TVA Vital Signs Monitoring and Reservoir Ecological Health Reports (1992, 1993, 1994a-b, 1995, 1996, 1997a, 1998a, 1999a-b, 2001, 2002, 2003b, 2004, 2005, and 2006); based on these screening-level data, intensive studies were not conducted at the Cherokee Reservoir. Except for mercury, fish tissue contaminant concentrations were typically either below detectable levels or below TDEC fish consumption advisory levels. In August 2007, TDEC issued a precautionary advisory for the upper portion of the Cherokee Reservoir for black bass and catfish consumption due to mercury contamination; this advisory was extended to the entirety of the Cherokee Reservoir in January 2020 (TDEC 2020a). There is a documented source of mercury contamination to the Holston River upstream of the JSF Plant (USEPA 2017).

[5] Entrainment is defined in Section 316(b) of the CWA as an adverse environmental impact (i.e., death or injury) in which aquatic organisms are drawn (or entrained) into cooling water systems and subjected to thermal, physical or chemical stresses.

2.1.6 Historical Fishery Study Conclusions

A summary of the conclusions from the historical fishery studies described in the previous sections is provided below.

Fish Population Monitoring. Key findings from historical fish population monitoring studies include:

- The 1973-77 studies found that the Cherokee Reservoir fish assemblage was not balanced or indigenous at that time; however, studies found no significant adverse impact on fish assemblage associated with JSF Plant operations (TVA 1977).
- After the 1977 fish kill, additional fish community studies were conducted that found no long-term trends in rough or prey fish standing stocks (TVA 1984).
- TVA (1984) concluded that while no significant impacts were identified for the riffle-inhabiting fish assemblage, the JSF Plant thermal effluent could not be ruled out as a factor in the absence of banded sculpin downstream.
- RFAI results for the 2003 monitoring concluded that the Holston River met BIP criteria at three downstream locations. RFAI scores at these locations were equal to or higher than the downstream Cherokee Reservoir transition and forebay locations (TVA 2003a).
- 2011 and 2012 pre- and post-operational biological monitoring of the Holston River at the JSF/JCC Plants found that comparisons between findings at upstream and downstream sampling locations were difficult due to differences in flows, depths, and substrate types. However, downstream aquatic communities were ecologically similar to their upstream control sites, supporting the finding that the JSF Plant thermal effluent was not adversely affecting downstream fish communities (TVA 2012, 2013a, and 2013b).
- Spring sportfish survey results showed black bass relative and proportional stock densities and relative weight values were typically within desirable ranges.

Fish Impingement Monitoring. Findings from the initial 1970s demonstration for compliance with CWA Section 316(b) indicated that the John Sevier Detention Dam prevented at least two fish species (paddlefish and sauger) from swimming upstream to spawn. This, in combination with chronic pollution of the Holston River associated with upstream sources not related to the JSF Plant, resulted in a relatively low-value fishery (TVA 1977 and 2007b). However, the 1970s and 2000s impingement studies indicated that the relatively low impingement at JSF Plant would not constitute a significant impact to fish populations in the John Sevier Detention Dam Reservoir (TVA 1984 and 2007b).

Fish Entrainment Studies. The 1970s and 2000s entrainment studies indicated no significant adverse environmental impact to the Cherokee or John Sevier Detention Reservoirs or changes in the upstream fish community due to JSF Plant operations (TVA 1977, 1984, and 2007b).

Fish Tissue Studies. Except for mercury. fish tissue contaminant concentrations were either below detectable levels or below TDEC fish consumption advisory levels[6].

[6] https://www.tn.gov/content/dam/tn/environment/water/planning-and-standards/wr_wq_fish-advisories.pdf

2.2 TDEC Order Investigation Activities

The objectives of the TDEC Order fish tissue investigation were to collect fish tissue samples for laboratory analysis to assess whether fish adjacent to and downstream of the JSF Plant have higher tissue concentrations of CCR-related constituents than the same species of fish from upstream reference locations, and to provide data to be used in conjunction with sediment and mayfly sampling results to evaluate the bioaccumulation of these constituents. The information from the fish tissue investigation was used to help evaluate if CCR material and/or dissolved CCR constituents have migrated from the CCR management units and potentially impacted aquatic life.

TVA performed EI sample collection activities within the Holston River in general accordance with the *Fish Tissue Sample and Analysis Plan (SAP)* (Stantec 2018), *Environmental Investigation Plan (EIP)* (TVA 2018b), and *Quality Assurance Project Plan (QAPP)* (Environmental Standards 2018), including TVA- and TDEC-approved programmatic and project-specific changes that were made after approval of the EIP. Descriptions of sample location selection, collection methodology, analyses, and Quality Assurance/Quality Control (QA/QC) completed for the investigation are provided in the *Fish Tissue Sampling and Analysis Report (SAR)* included in Appendix J.6. Fish tissue samples were not collected from Polly Branch due to the limited size of the surface water body, which is unable to support the fish communities required by the Fish Tissue SAP.

The scope of the EI sampling activities included collecting targeted fish samples identified in the *SAP* from April through June 2019 from four reaches on the Holston River. The Holston River reaches were established upstream, adjacent, and downstream of the JSF Plant CCR management units. Exhibits J.5-1 and J.5-1a show the locations of the sampling reaches. A total of 50 composite samples were collected, comprised of muscle, liver, and ovary samples for the gamefish species (bluegill, channel catfish, largemouth bass, smallmouth bass, and redear sunfish), and whole fish samples for the forage fish (shad), along with 23 duplicate samples.

Chapter 3 Results and Discussion

Fish tissue data from the EI were collected from four sample reaches in the Holston River proximate to the JSF Plant, as described above. The results of the sample analyses and evaluation are discussed in the chapters below.

To aid in interpreting these data, TDEC approved acute and chronic ecological screening values (ESVs) for the EAR (Tables 1-2 and 1-3 and Appendix A.2) to evaluate whether identified CCR constituent concentrations in surface stream and sediment samples may be indicative of potential impacts to aquatic life. For the fish tissue data, sampling results are compared to health-protective Critical Body Residue (CBR) values (Table 1-4), as described in Chapter 3.2.1 below.

The EAR screening levels are generic (not specific to an individual person or ecological receptor) and are protective of human and ecological health. Most screening levels are not regulatory standards and are conservatively based on published health studies. Concentrations above the screening level do not necessarily mean that an adverse health effect is occurring, but rather, that further evaluation is required in the Corrective Action/Risk Assessment Plan to determine if an unacceptable risk exists, and corrective action is required.

3.1 Analytical Results

The fish tissue samples were analyzed for the following CCR-related constituents, hereafter referred to collectively as "CCR Parameters" for the fish tissue investigation:

- Boron and calcium from 40 CFR Part 257 Appendix III
- 40 CFR Part 257 Appendix IV Constituents, excluding radium and fluoride
- Five inorganic constituents from Appendix I of TN Rule 0400-11-01-.04: copper, nickel, silver, vanadium, and zinc
- Strontium
- Percent moisture.

The results of the exploratory data analysis for the EI fish tissue data for the JSF Plant are presented in Appendix E.7.

3.2 Exploratory Data Analysis

The exploratory data analyses for the surface stream and sediment sample results identified CCR Parameters with concentrations above established ESVs, where the comparison to ESVs does not include statistically significant outliers identified as suitable for removal from further statistical analysis (see further discussion in Appendices E.4 and E.5, respectively). These constituents were also evaluated for the fish tissue sample results. In addition, mercury and selenium were further evaluated for fish tissue samples due to their known bioaccumulation potential. Following these criteria, fish tissue sampling results were reviewed for mercury, selenium, copper, and zinc in the Holston River.

A summary of fish tissue sampling results above or equal to the ESVs, including mercury, selenium, copper and zinc, identified in the exploratory data analysis for the Holston River is provided in Table J.5-1.

3.2.1 Comparative Analysis

The CCR Parameters identified from the exploratory data analysis for careful evaluation in the fish tissue data (i.e., focused on constituents with surface water or sediment concentrations above established ESVs and bioaccumulative constituents, mercury and selenium) were further evaluated by comparison to the CBR values for the specific fish tissues. Copper, mercury, selenium, and zinc were evaluated for fish tissues from the Holston River. The CBR values are included in the ESVs provided in Table 1-4 and Appendix A.2.

The comparative analysis chart for CBR values provided in Table J.5-2 demonstrates the relationships between the fish tissue constituent concentrations for mercury, selenium, copper, and zinc for the upstream, downstream and adjacent reaches in the Holston River and the respective CBR values for whole fish and tissue types. The gray cells show areas where no applicable CBR value is available for a specific tissue type (e.g., there is no CBR value for mercury in ovaries). Green cells show where the constituent concentrations for a tissue type are below CBR No Observed Adverse Effects Levels (NOAELs). Yellow cells show where constituent concentrations for a tissue type are above NOAELs but below CBR Lowest Observed Adverse Effects Levels (LOAELs). Red cells indicate constituent concentrations that are above LOAELs.

In most cases, the gamefish (bluegill, channel catfish, largemouth, smallmouth bass and redear sunfish) muscle and liver tissues contained mercury concentrations higher than either the NOAEL or LOAEL, and selenium and zinc concentrations in liver tissues were higher than the NOAELs. However, for all four constituents, concentrations at the upstream locations were higher or similar to the adjacent and downstream concentrations, suggesting no potential influence of CCR Parameters from the JSF Plant CCR management units on fish tissue concentrations. For whole fish, a similar observation was made; the upstream concentrations were analogous to the adjacent and downstream concentrations for mercury, copper, selenium and zinc. Exhibit J.5-2 shows the CCR Parameter results that were higher than CBR values for each fish type, tissue type, and reach location.

Chapter 4 Summary

Fish tissue samples collected during the EI from upstream, downstream, and adjacent reaches of the Holston River were evaluated for CCR Parameters that were identified based on surface stream and sediment sample results. The CCR Parameter concentrations in surface stream samples collected from the Holston River were less than their respective ESVs, whereas sediment samples taken from the river showed mercury and copper with concentration levels higher than their ESVs, and one sample result of zinc equal to the chronic ESV. Selenium concentrations in fish tissue samples were also evaluated due to its bioaccumulative properties in fish, even though selenium concentrations in the Holston River sediment and surface stream samples were less than its ESVs for those media. When comparing these data to the CBR values, upstream fish tissue concentration levels for mercury, copper, zinc and selenium were similar or sometimes higher than the adjacent and downstream fish tissue concentration levels. A similar observation was made for whole fish samples, in which the adjacent and downstream concentrations for mercury, copper and zinc were analogous to upstream concentrations. In addition, biological monitoring of the Holston River performed to determine if ATLs established for the JSF Plant and JCC Plant thermal discharge were protective of a BIP of aquatic life found that downstream aquatic communities near the JSF and JCC Plants were ecologically similar to their upstream control sites.

The fish tissue sampling results for the Holston River, together with the biological monitoring results, illustrate a consistent, balanced indigenous fish population, and do not indicate potential impacts to fish tissue concentrations or the fish community related to the JSF Plant CCR management units.

Chapter 5 References

Environmental Standards, Inc. (2018). *Quality Assurance Project Plan for the Tennessee Valley Authority, John Sevier Fossil Plant Environmental Investigation, Revision 2*. October 2018.

Hickman, G. D. and T. A. McDonough. (1996). Assessing the Reservoir Fish Assemblage Index- A potential measure of reservoir quality. In: D. DeVries (Ed.) Reservoir symposium- Multidimensional approaches to reservoir fisheries management. Reservoir Committee, Southern Division, American Fisheries Society, Bethesda, MD. pp 85-97.

Hickman, G.D. (2000). Sport Fishing Index (SFI): A method to quantify sport fishing quality, Environmental Science & Policy, Volume 3, Supplement 1, September 2000, Pages 117-125, ISSN 1462-9011. Located at: https://doi.org/10.1016/S1462-9011(00)00034-4 and http://www.sciencedirect.com/science/article/pii/S1462901100000344. Assessed on August 10, 2021.

Jennings, M. J., L. S. Fore, and J. R. Karr. (1995). *Biological monitoring of fish assemblages in the Tennessee Valley reservoirs.* Regulated Rivers, 11, 263-274.

McDonough, T.A. and G.D. Hickman. (1999). *Reservoir Fish Assemblage Index development: A tool for assessing ecological health in Tennessee Valley Authority impoundments. In: Assessing the sustainability and biological integrity of water resources using fish communities*. Simon, T. (Ed.) CRC Press, Boca Raton, pp 523-540.

Stantec Consulting Services, Inc. (2018). *Fish Tissue Sampling and Analysis Plan.* John Sevier Fossil Plant, Revision 3 Final. October 19, 2018.

Tennessee Department of Environment and Conservation (TDEC). (2015). Commissioner's Order No. OGC15- 177. August 6.

TDEC. (2020a). TDEC Extends Precautionary Fish Consumption Advisory to Cherokee Reservoir. January 8.

TDEC. (2020b). NPDES Permit No. TN0005436 TVA John Sevier Combined Cycle Plant (JCC). April 1.

TVA. (1977). 316(a) and 316(b) Demonstrations, John Sevier Steam Plant. Volumes 1 through 5. April.

TVA. (1979a). Supplemental Information to the Technical Report - Response of Biological Communities of the Holston River to Thermal Effluents from John Sevier Steam Plant. April.

TVA. (1979b). Investigations of Dynamics and Fate of Larval Fish in the Vicinity of John Sevier Stream-Electric Plant. April.

TVA. (1984). Responses of Selected Aquatic Biota to Discharges from John Sevier Steam-Electric Plant, Holston River, Tennessee, 1978 through 1981. June.

TVA. (1986). John Sevier Fossil Plant, Hydrothermal, Water Quality, and Biological Assessments of Thermal Impacts. December.

TVA. (1992). Reservoir Vital Signs Monitoring – 1991. Summary of Vital Signs and Use Impairment Monitoring on Tennessee Valley Reservoirs. July.

TVA. (1993). Reservoir Monitoring – 1992 Summary of Vital Signs and Use Suitability Monitoring on Tennessee Valley Reservoirs, August.

TVA. (1994a). Tennessee Valley Reservoir and Stream Quality – 1993, Summary of Reservoir Fish Assemblage Results. April.

TVA. (1994b). Tennessee Valley Reservoir and Stream Quality – 1993 Summary of Vital Signs and Use Suitability Monitoring, May.

TVA. (1995). Aquatic Ecological Health Determinations for TVA Reservoirs – 1994. April.

TVA. (1996). Aquatic Ecological Health Determinations for TVA Reservoirs – 1995. April.

TVA. (1997a). Aquatic Ecological Health Determinations for TVA Reservoirs – 1996. April.

TVA. (1998a). Aquatic Ecological Health Determinations for TVA Reservoirs – 1997. April.

TVA. (1999a). Aquatic Ecological Health Determinations for TVA Reservoirs – 1998. August.

TVA. (1999b). Watershed and Reservoir Physical Description Including Summary of Ecological Health Results for Each Reservoir Sampled in 1999.

TVA. (2001). Aquatic Ecological Health Determinations for TVA Reservoirs – 2000. September.

TVA. (2002). Aquatic Ecological Health Determinations for TVA Reservoirs – 2001. September.

TVA. (2003a). Results of Fish Community Monitoring in the Vicinity of John Sevier Fossil Plant During Spring 2003 in Support of a Continued 316(a) Thermal Variance.

TVA. (2003b). Aquatic Ecological Health Determinations for TVA Reservoirs – 2002. September.

TVA. (2004). Aquatic Ecological Health Determinations for TVA Reservoirs – 2003. August.

TVA. (2005). Aquatic Ecological Health Determinations for TVA Reservoirs – 2004. June.

TVA. (2006). Aquatic Ecological Health Determinations for TVA Reservoirs – 2005. June.

TVA. (2007a). Cherokee Reservoir Spring Sportfish Survey 2007.

TVA. (2007b). Entrainment and Impingement of Fish at John Sevier Fossil Plant During 2005 through 2007, Tennessee Valley Authority, John Sevier Fossil Plant, NPDES Permit No. TV0005436, 316(b) Monitoring Program

TVA. (2012). Biological Monitoring of the Holston River Near John Sevier Fossil and Combined Cycle/Combustion Turbine Plant Discharges, Summer and Autumn 2011. June.

References

TVA. (2013a). Biological Monitoring of the Holston River Near John Sevier Fossil and Combined Cycle/Combustion Turbine Plant Discharges, Summer and Autumn 2012. April.

TVA. (2013b). Plankton Monitoring of the Holston River Near John Sevier Fossil and Combined Cycle/Combustion Turbine Plant Discharges, Summer and Autumn 2011. June.

TVA. (2018a). Evaluating the Presence and Maintenance of a Balanced Indigenous Population of Fish and Wildlife in the Tennessee River Downstream of TVA's Watts Bar Nuclear Plant. July.

TVA. (2018b). *Environmental Investigation Plan*, John Sevier Fossil Plant, Revision 3 Final. October 19, 2018.

TVA. (2019b). Where the Sport Fish Are Located at: https://www.tva.com/newsroom/articles/where-the-sport-fish-are. Accessed on November 11, 2020. April 15.

United States Environmental Protection Agency (USEPA). (1977 [draft]). *Interagency 316(a) technical guidance manual and guide for thermal effects sections of nuclear facilities Environmental Impact Statements*. U.S. Environmental Protection Agency, Office of Water Enforcement, Permits Division, Industrial Permits Branch, Washington, DC.

USEPA. (2017). Fifth Five-Year Review Report for Saltville Waste Disposal Ponds Superfund Site, Smyth County, Virginia. September 26, 2017.

USEPA. (2021). Code of Federal Regulation, Title 40 / Chapter I / Subpart D / Part 125 / Subpart H - 40 C.F.R. § 125.71(c). November 19, 2021. Available at: eCFR :: 40 CFR Part 125 Subpart H -- Criteria for Determining Alternative Effluent Limitations Under Section 316(a) of the Act

TABLES

TABLE J.5-1 : Fish Tissue Analytical Results
John Sevier Fossil Plant
April - June 2019

Species	Sample Location	Sample Date	Sample ID	Parent Sample ID	Sample Type	Level of Review	Copper mg/kg	Mercury mg/kg	Selenium mg/kg	Zinc mg/kg
Bluegill	JSF-HRA1	22-May-19	JSF-FH-BG-HRA1-F-20190522		Normal Environmental Sample	Final-Verified	0.38 J	0.043 J	0.23	5.6
		22-May-19	JSF-FH-BG-HRA1-L-20190522		Normal Environmental Sample	Final-Verified	1.4	0.091	1.0	23.3
		22-May-19	JSF-FH-BG-HRA1-O-20190522		Normal Environmental Sample	Final-Verified	1.1	0.011 U*	0.83	25.5
	JSF-HRA2	7-May-19	JSF-FH-BG-HRA2-F-20190507		Normal Environmental Sample	Final-Verified	<0.27	0.21 J	0.40	6.1
		7-May-19	JSF-FH-BG-HRA2-L-20190507		Normal Environmental Sample	Final-Verified	1.4	0.089	2.8	20.6
		7-May-19	JSF-FH-BG-HRA2-O-20190507		Normal Environmental Sample	Final-Verified	1.1	0.016 U*	1.9	30.7
	JSF-HRD	7-May-19	JSF-FH-BG-HRD-F-20190507		Normal Environmental Sample	Final-Verified	<0.27	0.19 J	0.29	5.7
		7-May-19	JSF-FH-BG-F-DUP01-20190507	JSF-FH-BG-HRD-F-20190507	Field Duplicate Sample	Final-Verified	<0.27	0.21 J	0.29	6.5
		7-May-19	JSF-FH-BG-HRD-L-20190507		Normal Environmental Sample	Final-Verified	1.5	0.10	1.8	22.0
		7-May-19	JSF-FH-BG-L-DUP01-20190507	JSF-FH-BG-HRD-L-20190507	Field Duplicate Sample	Final-Verified	1.4	0.12	1.6	23.8
		7-May-19	JSF-FH-BG-HRD-O-20190507		Normal Environmental Sample	Final-Verified	1.0	0.013 U*	1.3	33.1
		7-May-19	JSF-FH-BG-O-DUP01-20190507	JSF-FH-BG-HRD-O-20190507	Field Duplicate Sample	Final-Verified	1.3	0.018 U*	1.0	30.5
	JSF-HRU	7-May-19	JSF-FH-BG-HRU-F-20190507		Normal Environmental Sample	Final-Verified	<0.27	0.18 J	0.35	5.8
		7-May-19	JSF-FH-BG-F-DUP02-20190507	JSF-FH-BG-HRU-F-20190507	Field Duplicate Sample	Final-Verified	<0.28	0.21 J	0.36	6.4
		7-May-19	JSF-FH-BG-HRU-L-20190507		Normal Environmental Sample	Final-Verified	1.3	0.20	1.6	22.2
		7-May-19	JSF-FH-BG-L-DUP02-20190507	JSF-FH-BG-HRU-L-20190507	Field Duplicate Sample	Final-Verified	1.5	0.21	2.4	23.7
		7-May-19	JSF-FH-BG-HRU-O-20190507		Normal Environmental Sample	Final-Verified	1.4	0.0095 U*	1.1	31.8
		7-May-19	JSF-FH-BG-O-DUP02-20190507	JSF-FH-BG-HRU-O-20190507	Field Duplicate Sample	Final-Verified	1.5	0.022 U*	1.5	31.6
Channel Catfish	JSF-HRA1	7-May-19	JSF-FH-CC-HRA1-F-20190507		Normal Environmental Sample	Final-Verified	<0.28	0.25 J	0.13 J	5.4
		7-May-19	JSF-FH-CC-F-DUP01-20190507	JSF-FH-CC-HRA1-F-20190507	Field Duplicate Sample	Final-Verified	0.34 J	0.25 J	0.13 J	5.7
		7-May-19	JSF-FH-CC-HRA1-L-20190507		Normal Environmental Sample	Final-Verified	1.6	0.37 J	1.1	21.0
		7-May-19	JSF-FH-CC-L-DUP01-20190507	JSF-FH-CC-HRA1-L-20190507	Field Duplicate Sample	Final-Verified	2.3	0.44 J	1.3	22.4
		7-May-19	JSF-FH-CC-HRA1-O-20190507		Normal Environmental Sample	Final-Verified	1.0	0.021 J	0.89	46.0
	JSF-HRA2	11-Jun-19	JSF-FH-CC-HRA2-F-20190611		Normal Environmental Sample	Final-Verified	<0.27	0.19 J	0.15 J	6.1
		11-Jun-19	JSF-FH-CC-HRA2-L-20190611		Normal Environmental Sample	Final-Verified	2.4	0.43 J	1.4	24.3
	JSF-HRD	19-Jun-19	JSF-FH-CC-HRD-F-20190619		Normal Environmental Sample	Final-Verified	0.72 J	0.070 J	0.17	6.3
		19-Jun-19	JSF-FH-CC-HRD-L-20190619		Normal Environmental Sample	Final-Verified	2.9	0.74 J	1.4	26.5
	JSF-HRU	30-Apr-19	JSF-FH-CC-HRU-F-20190430		Normal Environmental Sample	Final-Verified	<0.28	0.23 J	0.18	5.1
		30-Apr-19	JSF-FH-CC-F-DUP02-20190430	JSF-FH-CC-HRU-F-20190430	Field Duplicate Sample	Final-Verified	0.32 J	0.42 J	0.16 J	6.0
		30-Apr-19	JSF-FH-CC-HRU-L-20190430		Normal Environmental Sample	Final-Verified	2.2	0.26 J	1.5	25.6
		30-Apr-19	JSF-FH-CC-L-DUP02-20190430	JSF-FH-CC-HRU-L-20190430	Field Duplicate Sample	Final-Verified	1.8	1.0 J	1.3	21.2
		30-Apr-19	JSF-FH-CC-O-DUP02-20190430		Normal Environmental Sample	Final-Verified	1.1	0.031 J	0.90	38.4
Smallmouth Bass	JSF-HRA1	9-Apr-19	JSF-FH-SB-HRA1-F-20190409		Normal Environmental Sample	Final-Verified	0.35 J	0.59 J	0.26	3.3 J
		9-Apr-19	JSF-FH-SB-HRA1-L-20190409		Normal Environmental Sample	Validated	1.4	0.29 J	0.93	19.1
		9-Apr-19	JSF-FH-SB-HRA1-O-20190409		Normal Environmental Sample	Final-Verified	1.3	0.025 J	0.66	31.0
Largemouth Bass	JSF-HRA2	9-Apr-19	JSF-FH-LB-HRA2-F-20190409		Normal Environmental Sample	Final-Verified	<0.27	0.54 J	0.18	4.5
		9-Apr-19	JSF-FH-LB-HRA2-L-20190409		Normal Environmental Sample	Validated	8.0	0.22 J	0.87	25.4
		9-Apr-19	JSF-FH-LB-HRA2-O-20190409		Normal Environmental Sample	Final-Verified	1.6	0.024 J	0.68	34.4
	JSF-HRD	10-Apr-19	JSF-FH-LB-HRD-F-20190410		Normal Environmental Sample	Final-Verified	0.41 J	0.70 J	0.23	3.9 J
		10-Apr-19	JSF-FH-LB-F-DUP01-20190410	JSF-FH-LB-HRD-F-20190410	Field Duplicate Sample	Final-Verified	<0.27	0.58 J	0.23	4.4 J
		10-Apr-19	JSF-FH-LB-HRD-L-20190410		Normal Environmental Sample	Validated	11.7	0.60 J	1.1	28.0
		10-Apr-19	JSF-FH-LB-L-DUP01-20190410	JSF-FH-LB-HRD-L-20190410	Field Duplicate Sample	Validated	11.7	0.28 J	0.98	28.3
		10-Apr-19	JSF-FH-LB-HRD-O-20190410		Normal Environmental Sample	Validated	1.3 J	0.095 J	0.63	27.0
		10-Apr-19	JSF-FH-LB-O-DUP01-20190410	JSF-FH-LB-HRD-O-20190410	Field Duplicate Sample	Validated	4.3 J	0.047 J	0.93	35.4
	JSF-HRU	9-Apr-19	JSF-FH-LB-HRU-F-20190409		Normal Environmental Sample	Final-Verified	0.28 J	0.79 J	0.24	4.1 J
		9-Apr-19	JSF-FH-LB-F-DUP02-20190409	JSF-FH-LB-HRU-F-20190409	Field Duplicate Sample	Final-Verified	<0.28	0.74 J	0.22	4.3 J
		9-Apr-19	JSF-FH-LB-HRU-L-20190409		Normal Environmental Sample	Validated	7.5 J	0.46 J	0.94	23.3
		9-Apr-19	JSF-FH-LB-L-DUP02-20190409	JSF-FH-LB-HRU-L-20190409	Field Duplicate Sample	Validated	19.6 J	0.64 J	1.1	32.5
		9-Apr-19	JSF-FH-LB-HRU-O-20190409		Normal Environmental Sample	Validated	1.8	0.082 J	0.74	32.7
		9-Apr-19	JSF-FH-LB-O-DUP02-20190409	JSF-FH-LB-HRU-O-20190409	Field Duplicate Sample	Validated	1.3	0.087 J	0.79	35.9

TABLE J.5-1 : Fish Tissue Analytical Results
John Sevier Fossil Plant
April - June 2019

Species	Sample Location	Sample Date	Sample ID	Parent Sample ID	Sample Type	Level of Review	Copper mg/kg	Mercury mg/kg	Selenium mg/kg	Zinc mg/kg
Redear Sunfish	JSF-HRA1	15-May-19	JSF-FH-RS-HRA1-F-20190515		Normal Environmental Sample	Validated	<0.27	0.072 J	0.35	6.1
		15-May-19	JSF-FH-RS-HRA1-L-20190515		Normal Environmental Sample	Final-Verified	2.2	0.15	2.1	20.5
		15-May-19	JSF-FH-RS-HRA1-O-20190515		Normal Environmental Sample	Validated	0.78 J	0.027 J	0.91	26.2
	JSF-HRA2	7-May-19	JSF-FH-RS-HRA2-F-20190507		Normal Environmental Sample	Validated	<0.27	0.19 J	0.39	6.8
		15-May-19	JSF-FH-RS-F-DUP02-20190515	JSF-FH-RS-HRA2-F-20190507	Field Duplicate Sample	Validated	<0.27	0.39 J	0.60	7.7
		7-May-19	JSF-FH-RS-HRA2-L-20190507		Normal Environmental Sample	Final-Verified	1.1 J	0.076 U*	1.8 J	19.0
		15-May-19	JSF-FH-RS-L-DUP02-20190515	JSF-FH-RS-HRA2-L-20190507	Field Duplicate Sample	Final-Verified	8.4 J	0.17	3.3 J	22.3
		7-May-19	JSF-FH-RS-HRA2-O-20190507		Normal Environmental Sample	Validated	0.77 J	0.010 J	1.2	30.2
		15-May-19	JSF-FH-RS-O-DUP02-20190515	JSF-FH-RS-HRA2-O-20190507	Field Duplicate Sample	Final-Verified	1.2 J	0.024 U*	1.8	33.0
	JSF-HRD	30-Apr-19	JSF-FH-RS-HRD-F-20190430		Normal Environmental Sample	Validated	0.73 J	0.24 J	0.56	8.3
		30-Apr-19	JSF-FH-RS-HRD-L-20190430		Normal Environmental Sample	Final-Verified	1.0 J	0.12	1.9	17.4
		30-Apr-19	JSF-FH-RS-HRD-O-20190430		Normal Environmental Sample	Validated	0.73 J	0.017 J	1.7	32.9
	JSF-HRU	30-Apr-19	JSF-FH-RS-HRU-F-20190430		Normal Environmental Sample	Validated	<0.26	0.21 J	0.39	5.6
		30-Apr-19	JSF-FH-RS-F-DUP01-20190430	JSF-FH-RS-HRU-F-20190430	Field Duplicate Sample	Validated	<0.27	0.21 J	0.35	6.4
		30-Apr-19	JSF-FH-RS-HRU-L-20190430		Normal Environmental Sample	Final-Verified	1.2 J	0.16	1.7	20.3
		30-Apr-19	JSF-FH-RS-L-DUP01-20190430	JSF-FH-RS-HRU-L-20190430	Field Duplicate Sample	Final-Verified	1.2 J	0.12	1.2	19.2
		30-Apr-19	JSF-FH-RS-HRU-O-20190430		Normal Environmental Sample	Validated	0.91	0.016 J	0.86	34.0
		30-Apr-19	JSF-FH-RS-O-DUP01-20190430	JSF-FH-RS-HRU-O-20190430	Field Duplicate Sample	Final-Verified	0.74 J	0.018 U*	0.92	30.7
Gizzard Shad	JSF-HRA1	30-Apr-19	JSF-FH-SH-HRA1-WF-20190430		Normal Environmental Sample	Final-Verified	<1.4	0.039 U*	0.39 J	19.8 J
	JSF-HRA2	30-Apr-19	JSF-FH-SH-HRA2-WF-20190430		Normal Environmental Sample	Final-Verified	<1.4	0.034 U*	0.38 J	15.1 J
		30-Apr-19	JSF-FH-SH-WF-DUP01-20190430	JSF-FH-SH-HRA2-WF-20190430	Field Duplicate Sample	Final-Verified	<1.4	0.035 U*	0.32 J	18.3 J
	JSF-HRD	30-Apr-19	JSF-FH-SH-HRD-WF-20190430		Normal Environmental Sample	Final-Verified	<1.3	0.038 U*	0.37 J	20.0 J
	JSF-HRU	30-Apr-19	JSF-FH-SH-HRU-WF-20190430		Normal Environmental Sample	Final-Verified	1.5 J	0.034 U*	0.31 J	17.0 J

		Copper	Mercury	Selenium	Zinc
Whole Body Fish Tissue	NOAEL	0.196	0.45	0.006	8.5
	LOAEL	1.96	4.5	0.06	8.5
Liver Tissue	NOAEL	6.52	3.4	0.0009	0.524
	LOAEL	65.2	34	0.009	5.24
Muscle Tissue	NOAEL	3.4	0.08	11.3	NA
	LOAEL	34	0.8	11.3	NA
Ovary Tissue	NOAEL	NA	NA	15.1	NA
	LOAEL	NA	NA	15.1	NA

Legend:

Concentration > CBR NOAEL

Concentration > CBR LOAEL

Notes:

15.2	measured concentration did not exceed the indicated standard
<0.03	analyte was not detected at a concentration greater than the Method Detection Limit
CBR	Critical body residue
ID	identification
LOAEL	lowest observed adverse effect level
NOAEL	no-observable adverse effect level
n/v	No standard/guideline value.
J	quantitation is approximate due to limitations identified during data validation
U*	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.
%	percent
mg/kg	milligrams per kilogram

1. Level of review is defined in the Quality Assurance Project Plan.
2. Fish tissue sampling results were evaluated using Critical Body Residue (CBR) values for the CCR parameters detected above ESVs in surface stream water and sediment samples (see Section 4.3).

Table J.5-2 – Critical Body Residue Value Analysis - Holston River

Constituent Type	Constituent	Sample Location	Gradient	Sample Concentration (mg/kg ww)*															
				Muscle					Liver					Ovary					Whole Body
				BG	CC	LB	SB	RS	BG	CC	LB	SB	RS	BG	CC	LB	SB	RS	SH
CCR Rule Appendix IV	Mercury	HRU	Upstream	0.18	0.23	0.79	-	0.21	0.2	0.26	0.46	-	0.16	<0.0095	-	0.082	-	0.016	<0.034
		HRA1	Adjacent	0.043	0.25	-	0.59	0.072	0.091	0.37	-	0.29	0.15	<0.011	0.021	-	0.025	0.027	<0.039
		HRA2	Adjacent	0.21	0.19	0.54	-	0.19	0.089	0.43	0.22	-	<0.076	<0.016	-	0.024	-	0.01	<0.034
		HRD	Downstream	0.19	0.07	0.7	-	0.24	0.1	0.74	0.6	-	0.12	<0.013	-	0.095	-	0.017	<0.038
	Selenium*	HRU	Upstream	1.8	0.77	1.3	-	2.1	1.6	1.5	0.94	-	1.7	3.1	-	2.3	-	2.5	1.3
		HRA1	Adjacent	1.2	0.67	-	1.27	2	1	1.1	-	0.93	2.1	2.6	2.1	-	1.6	2.9	1.7
		HRA2	Adjacent	2.1	0.79	0.96	-	2	2.8	1.4	0.87	-	1.8	6.2	-	2.1	-	3.7	1.8
		HRD	Downstream	1.6	0.83	1.2	-	3.2	1.8	1.4	1.1	-	1.9	3.9	-	2.1	-	5.1	1.7
TDEC Appendix I	Copper	HRU	Upstream	<0.27	<0.28	0.28	-	<0.26	1.3	2.2	7.5	-	1.2	1.4	-	1.8	-	0.91	1.5
		HRA1	Adjacent	0.38	<0.28	-	0.35	<0.27	1.4	1.6	-	1.4	2.2	1.1	1	-	1.3	0.78	<1.4
		HRA2	Adjacent	<0.27	<0.27	<0.27	-	<0.27	1.4	2.4	8	-	1.1	1.1	-	1.6	-	0.77	<1.4
		HRD	Downstream	<0.27	0.72	0.41	-	0.73	1.5	2.9	11.7	-	1	1	-	1.3	-	0.73	<1.3
	Zinc	HRU	Upstream	5.8	5.1	4.1	-	5.6	22	26	23	-	20	32	-	33	-	34	17
		HRA1	Adjacent	5.6	5.4	-	3.3	6.1	23	21	-	19	21	26	46	-	31	26	20
		HRA2	Adjacent	6.1	6.1	4.5	-	6.8	21	24	25	-	19	31	-	34	-	30	15
		HRD	Downstream	5.7	6.3	3.9	-	8.3	22	27	28	-	17	33	-	27	-	33	20

	Critical Body Residue Values							
	Muscle Tissue		Liver Tissue		Ovary Tissue		Whole Body	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Mercury	0.08	0.8	0.0009	0.009	NA	NA	0.006	0.06
Selenium	11.3	11.3	0.524	5.24	15.1	15.1	8.5	8.5
Copper	3.4	34	6.52	65.2	NA	NA	0.196	1.96
Zinc	NA	NA	3.4	34	NA	NA	0.45	4.5

Legend
No applicable CBR
Concentration < CBR NOAEL
Concentration ≥ CBR NOAEL
Concentration ≥ CBR LOAEL

Notes:

CCR Rule - Title 40, Code of Federal Regulations, Part 257

LOAEL – Lowest Observed Adverse Effect Level

NOAEL - No Observed Adverse Effect Level

mg/kg – milligram per kilogram

ww – wet weight

" - " - Not applicable

TDEC – Tennessee Department of Environment and Conservation

HRU – Holston River Upstream

HRA – Holston River Adjacent

HRD – Holston River Downstream

BG – Bluegill, CC – Channel Catfish, LB – Largemouth Bass,
SB – Smallmouth Bass, RS – Redear Sunfish, SH – Shad

*Selenium concentrations reported as mg/kg ww for liver tissue and mg/kg dry weight for whole body, muscle, and ovary to permit direct comparison to the selenium CBRs for these tissues.

EXHIBITS

Exhibit No.
J.5-1

Title
Fish Tissue Sampling Reaches

Client/Project

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

Project Location
Rogersville, Tennessee

175566338
Prepared by DMB on 2022-05-31
Technical Review by BL on 2022-05-31

0 2,000 4,000 6,000 8,000 Feet

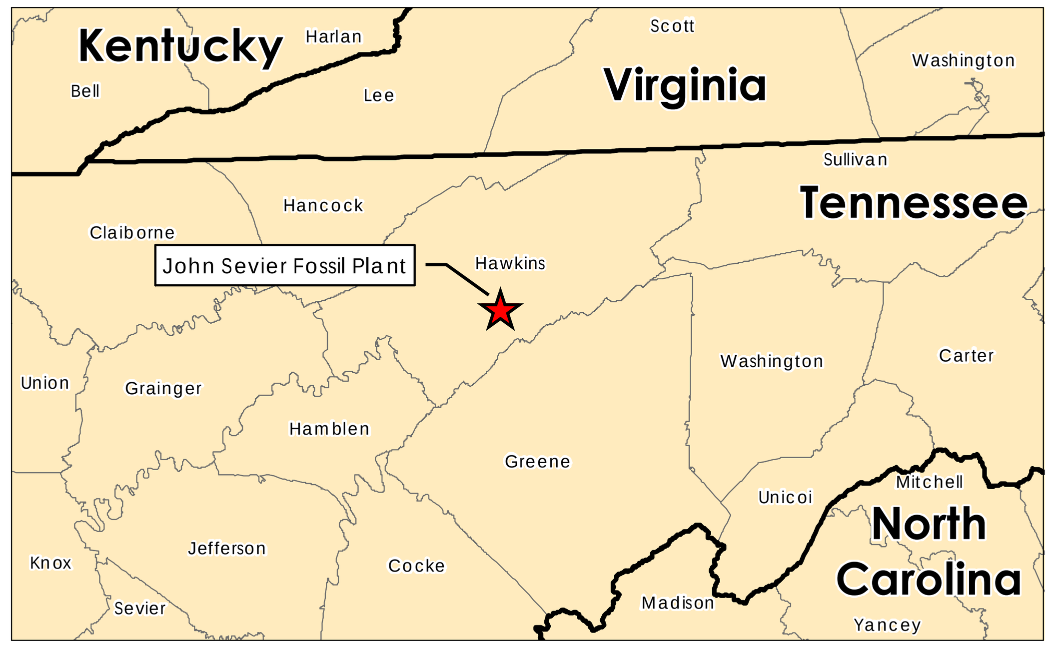
1:24,000 (At original document size of 22x34)

Legend

- Fish Sampling Reaches
  - *HRU – Holston River Upstream*
  - *HRA1 – Holston River Adjacent 1*
  - *HRA2 – Holston River Adjacent 2*
  - *HRD – Holston River Downstream*
- 2017 Imagery Boundary
- 2018 Imagery Boundary
- Limit of Historical Ash Disposal Ponds (Approximate)
- CCR Unit Area (Approximate)
- Closed Coal Yards and Chemical Ponds (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), TVA (2018-09-11), and Bing Imagery



Stantec

TVA

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U:\TVA-EIP\175568225_JSF_Phase2\gis\mxd\EAR\JSF_ExJ.5-1_Fish_Tissue_Sampling_Reaches.mxd Revised: 2022-05-31 By: mbough

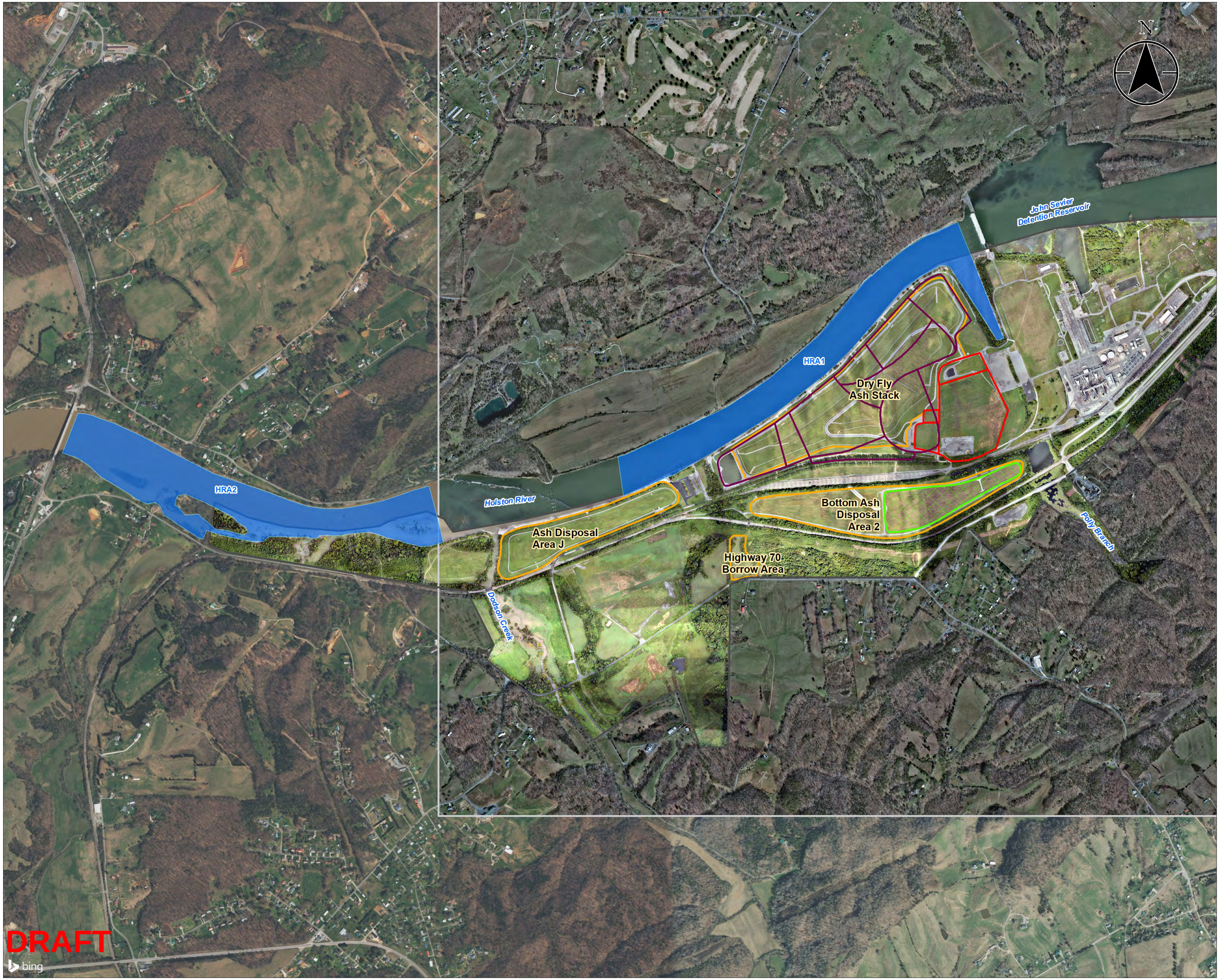


Exhibit No.

J.5-1a

Title

Fish Tissue Sampling Reaches

Client/Project

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

Project Location

Rogersville, Tennessee

175566338

Prepared by DMB on 2022-05-31
Technical Review by BL on 2022-05-31

0 | 700 | 1,400 | 2,100 | 2,800 Feet

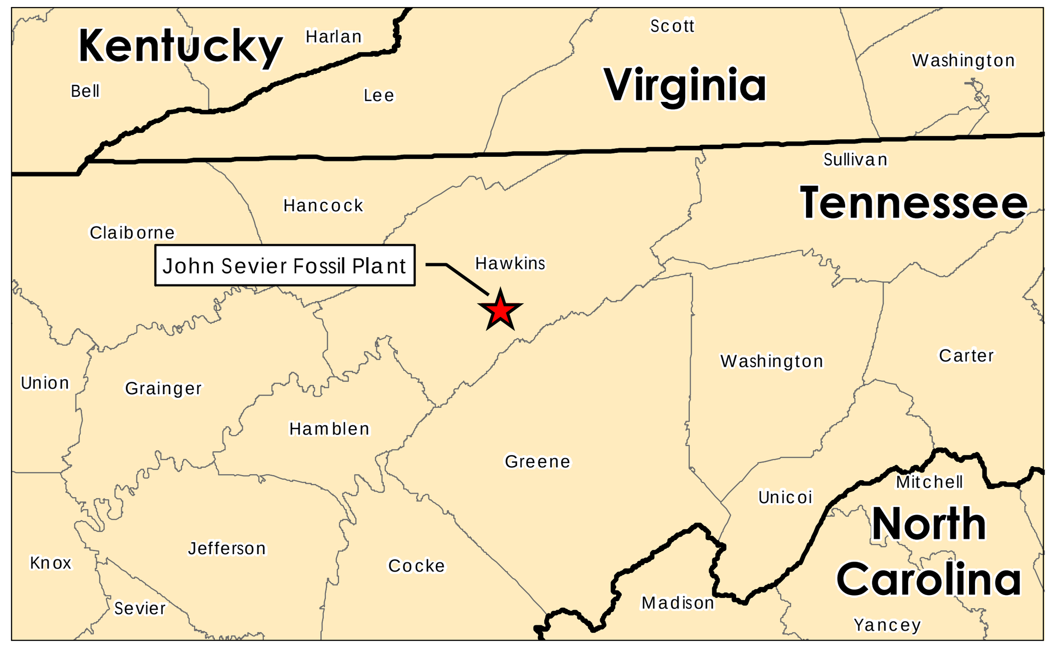
1:8,400 (At original document size of 22x34)

Legend

- Fish Sampling Reaches — *HRA1 – Holston River Adjacent 1*, *HRA2 – Holston River Adjacent 2*
- 2017 Imagery Boundary
- 2018 Imagery Boundary
- Limit of Historical Ash Disposal Ponds (Approximate)
- CCR Unit Area (Approximate)
- Closed Coal Yards and Chemical Ponds (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), TVA (2018-09-11), and Bing Imagery



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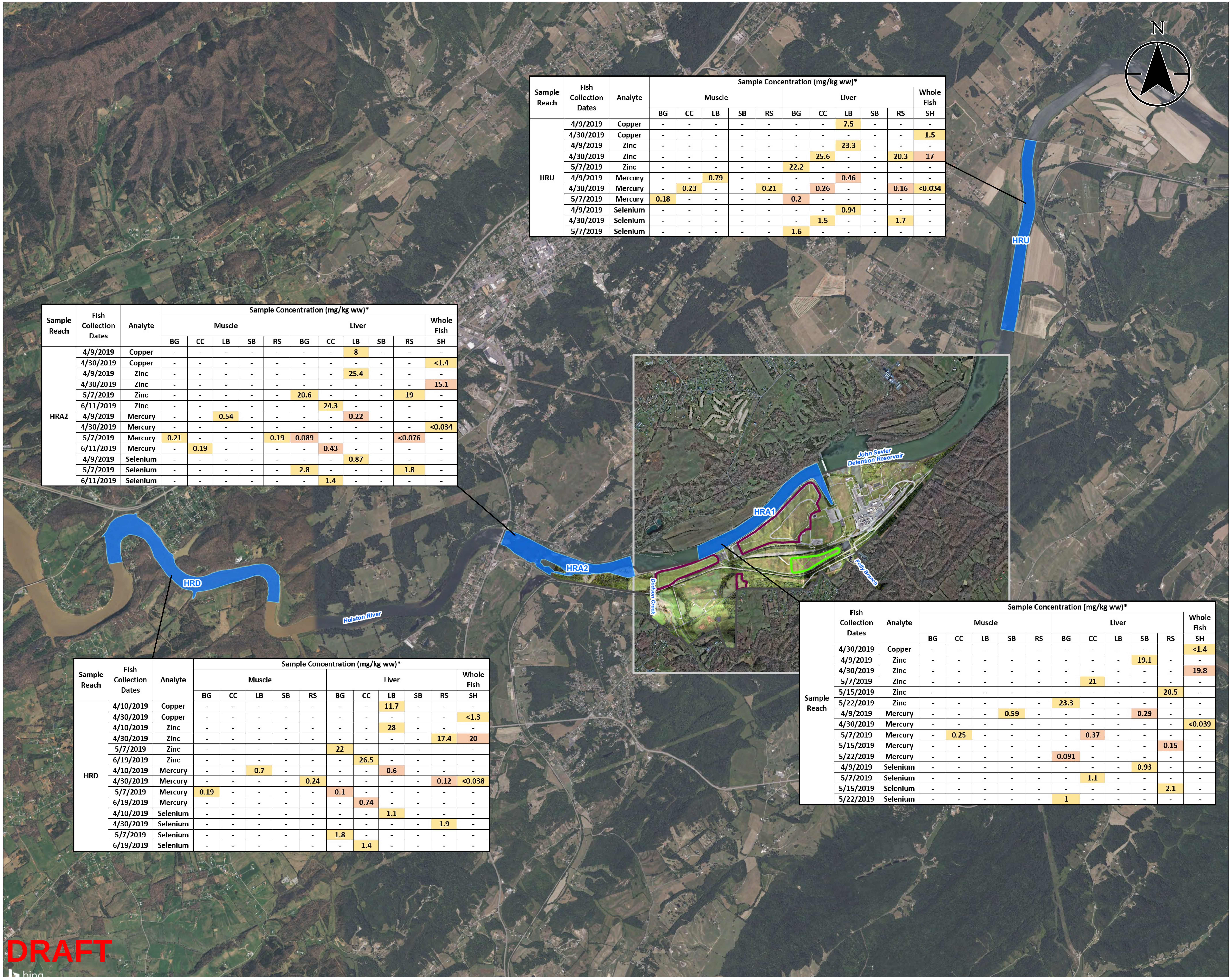

Sample Reach	Fish Collection Dates	Analyte	Sample Concentration (mg/kg ww)*										
			Muscle					Liver					Whole Fish
			BG	CC	LB	SB	RS	BG	CC	LB	SB	RS	SH
HRU	4/9/2019	Copper	-	-	-	-	-	-	-	7.5	-	-	-
	4/30/2019	Copper	-	-	-	-	-	-	-	-	-	-	1.5
	4/9/2019	Zinc	-	-	-	-	-	-	-	23.3	-	-	-
	4/30/2019	Zinc	-	-	-	-	-	-	25.6	-	-	20.3	17
	5/7/2019	Zinc	-	-	-	-	-	22.2	-	-	-	-	-
	4/9/2019	Mercury	-	-	0.79	-	-	-	-	0.46	-	-	-
	4/30/2019	Mercury	-	0.23	-	-	0.21	-	0.26	-	-	0.16	<0.034
	5/7/2019	Mercury	0.18	-	-	-	-	0.2	-	-	-	-	-
	4/9/2019	Selenium	-	-	-	-	-	-	-	0.94	-	-	-
	4/30/2019	Selenium	-	-	-	-	-	-	1.5	-	-	1.7	-
	5/7/2019	Selenium	-	-	-	-	-	1.6	-	-	-	-	-

Sample Reach	Fish Collection Dates	Analyte	Sample Concentration (mg/kg ww)*										
			Muscle					Liver					Whole Fish
			BG	CC	LB	SB	RS	BG	CC	LB	SB	RS	SH
HRA2	4/9/2019	Copper	-	-	-	-	-	-	-	8	-	-	-
	4/30/2019	Copper	-	-	-	-	-	-	-	-	-	-	<1.4
	4/9/2019	Zinc	-	-	-	-	-	-	-	25.4	-	-	-
	4/30/2019	Zinc	-	-	-	-	-	-	-	-	-	-	15.1
	5/7/2019	Zinc	-	-	-	-	-	20.6	-	-	-	19	-
	6/11/2019	Zinc	-	-	-	-	-	-	24.3	-	-	-	-
	4/9/2019	Mercury	-	-	0.54	-	-	-	-	0.22	-	-	-
	4/30/2019	Mercury	-	-	-	-	-	-	-	-	-	-	<0.034
	5/7/2019	Mercury	0.21	-	-	-	0.19	0.089	-	-	-	<0.076	-
	6/11/2019	Mercury	-	0.19	-	-	-	-	0.43	-	-	-	-
	4/9/2019	Selenium	-	-	-	-	-	-	-	0.87	-	-	-
	5/7/2019	Selenium	-	-	-	-	-	2.8	-	-	-	1.8	-
	6/11/2019	Selenium	-	-	-	-	-	-	1.4	-	-	-	-

Sample Reach	Fish Collection Dates	Analyte	Sample Concentration (mg/kg ww)*										
			Muscle					Liver					Whole Fish
			BG	CC	LB	SB	RS	BG	CC	LB	SB	RS	SH
	4/30/2019	Copper	-	-	-	-	-	-	-	-	-	-	<1.4
	4/9/2019	Zinc	-	-	-	-	-	-	-	-	19.1	-	-
	4/30/2019	Zinc	-	-	-	-	-	-	-	-	-	-	19.8
	5/7/2019	Zinc	-	-	-	-	-	-	21	-	-	-	-
	5/15/2019	Zinc	-	-	-	-	-	-	-	-	-	20.5	-
	5/22/2019	Zinc	-	-	-	-	-	23.3	-	-	-	-	-
	4/9/2019	Mercury	-	-	-	0.59	-	-	-	-	0.29	-	-
	4/30/2019	Mercury	-	-	-	-	-	-	-	-	-	-	<0.039
	5/7/2019	Mercury	-	0.25	-	-	-	-	0.37	-	-	-	-
	5/15/2019	Mercury	-	-	-	-	-	-	-	-	-	0.15	-
	5/22/2019	Mercury	-	-	-	-	-	0.091	-	-	-	-	-
	4/9/2019	Selenium	-	-	-	-	-	-	-	-	0.93	-	-
	5/7/2019	Selenium	-	-	-	-	-	-	1.1	-	-	-	-
	5/15/2019	Selenium	-	-	-	-	-	-	-	-	-	2.1	-
	5/22/2019	Selenium	-	-	-	-	-	1	-	-	-	-	-

Sample Reach	Fish Collection Dates	Analyte	Sample Concentration (mg/kg ww)*										
			Muscle					Liver					Whole Fish
			BG	CC	LB	SB	RS	BG	CC	LB	SB	RS	SH
HRD	4/10/2019	Copper	-	-	-	-	-	-	-	11.7	-	-	-
	4/30/2019	Copper	-	-	-	-	-	-	-	-	-	-	<1.3
	4/10/2019	Zinc	-	-	-	-	-	-	-	28	-	-	-
	4/30/2019	Zinc	-	-	-	-	-	-	-	-	-	17.4	20
	5/7/2019	Zinc	-	-	-	-	-	22	-	-	-	-	-
	6/19/2019	Zinc	-	-	-	-	-	-	26.5	-	-	-	-
	4/10/2019	Mercury	-	-	0.7	-	-	-	-	0.6	-	-	-
	4/30/2019	Mercury	-	-	-	-	0.24	-	-	-	-	0.12	<0.038
	5/7/2019	Mercury	0.19	-	-	-	-	0.1	-	-	-	-	-
	6/19/2019	Mercury	-	-	-	-	-	-	0.74	-	-	-	-
	4/10/2019	Selenium	-	-	-	-	-	-	-	1.1	-	-	-
	4/30/2019	Selenium	-	-	-	-	-	-	-	-	-	1.9	-
	5/7/2019	Selenium	-	-	-	-	-	1.8	-	-	-	-	-
	6/19/2019	Selenium	-	-	-	-	-	-	1.4	-	-	-	-

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Exhibit No.

J.5-2

Title

Fish Tissue Sampling Results Equal to or Above Critical Body Residue Values

Client/Project

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

Project Location

175566338

Rogersville, Tennessee

Prepared by DMB on 2022-10-20
Technical Review by BL on 2022-10-20

0 2,000 4,000 6,000 8,000 Feet

1:24,000 (At original document size of 22x34)

Legend

Fish Sampling Reaches: HRU – Holston River Upstream; HRA1 – Holston River Adjacent 1; HRA2 – Holston River Adjacent 2; HRD – Holston River Downstream

CCR Unit Area (Approximate)

Consolidated & Capped CCR Area (Approximate)

Concentration > CBR NOAEL

Concentration > CBR LOAEL

Abbreviations:

BG Bluegill
CC Channel Catfish
LB Largemouth Bass
SB Smallmouth Bass
RS Redear Sunfish
SH Shad

HR = Holston River
U = Upstream
A = Adjacent
D = Downstream

CBR - Critical Body Residue
NOAEL - No Observed Adverse Effects Value
LOAEL - Lowest Observed Adverse Effects Value

* Selenium concentrations reported as mg/kg wet weight (ww) for liver tissue and mg/kg dry weight for whole body, muscle, and ovary samples to permit direct comparison to the selenium CBRs for these tissues.

	Critical Body Residue Values							
	Whole Body Fish Tissue		Liver Tissue		Muscle Tissue		Ovary Tissue	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Copper	0.196	1.96	6.52	65.2	3.4	34	NA	NA
Zinc	0.45	4.5	3.4	34	NA	NA	NA	NA
Mercury	0.006	0.06	0.0009	0.009	0.08	0.8	NA	NA
Selenium	8.5	8.5	0.524	5.24	11.3	11.3	15.1	15.1

Notes

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

Stantec

TVA

APPENDIX J.6

FISH TISSUE SAMPLING AND ANALYSIS REPORT

John Sevier Fossil Plant -
Fish Tissue Sampling and Analysis Report

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

June 23, 2022

Prepared by:

Tennessee Valley Authority

TVA TENNESSEE VALLEY AUTHORITY

Revision Record

Revision	Description	Date
0	Submittal to TDEC	June 23, 2022

Table of Contents

LIST OF APPENDICES

APPENDIX A - EXHIBITS

APPENDIX B - TABLES

Abbreviations

˚C	degrees Celsius
CCR	Coal Combustion Residuals
CCR Parameters	Boron and calcium (40 CFR 257 Appendix III); 40 CFR Part 257 Appendix IV Constituents, excluding radium and fluoride; five inorganic constituents included in Appendix I of Tennessee Rule 0400-11-01-.04; strontium and percent moisture
CFR	Code of Federal Regulations
COC	Chain-of-Custody
DI	Deionized
EAR	Environmental Assessment Report
EIP	Environmental Investigation Plan
EnvStds	Environmental Standards, Inc.
EPA	United States Environmental Protection Agency
GPS	Global Positioning System
HRM	Holston River Mile
ID	Identification
IDW	Investigation Derived Waste
JSF Plant	John Sevier Fossil Plant
ft amsl	feet above mean sea level
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
QC	Quality Control
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
TI	Technical Instruction
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency

1.0 INTRODUCTION

The Tennessee Valley Authority (TVA) has prepared this sampling and analysis report (SAR) to document completion of activities related to the fish tissue investigation at TVA's John Sevier Fossil Plant (JSF Plant) in Rogersville, Tennessee.

The purpose of the fish tissue investigation was to characterize concentrations of constituents related to coal combustion residuals (CCR) in fish in the vicinity of 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 performed and to present the information and data collected during the execution of the Fish Tissue Sampling and Analysis Plan (SAP) (Stantec Consulting Services Inc. [Stantec] 2018a). This SAR is not intended to provide conclusions or evaluate results. The scope of the fish tissue 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 CCR programs, and will be presented in the Environmental Assessment Report (EAR).

Fish tissue investigation activities were performed in general accordance with the following documents developed by TVA to support fulfilling the requirements of the TDEC Order:

- *Fish Tissue SAP* (Stantec 2018a)
- *Environmental Investigation Plan (EIP)* (Stantec 2018b)
- *Quality Assurance Project Plan (QAPP)* (Environmental Standards, Inc. [EnvStds] 2018).

The fish tissue investigation was implemented in accordance with TVA- and TDEC-approved Programmatic and Project-specific changes. Variations in scope and procedures from those outlined in the Fish Tissue SAP and occurring during field activities due to field conditions and programmatic updates are referenced in Section 3.6.

Fish tissue investigation field activities were performed between April 9, 2019 and July 3, 2019, when the targeted fish species were reproductively mature. TVA personnel performed all field work activities, including fish tissue resections. TVA shipped the fish tissue samples to the analytical laboratory in October 2019. Laboratory analysis of constituents was performed by Pace Analytical in Green Bay, Wisconsin. Additional Quality Assurance oversight on data acquisition protocols, sampling practices, and data validation or verification was performed by EnvStds under direct contract to TVA.

2.0 OBJECTIVE AND SCOPE

The primary objective of the investigation conducted pursuant to the Fish Tissue SAP was to assess whether fish in the immediate vicinity and downstream of the JSF Plant have higher tissue concentrations of CCR-related constituents than fish from an upstream reference location. The assessment of the tissue concentrations will be discussed in the EAR. The SAR documents completion of the activities related to the fish tissue investigation at the JSF Plant. The approach for the fish tissue investigation was to:

- Collect fish from four sampling reaches located on the Holston River upstream of, adjacent to, and downstream of the CCR units
- Collect five species of fish representing different trophic levels from each of the sampling reaches
- Prepare fish tissue samples from the collected fish species for analysis of CCR-related constituents.

The scope of work for the fish tissue investigation consisted of the following tasks:

- Obtaining a Tennessee Wildlife Resources Agency (TWRA) Scientific Collection Permit and coordinating with that agency during field sampling activities
- Verifying the fish collection sampling reaches using the global positioning system (GPS), and identifying access locations
- Collecting fish species using boat-mounted electro-shocking (electrofishing) and/or gill netting
- Processing the collected fish to prepare tissue samples for laboratory analysis by resection, compositing tissue samples as specified in the SAP, and submitting the samples to the laboratory for analysis.

3.0 FIELD ACTIVITIES

Fish tissue investigation field activities were performed between April 9, 2019 and July 3, 2019. TVA performed fish collections and fish tissue processing activities based on guidance and specifications listed in TVA's Technical Instructions (TIs) and Standard Operating Procedures (SOPs), the SAP, the QAPP, and United States Environmental Protection Agency (EPA) *Guidance for Assessing Chemical Contaminants Data for Use in Fish Advisories* (EPA 2000), except as noted in the Variations section of this report. As part of TVA's commitment to generate representative and reliable data, data validation and/or verification of laboratory analytical results were performed by EnvStds under direct contract with TVA. EnvStds also conducted audits of field activities and tissue resections, and provided quality reviews of field documentation. In addition, Civil and Environmental Consultants, Inc., on behalf of TDEC, accompanied TVA during fish collections on May 15, 2019; no split samples were collected.

During the fish tissue investigation, TVA:

- Coordinated activities with TWRA as required by the Scientific Collection Permit
- Verified sampling reaches using GPS coordinates
- Collected five species of fish representing different trophic levels from each of four sampling reaches located on the Holston River, including one reach upstream of the CCR units, two reaches adjacent to the CCR units, and one reach downstream of the CCR units
- Conveyed whole fish collected during field sampling efforts to TVA's Chickamauga Power Service Center in Chattanooga, Tennessee, for processing
- Resected fillet, egg/ovary, and liver tissues from bluegill, channel catfish, largemouth bass, and redear sunfish; and generated samples of composited tissues by species, tissue type, and sample reach
- Generated whole fish composite samples of gizzard shad with gut content by sample reach
- Collected quality control (QC) samples including 23 field duplicates and seven equipment blanks
- Shipped fish tissue samples via commercial courier service to Pace Analytical for analysis.

Details on each activity are presented in the sections below.

3.1 SAMPLING LOCATIONS

Four sampling reaches were selected on the Holston River for the collection of fish and associated fish tissues. These areas represent background, adjacent, and downstream conditions relative to the CCR units and coincide with the mayfly sampling areas (Stantec 2018c). The sampling reaches and the TDEC Order CCR units at the JSF Plant are shown on Exhibits A.1 and A.1a in Appendix A. Tables B.1 and B.2, in Appendix B, provide a summary of the sampling reaches and the fish tissue samples collected, respectively.

Two sampling reaches were located adjacent to or immediately downstream of the JSF Plant and were associated with the CCR units. The adjacent reach HRA1 was located between Holston River Mile (HRM) 106.2 and HRM 105.0, starting just downstream of the John Sevier Dam and extending downstream approximately 1.2 river miles. HRA2 was located downstream of Ash Disposal Area J and extended approximately 1.1 river miles (HRM 104.5 to 103.4).

The downstream-most sampling reach (HRD) originated approximately 2.5 miles downstream from HRA2 and extended downstream approximately 2 river miles (HRM 100.9 to 98.9). The upstream reference reach, HRU (HRM 109.9 to 108.3), was within the John Sevier Detention Reservoir. HRU originated approximately 2 river miles upstream from the JSF CCR units and extended upstream approximately 1.6 river miles.

The instream habitat is unique in the vicinity of the JSF Plant due to the plant's location at the upstream extent of Cherokee Reservoir and the presence of the John Sevier Detention Reservoir, as well as a historical Native American fish weir that is located between sampling reaches HRA1 and HRA2.

Water depths vary appreciably in the three sampling reaches (HRA1, HRA2, and HRD) downstream of the John Sevier Dam due to seasonal changes in Cherokee Reservoir headwater elevations — typical operating range of 1039 to 1071 feet above mean sea level (ft amsl). Water depth in HRA1 and HRA2 is dependent on flows in the Holston River (i.e., flow passing over the detention dam) when Cherokee Reservoir headwater elevations are below approximately 1062 and 1058 ft amsl, respectively. Likewise, when Cherokee Reservoir headwater is below an elevation of 1058 ft amsl, the Holston River within reaches HRA1 and HRA2 is free-flowing, with areas composed of riffle habitat and large portions that are wadable. The Cherokee Reservoir pool typically reaches John Sevier Dam during a portion of spring and summer. When Cherokee Reservoir headwater is at full pool, water depths within sampling reaches HRA1 and HRA2 are increased approximately nine to 14 feet, varying by proximity to John Sevier Dam, and are increased by approximately 25 feet within sampling reach HRD.

The fish assemblages in reaches HRA1, HRA2, and HRD also undergo substantial season variation as several migratory fish (e.g., paddlefish, white bass, and Cherokee bass) utilize the area during their respective spawning seasons. Additionally, some species of fish move in and out of these reaches as changes in flow and water depth change the availability of preferred habitat and/or food sources.

3.2 DOCUMENTATION

TVA maintained field documentation in accordance with TVA TI ENV-TI-05.80.03, *Field Record Keeping* and the QAPP. Field activities were recorded in field logbooks. Health and safety forms were completed in accordance with TVA health and safety requirements. Additional information regarding field documentation is provided below.

3.2.1 Field Forms

TVA used program-specific field forms and field logbooks to record field observations and data for specific activities. Field forms used during the fish tissue investigation included:

- *TVA Biota Field Chain-of-Custody (COC)*
- *Analytical Laboratory COC*
- *Weekly Balance Check.*

3.2.1.1 Field Logbook

TVA field sampling personnel recorded field activities, observations, and supporting information (e.g., number and species of fish retained) in field logbooks to chronologically document the field program. Deviations from the SAP, TIs, SOPs, or QAPP were documented in the field logbooks.

3.2.1.2 TVA Biota Field Chain-of-Custody

TVA field sampling personnel completed Biota Field *COCs* to document the fish retained during the fish tissue investigation field activities. The Biota Field *COC* documents the field collection team, sampling location, collection date and time, and the number of each fish species collected and transported to the TVA Chickamauga Power Service Center, Chattanooga, Tennessee.

3.2.1.3 Analytical Laboratory Chain-of-Custody

TVA personnel completed Analytical Laboratory *COCs*, listing each fish tissue sample. The sample identification (ID), sample location, type of sample, sample date and time, analysis requested, and the sample custody record were recorded on the *COCs*. The Fish Tissue Investigation Lead reviewed the *COCs* for completeness, and a QC check of samples in each cooler compared to sample IDs on the corresponding *COC* was conducted. *COCs* were completed in general accordance with ENV-TI-05.80.02, *Sample Labeling and Custody*.

3.2.1.4 Weekly Balance Check

Balances used to weigh fish and resected fish tissues were checked weekly for accuracy using check weights.

3.3 SAMPLING METHODS

The following sections present data collection and sampling procedures used in the fish tissue investigation.

3.3.1 Fish Collection

Fish collection occurred between April 9 and July 3, 2019, when fish were reproductively mature and developing their gonads. In order to collect female fish with mature ovaries, fish of each species were collected during their respective spawning seasons, which necessitated multiple mobilizations to the JSF Plant.

As specified in the SAP, five species of fish representing different trophic levels were targeted for analysis, including four species of gamefish — largemouth bass, *Micropterus salmoides* (top carnivore), bluegill, *Lepomis macrochirus* (invertivore), redear sunfish, *Lepomis microlophus* (bottom feeding invertivore), and channel catfish, *Ictalurus punctatus* (bottom feeding omnivore) — and one species of forage fish — gizzard shad, *Dorosoma cepedianum* (planktivore). However, because few harvestable size largemouth bass with mature ovaries were observed within reach HRA1, smallmouth bass, *Micropterus dolomieu* (top carnivore), substituted for largemouth bass in this sampling reach.

Fish were collected using primarily boat electrofishing (TVA-KIF-SOP-33, *Standard Operating Procedure for: Fish Sampling Using Boat-Mounted Electroshocker*). Fish species targeted for analysis were retained in aerated live wells until completion of a sampling effort within a sampling reach. At the completion of a sampling effort, fish were sorted based on species, size (total length), and a visual assessment of female egg development stage, to determine which fish would be retained for further evaluation.

The use of gill nets was limited to one effort (a single gill net set overnight) within reach HRA2 and reach HRD. Flow velocities and/or water depths generally precluded the use of gill nets within reaches HRA1 and HRA2, while conditions within the downstream reach, HRD, vary more on a seasonal basis because of its location further downstream in Cherokee Reservoir. In addition, there was concern for bycatch due to the large numbers of migratory fish (e.g., Cherokee bass, paddlefish, striped bass, white bass; and walleye, sauger, and saugeye) that utilize the Holston River downstream of John Sevier Dam during spring. An attempt to collect the targeted species of fish using trotlines and juglines was not successful, and an attempt using rod and reel yielded one male bluegill that was not utilized in the samples.

Fish retained for further evaluation were double-bagged separately by species and sample reach. Bags containing fish were labeled with facility name, site ID, date of collection, and collector's initials and placed in coolers with wet ice; ensuring ice completely covered the fish. Fish were stored in separate coolers for each sampling reach and two custody seals were applied to each cooler. Field sampling personnel wore new, clean nitrile gloves when handling fish.

TVA personnel transported whole fish from the field to TVA Chickamauga Power Service Center in Chattanooga, Tennessee, for processing. TVA used TVA form 21230, *Biota Field Sampling Form*, for sample custody. Bags containing fish were labeled and handled in accordance with ENV-TI-05.80.02, *Sample Labeling and Custody.*

3.3.2 Fish Processing and Sample Analysis

TVA personnel performed fish tissue processing activities at the TVA Chickamauga Power Service Center. Fish were processed and tissue samples frozen within 48 hours of collection, with the exception of one bluegill (HRA1) that was frozen after collection to hold for processing. Individual fish received for processing were inspected carefully to ensure that they were not compromised in any way (i.e., mutilated by the collection gear or not properly preserved during shipment). Fish also were observed for abnormalities, such as scoliosis, blind eye, parasites, fungus, or lesions and the abnormalities recorded.

Table B.3, in Appendix B, provides the measurements and observations made on each fish during processing.

Gamefish were processed into muscle (skinless, boneless fillet), ovary, and liver tissues, and the tissues were combined to form six-fish composite samples for each tissue type by species and sampling reach, except as noted in the Variations section of this report. Total length, weight, and sex were recorded for each fish, and the weight of each resected tissue was recorded. Personnel wore new, clean nitrile gloves when handling and processing fish. Fish were rinsed with deionized (DI) water prior to tissue resection and each resected tissue was rinsed with DI water prior to being placed in a labeled plastic bag and frozen. Tissue samples were maintained at or below −20 degrees Celsius (˚C) in secure freezers at the TVA Chickamauga Power Service Center.

Each gamefish produced two fillet samples, a right and left fillet. Female fish with mature ovaries produced two ovary samples. Livers from largemouth bass and channel catfish were proportioned into two samples. Due to limited mass, livers from bluegill and redear sunfish were retained whole, producing one sample from each fish. One fillet, ovary, and liver sample from each fish was allocated to a composite sample for analytical analysis. Accordingly, females of each gamefish species were preferred over males. However, as allowed for in the Fish Tissue SAP, male fish were utilized in composites when sufficient numbers of females were not obtained from a given sampling reach. Remaining fillet, ovary, and liver tissues were retained as individual samples and archived frozen for potential future analysis, if needed.

Whole fish composite samples of 12 to 15 gizzard shad also were obtained from each sampling reach. Shad were measured (total length), rinsed with DI water, and composited. The whole fish composites, with gut content, were weighed, placed in labeled plastic bags, and maintained in secure freezers at or below −20˚C.

In addition, one to four co-located samples were collected from each sampling reach. Co-located samples were additional composites of fillets, ovaries, and/or liver tissues of one of the targeted gamefish species or an additional whole fish composite of gizzard shad. These samples were prepared as field duplicates and submitted to the analytical laboratory for analysis. Field duplicates were collected in accordance with the SAP and ENV-TI-05.80.04, *Field Sampling Quality Control.*

Except as noted in the Variations section of this report, fish used to generate composited tissue samples met the following criteria:

- Were of the same species
- Met legal requirements of harvestable size, if applicable
- Were of similar size so that the smallest individual in a composite was no less than 75 percent of the total length of the largest individual
- Consistent with EPA guidance (EPA 2000), the same number of gamefish were used in each composite sample
- Individuals of the same species were collected as close to the same time as possible.

Fish tissue samples were analyzed for the following CCR-related constituents, hereafter referred to collectively as “CCR Parameters” for the fish tissue investigation:

- Boron and calcium from Title 40 of the Code of Federal Regulations (CFR) Part 257 (40 CFR 257) Appendix III
- 40 CFR 257 Appendix IV Constituents, excluding radium and fluoride
- Five inorganic constituents from Appendix I of TN Rule 0400-11-.04: copper, nickel, silver, vanadium, and zinc
- Strontium
- Percent moisture.

The 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 other TDEC environmental programs. As specified in the SAP, the fish tissue analysis did not include dissolved oxygen, chloride, fluoride, pH, sulfate, or total dissolved solids (which are on the federal CCR Appendices III and IV constituents lists) because those constituents are not relevant to analyses of animal tissues.

3.3.3 Equipment Decontamination Procedures

Decontamination was performed for fish tissue sampling and processing equipment in accordance with TVA TI ENV-TI-05.80.05, *Field Sampling Equipment Cleaning and Decontamination* and EPA *Guidance for Assessing Chemical Contaminants Data for Use in Fish Advisories* (EPA 2000).

Prior to field mobilizations, dip nets used to retrieve fish during boat electrofishing were washed in a Liquinox™ solution, rinsed with tap water and then with DI water, allowed to dry, and placed in plastic bags. During field collections, a clean dip net was used for each sampling reach. Additionally, coolers for transporting fish were washed with a Liquinox™ solution and rinsed with tap water. Live wells also were drained, then flushed and refilled with surface water from the sampling reach prior to the start of fish collections.

Utensils used for tissue resections were decontaminated between a change in species or sampling reach. Tissue resections were done on cutting boards covered with heavy duty aluminum foil that was changed after each fish. A clean sheet of aluminum foil was placed on scales to weigh each fish or resected tissue. Equipment blanks were collected in accordance with ENV-TI-05.80.04, *Field Sampling Quality Control.*

3.4 INVESTIGATION DERIVED WASTE

Investigation derived waste (IDW) generated during the fish tissue investigation included:

- Fish remains
- Personal protective equipment (PPE)

- Decontamination fluids
- General trash.

IDW was handled in accordance with ENV-TI-05.80.05, *Field Sampling Equipment Cleaning and Decontamination*; the JSF Plant-specific waste management plan; and local, state, and federal regulations. Fish remains were frozen and disposed of in a general trash dumpster at the TVA Chickamauga Power Service Center. Used disposable PPE (e.g., nitrile gloves) and general trash generated throughout the day were stored in garbage bags and disposed of in a general trash dumpster onsite or at another TVA facility.

3.5 SAMPLE SHIPMENT

Samples were packed, transported, and shipped under *COC* procedures specified in ENV-TI-05.80.06, *Handling and Shipping of Samples*. Samples were shipped overnight on dry ice via a commercial courier to Pace Analytical in Green Bay, Wisconsin. Pace Analytical submitted sample receipt confirmation forms to EnvStds for review and confirmation.

3.6 VARIATIONS

The proposed scope and procedures for the fish tissue investigation were outlined in the SAP, QAPP, applicable TVA TIs and SOPs 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 SAP are described in the following sections. As discussed below, these variations do not impact the overall usability and representativeness of the dataset provided in this SAR for the fish tissue investigation at the JSF Plant.

3.6.1 Variations in Scope

Variations in scope are provided below.

- The Fish Tissue SAP specified collecting one co-located sample from each of the four sampling reaches. In practice, a total of nine co-located samples were collected (Table B.2), with one to four co-located samples collected from each sampling reach. It should be noted, however, that both samples of redear sunfish — one parent sample and one co-located sample — from HRA2 consisted of one fish. The redear sunfish from HRA2 were not composited due to the limited number (2 males and 2 females) of adult fish collected, the variability in size among those fish, and the extended period (43 days) over which the fish were collected. Moreover, due to the dissimilarities among the fish collected, a fillet, ovary, and liver sample from each female fish was submitted for analytical analysis.
- Four of six channel catfish composite samples did not yield ovary samples, and the two ovary samples submitted (HRU and HRA1) for analytical analysis comprised tissue from three fish each (Table B.3). Only six of the 73 catfish retained from the JSF Plant study area for further evaluation were females with mature ovaries.

3.6.2 Variations in Procedures

Variations in procedures occurring in the field are provided below.

- The Fish Tissue SAP specified that fish be processed and tissue samples frozen within 48 hours of collection. However, as allowed for in EPA guidance (EPA 2000), one bluegill from HRA1 was frozen after collection to hold for processing. The fish was rinsed with DI water, place in a clean, resealable plastic bag, and maintain frozen until resection could be performed. For resection, the fish was minimally thawed, and the internal organs were resected prior to resecting the fillets. Each resected tissue was rinsed with DI water prior to being placed in a clean, labeled plastic bag and frozen.

- The Fish Tissue SAP specified that each composite sample submitted for analytical analysis consist of at least eight grams of tissue. Three of six bluegill liver samples consisted of 5.1 to 7.5 grams of tissue, and three of six redear sunfish liver samples consisted of 2.9 to 5.5 grams of tissue. However, 2.9 grams of tissue was sufficient to allow analysis of the CCR Parameters and percent moisture.

- The Fish Tissue SAP specified that each composite sample for the gamefish species consist of a minimum of six individual fish. In practice, two composite samples of channel catfish (HRU and HRD) and one composite sample of redear sunfish (HRA1) (Table B.2) comprised three or four fish. In addition, as detailed above, the two samples of redear sunfish from HRA2 were comprised of one fish each and thus were not composites. Few adult redear sunfish were encountered within reaches HRA1 and HRA2, and only 10 fish were retained (six and four, respectively) for further evaluation. Redear sunfish prefer areas with low flow velocities and aquatic vegetation. Preferred spawning habitat includes small gravel, clay, and/or sandy substrate. The Holston River downstream of the detention dam (HRA1 and HRA2) is riverine, and substrates are predominantly cobble, gravel, and bedrock. Some additional substrate of sand, clay, and vegetation is present, but it is only accessible to fish during a portion of spring and summer when Cherokee Reservoir pool levels inundate the islands and the mudflats in the peripheral area of the main channel.

- Smallmouth bass substituted for largemouth bass in reach HRA1. An insufficient number of harvestable size largemouth bass with mature ovaries were encountered within reach HRA1. The six-fish composite consisted only of smallmouth bass.

- The Fish Tissue SAP specified collecting an equipment blank each day of fish tissue sample processing, anticipating only fish from one TVA fossil plant would be processed per day. In practice, fish from several different plants typically were processed each day, so rather than collecting one equipment blank per day, a sufficient number of equipment blanks were collected to cover all the plants. The result was that 17 equipment blanks were collected during seven of the 15 days that fish from the JSF Plant were processed. This met the data quality objectives of having sufficient equipment blanks to assess decontamination procedures and to evaluate sample data usability during the data validation/verification process performed by EnvStds.

4.0 SUMMARY

The data presented in this report are from the fish tissue investigation sampling at the JSF Plant. The scope of work during this investigation included collecting five species of fish representing different trophic levels from each of four sampling reaches located on the Holston River, and processing fish tissue to prepare samples for analysis of CCR Parameters. Fish tissue investigation field activities were completed between April 9, 2019 and July 3, 2019, and the fish tissue samples were shipped to the analytical laboratory in October 2019.

Fish tissue sampling reaches are provided in Table B.1 and depicted on Exhibits A.1 and A.1a. A summary of the samples collected, including field duplicate samples, is presented in Table B.2. Fish measurements and observations are presented in Table B.3. Analytical data for CCR Parameters are presented in Table B.4. Analytical data were reported by Pace Analytical, and data verification or validation was performed by EnvStds.

TVA has completed the fish tissue investigation at the JSF Plant in Rogersville, Tennessee, in accordance with the Fish Tissue SAP as documented herein. The data collected during this 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.

5.0 REFERENCES

Environmental Standards, Inc. 2018. *Quality Assurance Project Plan for the Tennessee Valley Authority John Sevier Fossil Plant Environmental Investigation*. Prepared for Tennessee Valley Authority. Revision 2. October 2018.

Stantec Consulting Services Inc. (Stantec). 2018a. *Fish Tissue Sampling and Analysis Plan, John Sevier Fossil Plant.* Revision 3. Prepared for Tennessee Valley Authority. October 19, 2018.

Stantec. 2018b. *Environmental Investigation Plan, John Sevier Fossil Plant.* Revision 3. Prepared for Tennessee Valley Authority. October 19, 2018.

Stantec. 2018c. *Benthic Sampling and Analysis Plan, John Sevier Fossil Plant*. Revision 3. Prepared for Tennessee Valley Authority. October 19, 2018.

Tennessee Department of Environment and Conservation. 2015. *Commissioner's Order No. OGC15-0177.* August 6, 2015

Tennessee Valley Authority (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, TVA-KIF-SOP-33*, Standard Operating Procedure for: Fish Sampling Using Boat-mounted Electroshocker.*

Tennessee Wildlife Resources Agency (TWRA). 2019. *Tennessee Fishing Guide, 2019-2020*.

United States Environmental Protection Agency (EPA). 2000. *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 1, Fish Sampling and Analysis, Third Edition.* EPA-823-B-00-007. November.

APPENDIX A - EXHIBITS

Exhibit No.

A.1

Title

Fish Tissue Sampling Reaches

Client/Project

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

Project Location

Rogersville, Tennessee

175566338
Prepared by DMB on 2022-04-27
Technical Review by BL on 2022-04-27

0 2,000 4,000 6,000 8,000 Feet

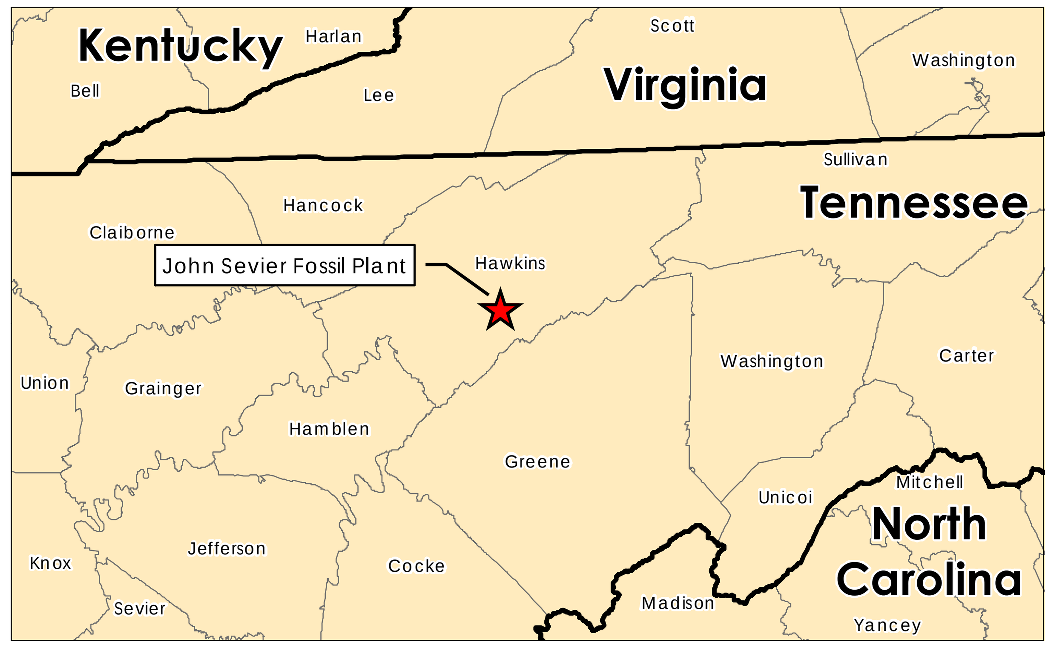
1:24,000 (At original document size of 22x34)

Legend

- Fish Sampling Reaches: HRU – Holston River Upstream; HRA1 – Holston River Adjacent 1; HRA2 – Holston River Adjacent 2; HRD – Holston River Downstream
- 2017 Imagery Boundary
- 2018 Imagery Boundary
- Limit of Historical Ash Disposal Ponds (Approximate)
- CCR Unit Area (Approximate)
- Closed Coal Yards and Chemical Ponds (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), TVA (2018-09-11), Bing Imagery



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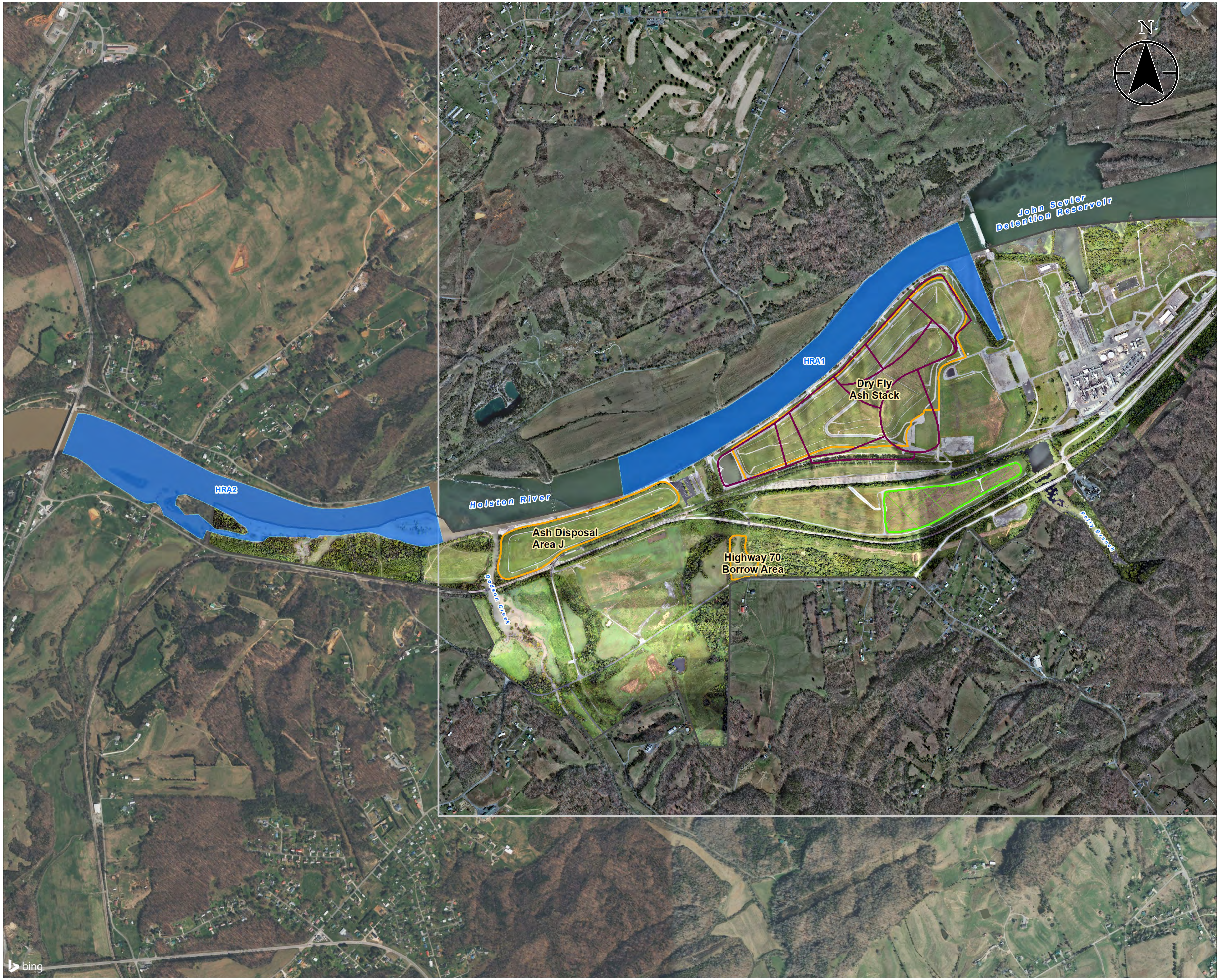


Exhibit No.

A.1a

Title

Fish Tissue Sampling Reaches

Client/Project

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

Project Location

Rogersville, Tennessee

175566338
Prepared by DMB on 2022-04-27
Technical Review by BL on 2022-04-27

0 | 700 | 1,400 | 2,100 | 2,800 Feet

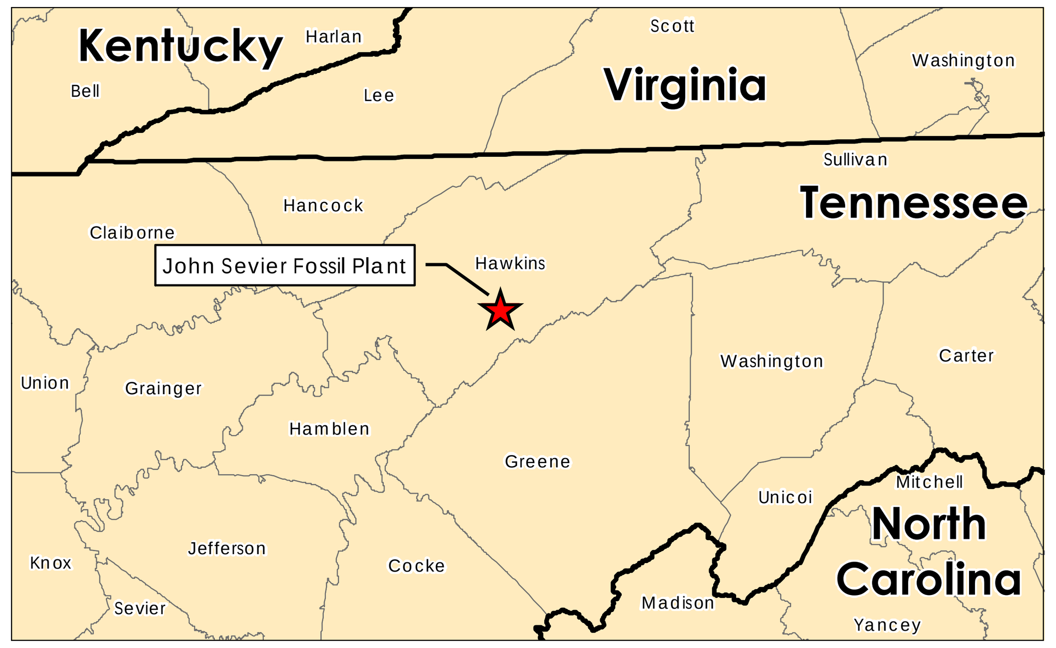
1:8,400 (At original document size of 22x34)

Legend

- Fish Sampling Reaches — *HRA1 – Holston River Adjacent 1*; *HRA2 – Holston River Adjacent 2*
- 2017 Imagery Boundary
- 2018 Imagery Boundary
- Limit of Historical Ash Disposal Ponds (Approximate)
- CCR Unit Area (Approximate)
- Closed Coal Yards and Chemical Ponds (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), TVA (2018-09-11), Bing Imagery



Stantec TVA

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APPENDIX B - TABLES

TABLE B.1 – Fish Tissue Sampling Reaches
John Sevier Fossil Plant

Sampling Reach ID	Sampling Reach Name[1]	Sampling Reach Location[2]			
		Approximate River Miles (extent)		Latitude	Longitude
HRU	Holston River Upstream	HRM 109.9 – 108.3 (1.6)	Upstream	36.418236	-82.934490
			Downstream	36.395515	-82.939245
HRA1	Holston River Adjacent-1	HRM 106.2 – 105.0 (1.2)	Upstream	36.380603	-82.966586
			Downstream	36.370862	-82.986031
HRA2	Holston River Adjacent-2	HRM 104.5 – 103.4 (1.1)	Upstream	36.370589	-82.994472
			Downstream	36.373986	-83.012437
HRD	Holston River Downstream	HRM 100.9 – 98.9 (2.0)	Upstream	36.367165	-83.046138
			Downstream	36.372120	-83.068394

Notes:

ID Identification
HRM Holston River Mile

1. Upstream, Adjacent, and Downstream relative to the John Sevier Fossil Plant CCR units
2. The coordinates provide the approximate upstream to downstream extent of each sampling reach presented on Exhibit A.1 in Appendix A.

TABLE B.2 – Summary of Fish Tissue Samples
John Sevier Fossil Plant
April - July 2019

Sampling Reach	Fish Species	Sample IDs[1]			Sample Type[2]	Number of fish						Length (mm)		Collection Date Range		Analysis Type		
						Sex		Tissue Composite										
		Fillet or Whole Fish	Ovary	Liver		Male	Female	Fillet	Ovary	Liver	Whole Fish	Min	Max	Initial	Final	Total Metals	Total Mercury	% Moisture
Holston River Upstream (HRU)	Bluegill	JSF-FH-BG-HRU-F-20190507	JSF-FH-BG-HRU-O-20190507	JSF-FH-BG-HRU-L-20190507	N	–	6	6	6	6	–	140	163	5/7/2019	5/15/2019	x	x	x
		JSF-FH-BG-F-DUP02-20190507	JSF-FH-BG-O-DUP02-20190507	JSF-FH-BG-L-DUP02-20190507	FD	–	6	6	6	6	–	132	153	5/7/2019	5/15/2019	x	x	x
	Channel Catfish	JSF-FH-CC-HRU-F-20190430	N/A	JSF-FH-CC-HRU-L-20190430	N	–	4	4	N/A	4	–	474	521	4/30/2019	5/21/2019	x	x	x
		JSF-FH-CC-F-DUP02-20190430	JSF-FH-CC-O-DUP02-20190430	JSF-FH-CC-L-DUP02-20190430	FD / N*	2	4	6	3	6	–	575	663	4/30/2019	5/23/2019	x	x	x
	Largemouth Bass	JSF-FH-LB-HRU-F-20190409	JSF-FH-LB-HRU-O-20190409	JSF-FH-LB-HRU-L-20190409	N	–	6	6	6	6	–	420	483	4/9/2019	4/17/2019	x	x	x
		JSF-FH-LB-F-DUP02-20190409	JSF-FH-LB-O-DUP02-20190409	JSF-FH-LB-L-DUP02-20190409	FD	–	6	6	6	6	–	404	482	4/9/2019	4/17/2019	x	x	x
	Redear Sunfish	JSF-FH-RS-HRU-F-20190430	JSF-FH-RS-HRU-O-20190430	JSF-FH-RS-HRU-L-20190430	N	–	6	6	6	6	–	180	200	4/30/2019	4/30/2019	x	x	x
		JSF-FH-RS-F-DUP01-20190430	JSF-FH-RS-O-DUP01-20190430	JSF-FH-RS-L-DUP01-20190430	FD	–	6	6	6	6	–	166	201	4/30/2019	4/30/2019	x	x	x
	Gizzard Shad	JSF-FH-SH-HRU-WF-20190430	–	–	N	–	–	–	–	–	13	155	200	4/30/2019	4/30/2019	x	x	x
Holston River Adjacent 1 (HRA1)	Bluegill	JSF-FH-BG-HRA1-F-20190522	JSF-FH-BG-HRA1-O-20190522	JSF-FH-BG-HRA1-L-20190522	N	–	6	6	6	6	–	139	150	5/22/2019	6/6/2019	x	x	x
	Channel Catfish	JSF-FH-CC-HRA1-F-20190507	JSF-FH-CC-HRA1-O-20190507	JSF-FH-CC-HRA1-L-20190507	N	–	6	6	3	6	–	443	566	5/7/2019	5/22/2019	x	x	x
		JSF-FH-CC-F-DUP01-20190507	N/A	JSF-FH-CC-L-DUP01-20190507	FD	2	4	6	N/A	6	–	393	425	5/7/2019	5/22/2019	x	x	x
	Smallmouth Bass	JSF-FH-SB-HRA1-F-20190409	JSF-FH-SB-HRA1-O-20190409	JSF-FH-SB-HRA1-L-20190409	N	–	6	6	6	6	–	464	478	4/9/2019	4/9/2019	x	x	x
	Redear Sunfish	JSF-FH-RS-HRA1-F-20190515	JSF-FH-RS-HRA1-O-20190515	JSF-FH-RS-HRA1-L-20190515	N	2	2	4	2	4	–	185	211	5/15/2019	5/22/2019	x	x	x
	Gizzard Shad	JSF-FH-SH-HRA1-WF-20190430	–	–	N	–	–	–	–	–	12	170	205	4/30/2019	4/30/2019	x	x	x
Holston River Adjacent 2 (HRA2)	Bluegill	JSF-FH-BG-HRA2-F-20190507	JSF-FH-BG-HRA2-O-20190507	JSF-FH-BG-HRA2-L-20190507	N	–	6	6	4	6	–	137	161	5/7/2019	5/15/2019	x	x	x
	Channel Catfish	JSF-FH-CC-HRA2-F-20190611	N/A	JSF-FH-CC-HRA2-L-20190611	N	2	4	6	N/A	6	–	389	471	6/11/2019	6/24/2019	x	x	x
	Largemouth Bass	JSF-FH-LB-HRA2-F-20190409	JSF-FH-LB-HRA2-O-20190409	JSF-FH-LB-HRA2-L-20190409	N	–	6	6	6	6	–	385	451	4/9/2019	4/16/2019	x	x	x
	Redear Sunfish	JSF-FH-RS-HRA2-F-20190507	JSF-FH-RS-HRA2-O-20190507	JSF-FH-RS-HRA2-L-20190507	N	–	1	1	1	1	–	178	178	5/7/2019	5/7/2019	x	x	x
		JSF-FH-RS-F-DUP02-20190515	JSF-FH-RS-O-DUP02-20190515	JSF-FH-RS-L-DUP02-20190515	FD	–	1	1	1	1	–	242	242	5/15/2019	5/15/2019	x	x	x
	Gizzard Shad	JSF-FH-SH-HRA2-WF-20190430	–	–	N	–	–	–	–	–	15	160	195	4/30/2019	4/30/2019	x	x	x
		JSF-FH-SH-WF-DUP01-20190430	–	–	FD	–	–	–	–	–	15	160	195	4/30/2019	4/30/2019	x	x	x
Holston River Downstream (HRD)	Bluegill	JSF-FH-BG-HRD-F-20190507	JSF-FH-BG-HRD-O-20190507	JSF-FH-BG-HRD-L-20190507	N	–	6	6	6	6	–	157	171	5/7/2019	5/22/2019	x	x	x
		JSF-FH-BG-F-DUP01-20190507	JSF-FH-BG-O-DUP01-20190507	JSF-FH-BG-L-DUP01-20190507	FD	–	6	6	6	6	–	150	164	5/7/2019	5/22/2019	x	x	x
	Channel Catfish	JSF-FH-CC-HRD-F-20190619	N/A	JSF-FH-CC-HRD-L-20190619	N	1	2	3	N/A	3	–	398	490	6/19/2019	6/19/2019	x	x	x
	Largemouth Bass	JSF-FH-LB-HRD-F-20190410	JSF-FH-LB-HRD-O-20190410	JSF-FH-LB-HRD-L-20190410	N	–	6	6	6	6	–	425	519	4/10/2019	4/16/2019	x	x	x
		JSF-FH-LB-F-DUP01-20190410	JSF-FH-LB-O-DUP01-20190410	JSF-FH-LB-L-DUP01-20190410	FD	–	6	6	6	6	–	390	470	4/10/2019	4/16/2019	x	x	x
	Redear Sunfish	JSF-FH-RS-HRD-F-20190430	JSF-FH-RS-HRD-O-20190430	JSF-FH-RS-HRD-L-20190430	N	–	6	6	6	6	–	174	218	4/30/2019	5/7/2019	x	x	x
	Gizzard Shad	JSF-FH-SH-HRD-WF-20190430	–	–	N	–	–	–	–	–	15	160	180	4/30/2019	4/30/2019	x	x	x

Notes:

Total Metals	SW-846 Method 6020A
Total Mercury	SW-846 Method 7473
% Moisture	ASTM D2974-87
–	measurement or observation not applicable
ID	Identification
mm	millimeter
N/A	tissue not analyzed / not available

1. Sample Naming Convention
   Sample Naming Convention for Normal Environmental Samples: Plant Acronym - Matrix Acronym - Species Acronym - Sampling Reach Identifier - Tissue Identifier - yyyymmdd
   Sample Naming Convention for Duplicate Samples: Plant Acronym - Matrix Acronym - Species Acronym - Tissue Identifier - Duplicate Number - yyyymmdd
   Species Acronym: BG=Bluegill, CC=Channel Catfish, LB=Largemouth Bass, SB=Smallmouth Bass, RS=Redear Sunfish, SH=Shad
   Tissue Identifier: F=Fillet, O=Ovary, L=Liver, WF=Whole Fish
   Sample date (yyyymmdd) is the earliest collection date among the fish contributing to a composite.
2. Sample Type: N=Normal Environmental Sample, FD=Field Duplicate; N*=ovary tissue sample *JSF-FH-CC-O-DUP02-20190430* is designated as a Normal Environmental Sample because it does not have an associated parent sample.

TABLE B.3 – Fish Measurements and Observations
John Sevier Fossil Plant
April - July 2019

Sampling Reach	Species	Sample IDs[1]	Sample Type[2]	Sample Date	Fish Length[3] (mm)	Fish Weight[4] (g)	Sex	Tissue Weights[5,6,7] Left Fillet Lab (g)	Right Fillet Archive (g)	Ovary Lab (g)	Ovary Archive (g)	Ovary Total (g)	Liver Lab (g)	Liver Archive (g)	Liver Total (g)	Abnormality[8]
Holston River Upstream (HRU)	Bluegill	JSF-FH-BG-HRU-F-20190507 JSF-FH-BG-HRU-O-20190507 JSF-FH-BG-HRU-L-20190507	N N N	5/7/2019	163	105.3	F	16.2	18.7	3.8	2.5	6.3	2.0	–	2.0	none
				5/7/2019	143	66.0	F	9.5	11.5	2.3	2.6	4.9	1.0	–	1.0	none
				5/7/2019	140	57.1	F	11.6	10.3	1.2	1.3	2.5	0.9	–	0.9	none
				5/15/2019	155	94.3	F	15.0	16.4	4.5	3.1	7.6	1.3	–	1.3	none
				5/15/2019	147	75.1	F	12.8	12.8	4.3	5.1	9.4	1.7	–	1.7	none
				5/15/2019	145	71.7	F	11.9	11.1	4.0	2.7	6.7	1.2	–	1.2	none
		JSF-FH-BG-F-DUP02-20190507 JSF-FH-BG-O-DUP02-20190507 JSF-FH-BG-L-DUP02-20190507	FD FD FD	5/7/2019	153	79.4	F	13.4	13.0	3.4	3.5	6.9	1.2	–	1.2	none
				5/7/2019	133	52.5	F	9.9	9.4	1.7	1.2	2.9	0.7	–	0.7	none
				5/7/2019	132	47.9	F	7.7	7.6	1.9	1.6	3.5	0.7	–	0.7	none
				5/15/2019	145	77.4	F	13.2	12.7	3.9	3.4	7.3	1.0	–	1.0	none
				5/15/2019	144	81.8	F	13.6	12.8	4.9	3.6	8.5	1.0	–	1.0	none
				5/15/2019	141	65.2	F	12.7	11.4	2.6	2.1	4.7	1.2	–	1.2	none
Holston River Adjacent 1 (HRA1)	Bluegill	JSF-FH-BG-HRA1-F-20190522 JSF-FH-BG-HRA1-O-20190522 JSF-FH-BG-HRA1-L-20190522	N N N	5/22/2019	150	75.2	F	12.4	13.1	3.5	2.4	5.9	1.0	–	1.0	none
				5/22/2019	145	64.6	F	8.7	8.3	2.5	2.2	4.7	0.9	–	0.9	none
				5/22/2019	139	67.4	F	8.9	8.4	3.5	4.4	7.9	0.9	–	0.9	none
				5/22/2019	140	59.7	F	10.4	10.4	2.7	2.6	5.3	0.8	–	0.8	none
				5/22/2019	142	57.7	F	10.5	10.5	1.3	1.1	2.4	0.6	–	0.6	none
				6/6/2019	145	69.0	F	11.5	11.9	1.7	1.8	3.5	0.9	–	0.9	none
Holston River Adjacent 2 (HRA2)	Bluegill	JSF-FH-BG-HRA2-F-20190507 JSF-FH-BG-HRA2-O-20190507 JSF-FH-BG-HRA2-L-20190507	N N N	5/7/2019	161	86.9	F	15.1	14.9	1.9	1.5	3.4	1.8	–	1.8	none
				5/7/2019	149	64.8	F	10.2	11.2	1.0	0.8	1.8	1.3	–	1.3	none
				5/7/2019	137	50.9	F	7.0	7.7	1.4	1.3	2.7	0.9	–	0.9	none
				5/15/2019	153	90.5	F	14.7	13.8	4.9	3.0	7.9	1.6	–	1.6	none
				5/15/2019	150	71.5	F	13.8	14.2	IM	IM	IM	1.0	–	1.0	none
				5/15/2019	148	70.6	F	13.5	13.7	IM	IM	IM	0.9	–	0.9	none
Holston River Downstream (HRD)	Bluegill	JSF-FH-BG-HRD-F-20190507 JSF-FH-BG-HRD-O-20190507 JSF-FH-BG-HRD-L-20190507	N N N	5/7/2019	165	101.5	F	18.2	16.6	3.2	3.2	6.4	1.6	–	1.6	none
				5/7/2019	163	94.2	F	16.4	16.5	3.8	2.6	6.4	1.8	–	1.8	none
				5/7/2019	158	86.4	F	13.4	13.7	3.0	3.6	6.6	1.7	–	1.7	none
				5/7/2019	157	77.5	F	13.1	12.6	1.6	2.1	3.7	1.1	–	1.1	none
				5/15/2019	171	109.5	F	18.1	19.4	3.6	3.2	6.8	2.3	–	2.3	none
				5/22/2019	163	93.1	F	14.2	14.8	3.6	3.5	7.1	1.9	–	1.9	none
		JSF-FH-BG-F-DUP01-20190507 JSF-FH-BG-O-DUP01-20190507 JSF-FH-BG-L-DUP01-20190507	FD FD FD	5/7/2019	158	92.5	F	18.8	17.7	3.4	2.2	5.6	1.6	–	1.6	none
				5/7/2019	150	73.8	F	14.1	14.6	3.2	2.3	5.5	1.2	–	1.2	none
				5/7/2019	150	76.6	F	14.1	15.2	2.4	1.7	4.1	0.9	–	0.9	none
				5/15/2019	164	117.8	F	19.9	19.0	5.2	6.5	11.7	2.1	–	2.1	none
				5/22/2019	153	87.1	F	12.8	12.2	3.1	3.0	6.1	1.8	–	1.8	none
				5/22/2019	157	82.7	F	12.8	13.7	2.7	2.6	5.3	1.5	–	1.5	none

See notes on last page.

TABLE B.3 – Fish Measurements and Observations
John Sevier Fossil Plant
April - July 2019

Sampling Reach	Species	Sample IDs[1]	Sample Type[2]	Sample Date	Fish Length[3] (mm)	Fish Weight[4] (g)	Sex	Tissue Weights[5,6,7]								Abnormality[8]
								Left Fillet Lab (g)	Right Fillet Archive (g)	Ovary Lab (g)	Ovary Archive (g)	Ovary Total (g)	Liver Lab (g)	Liver Archive (g)	Liver Total (g)	
Holston River Upstream (HRU)	Channel Catfish	JSF-FH-CC-HRU-F-20190430 JSF-FH-CC-HRU-L-20190430	N N	4/30/2019	521	1478	F	270.6	263.9	IM	IM	IM	16.2	13.2	29.4	none
				5/7/2019	485	1070	F	229.5	211.7	IM	IM	IM	9.8	11.3	21.1	none
				5/7/2019	474	1041	F	175.3	188.9	IM	IM	IM	12.5	8.9	21.4	none
				5/21/2019	500	1448	F	271.1	270.2	IM	IM	IM	12.5	12.0	24.5	none
		JSF-FH-CC-F-DUP02-20190430 JSF-FH-CC-O-DUP02-20190430 JSF-FH-CC-L-DUP02-20190430	FD N* FD	4/30/2019	610	2884	F	472.8	492.4	120.3	112.3	232.6	41.9	31.7	73.6	none
				4/30/2019	575	2600	F	498.6	487.3	138.1	125.8	263.9	38.3	30.4	68.7	none
				5/7/2019	642	1848	M	192.8	188.5	–	–	–	20.2	14.2	34.4	Skinny
				5/7/2019	595	2212	M	439.2	444.4	–	–	–	15.9	17.6	33.5	none
				5/21/2019	663	3430	F	584.7	603.0	IM	IM	IM	29.0	27.9	56.9	none
				5/23/2019	604	2576	F	415.3	415.1	169.5	152.3	321.8	25.1	20.2	45.3	none
Holston River Adjacent 1 (HRA1)	Channel Catfish	JSF-FH-CC-HRA1-F-20190507 JSF-FH-CC-HRA1-O-20190507 JSF-FH-CC-HRA1-L-20190507	N N N	5/7/2019	445	810	F	139.1	128.6	19.6	20.3	39.9	8.9	9.8	18.7	none
				5/15/2019	497	1296	F	206.0	215.8	79.1	82.9	162.0	16.9	15.8	32.7	none
				5/15/2019	566	1768	F	335.7	336.8	77.9	65.6	143.5	20.9	13.9	34.8	none
				5/22/2019	480	1022	F	191.7	178.9	IM	IM	IM	12.2	6.4	18.6	none
				5/22/2019	476	938	F	174.1	182.4	IM	IM	IM	8.7	7.1	15.8	none
				5/22/2019	443	840	F	146.5	146.3	IM	IM	IM	11.1	6.8	17.9	none
		JSF-FH-CC-F-DUP01-20190507 JSF-FH-CC-L-DUP01-20190507	FD FD	5/7/2019	425	728	M	136.5	136.9	–	–	–	8.9	6.7	15.6	none
				5/7/2019	422	714	F	133.1	125.6	IM	IM	IM	9.7	6.6	16.3	none
				5/7/2019	420	746	M	123.2	121.1	–	–	–	6.3	5.6	11.9	none
				5/15/2019	416	680	F	112.3	112.4	IM	IM	IM	10.2	7.8	18.0	none
				5/22/2019	413	644	F	96.4	103.1	IM	IM	IM	6.0	6.3	12.3	none
				5/22/2019	393	606	F	99.9	93.6	IM	IM	IM	9.2	6.4	15.6	none
Holston River Adjacent 2 (HRA2)	Channel Catfish	JSF-FH-CC-HRA2-F-20190611 JSF-FH-CC-HRA2-L-20190611	N N	6/11/2019	389	520	M	89.8	81.3	–	–	–	3.7	3.6	7.3	none
				6/13/2019	463	914	F	162.3	170.8	IM	IM	IM	8.4	7.0	15.4	none
				6/13/2019	418	708	F	127.8	118.9	IM	IM	IM	5.3	4.9	10.2	none
				6/18/2019	400	654	F	113.7	110.8	IM	IM	IM	6.0	5.8	11.8	none
				6/18/2019	429	696	M	120.3	124.5	–	–	–	4.0	4.4	8.4	none
				6/24/2019	471	1010	F	161.8	151.7	IM	IM	IM	6.6	10.8	17.4	none
Holston River Downstream (HRD)	Channel Catfish	JSF-FH-CC-HRD-F-20190619 JSF-FH-CC-HRD-L-20190619	N N	6/19/2019	490	1174	F	203.3	212.1	IM	IM	IM	9.6	7.9	17.5	Blind eye
				6/19/2019	440	744	M	136.2	140.3	–	–	–	4.5	4.0	8.5	none
				6/19/2019	398	434	F	83.7	81.1	IM	IM	IM	3.3	2.8	6.1	none

See notes on last page.

TABLE B.3 – Fish Measurements and Observations
John Sevier Fossil Plant
April - July 2019

Sampling Reach	Species	Sample IDs[1]	Sample Type[2]	Sample Date	Fish Length[3] (mm)	Fish Weight[4] (g)	Sex	Tissue Weights[5,6,7] Left Fillet Lab (g)	Right Fillet Archive (g)	Ovary Lab (g)	Ovary Archive (g)	Ovary Total (g)	Liver Lab (g)	Liver Archive (g)	Liver Total (g)	Abnormality[8]
Holston River Upstream (HRU)	Largemouth Bass	JSF-FH-LB-HRU-F-20190409 JSF-FH-LB-HRU-O-20190409 JSF-FH-LB-HRU-L-20190409	N N N	4/9/2019	456	1454	F	219.3	209.0	43.5	60.6	104.1	9.1	11.8	20.9	none
				4/9/2019	420	1174	F	174.5	156.8	36.6	35.8	72.4	14.6	11.3	25.9	none
				4/9/2019	483	1744	F	277.0	290.4	42.1	43.8	85.9	17.5	14.5	32.0	none
				4/17/2019	433	1281	F	213.5	224.9	30.5	35.0	65.5	9.6	11.1	20.7	none
				4/17/2019	461	1858	F	318.5	311.5	55.8	51.2	107.0	16.8	12.9	29.7	none
				4/17/2019	470	1765	F	315.4	293.8	51.6	50.2	101.8	17.2	15.8	33.0	none
		JSF-FH-LB-F-DUP02-20190409 JSF-FH-LB-O-DUP02-20190409 JSF-FH-LB-L-DUP02-20190409	FD FD FD	4/9/2019	433	1302	F	199.4	214.4	25.4	28.9	54.3	13.6	10.5	24.1	none
				4/9/2019	417	1042	F	179.9	175.2	33.1	31.7	64.8	7.8	8.0	15.8	none
				4/9/2019	482	1786	F	303.1	274.9	52.5	52.5	105.0	16.7	14.5	31.2	none
				4/9/2019	404	1004	F	140.5	143.4	24.7	29.7	54.4	7.5	8.1	15.6	none
				4/17/2019	439	1306	F	204.6	209.0	30.5	31.4	61.9	11.7	7.9	19.6	none
				4/17/2019	425	1161	F	209.7	196.2	23.2	26.6	49.8	7.7	5.0	12.7	none
Holston River Adjacent 1 (HRA1)	Smallmouth Bass	JSF-FH-SB-HRA1-F-20190409 JSF-FH-SB-HRA1-O-20190409 JSF-FH-SB-HRA1-L-20190409	N N N	4/9/2019	478	1574	F	220.0	233.6	79.5	91.0	170.5	11.5	9.6	21.1	none
				4/9/2019	474	1428	F	226.2	226.2	87.6	69.4	157.0	8.1	9.4	17.5	none
				4/9/2019	468	1408	F	221.1	228.2	45.9	72.7	118.6	8.0	9.0	17.0	none
				4/9/2019	468	1384	F	215.0	225.2	52.6	58.7	111.3	6.5	5.4	11.9	none
				4/9/2019	464	1478	F	248.3	229.5	70.6	60.4	131.0	8.0	6.2	14.2	none
				4/9/2019	473	1490	F	242.2	240.8	52.5	66.5	119.0	7.8	10.0	17.8	none
Holston River Adjacent 2 (HRA2)	Largemouth Bass	JSF-FH-LB-HRA2-F-20190409 JSF-FH-LB-HRA2-O-20190409 JSF-FH-LB-HRA2-L-20190409	N N N	4/9/2019	385	1018	F	144.9	168.2	26.9	29.3	56.2	8.4	6.0	14.4	none
				4/16/2019	440	1098	F	189.9	181.8	22.4	25.5	47.9	7.4	7.7	15.1	none
				4/16/2019	442	1300	F	236.9	244.6	27.8	19.5	47.3	10.9	6.2	17.1	none
				4/16/2019	451	1260	F	222.2	214.7	35.4	36.5	71.9	5.2	6.5	11.7	none
				4/16/2019	409	996	F	181.6	172.3	25.1	26.3	51.4	6.7	8.4	15.1	none
				4/16/2019	435	1112	F	191.7	193.9	31.9	36.9	68.8	10.4	7.4	17.8	none
Holston River Downstream (HRD)	Largemouth Bass	JSF-FH-LB-HRD-F-20190410 JSF-FH-LB-HRD-O-20190410 JSF-FH-LB-HRD-L-20190410	N N N	4/10/2019	473	1608	F	229.4	214.2	47.9	50.0	97.9	8.5	13.6	22.1	none
				4/10/2019	448	1454	F	258.2	245.7	41.5	37.9	79.4	10.4	5.2	15.6	none
				4/10/2019	450	1378	F	245.4	223.0	43.4	41.1	84.5	14.7	13.6	28.3	none
				4/16/2019	519	2195	F	356.8	361.4	47.0	29.4	76.4	11.2	14.0	25.2	none
				4/16/2019	488	1872	F	287.7	303.6	41.8	49.3	91.1	17.8	12.2	30.0	none
				4/16/2019	425	1170	F	193.6	205.3	25.4	24.4	49.8	6.9	9.7	16.6	none
		JSF-FH-LB-F-DUP01-20190410 JSF-FH-LB-O-DUP01-20190410 JSF-FH-LB-L-DUP01-20190410	FD FD FD	4/10/2019	470	1644	F	278.1	261.9	40.8	33.9	74.7	7.7	14.0	21.7	none
				4/10/2019	460	1682	F	302.6	273.8	71.5	60.6	132.1	15.1	9.5	24.6	none
				4/16/2019	442	1636	F	262.2	273.0	29.2	31.6	60.8	11.4	16.4	27.8	none
				4/16/2019	430	1324	F	246.3	249.5	43.0	40.6	83.6	12.7	8.9	21.6	none
				4/16/2019	420	1158	F	172.2	182.8	26.6	26.9	53.5	9.0	5.9	14.9	none
				4/16/2019	390	982	F	168.3	175.0	36.6	38.6	75.2	7.9	13.7	21.6	none

See notes on last page.

TABLE B.3 – Fish Measurements and Observations
John Sevier Fossil Plant
April - July 2019

Sampling Reach	Species	Sample IDs[1]	Sample Type[2]	Sample Date	Fish Length[3] (mm)	Fish Weight[4] (g)	Sex	Tissue Weights[5,6,7] Left Fillet Lab (g)	Right Fillet Archive (g)	Ovary Lab (g)	Ovary Archive (g)	Ovary Total (g)	Liver Lab (g)	Liver Archive (g)	Liver Total (g)	Abnormality[8]
Holston River Upstream (HRU)	Redear Sunfish	JSF-FH-RS-HRU-F-20190430 JSF-FH-RS-HRU-O-20190430 JSF-FH-RS-HRU-L-20190430	N N N	4/30/2019	200	184.1	F	31.7	32.0	8.5	6.1	14.6	3.5	–	3.5	none
				4/30/2019	199	180.7	F	27.3	25.1	10.6	8.0	18.6	2.5	–	2.5	none
				4/30/2019	200	187.5	F	26.3	25.7	6.3	6.0	12.3	4.5	–	4.5	none
				4/30/2019	196	158.6	F	22.9	23.7	7.6	7.2	14.8	3.7	–	3.7	none
				4/30/2019	189	136.0	F	24.0	23.7	4.4	3.9	8.3	2.4	–	2.4	none
				4/30/2019	180	120.3	F	19.6	19.2	5.6	2.6	8.2	2.8	–	2.8	none
		JSF-FH-RS-F-DUP01-20190430 JSF-FH-RS-O-DUP01-20190430 JSF-FH-RS-L-DUP01-20190430	FD FD FD	4/30/2019	200	167.7	F	22.2	22.6	6.9	6.6	13.5	3.0	–	3.0	none
				4/30/2019	185	131.4	F	20.6	21.6	5.6	8.1	13.7	2.1	–	2.1	none
				4/30/2019	201	187.8	F	31.9	30.5	12.3	8.0	20.3	4.0	–	4.0	none
				4/30/2019	200	173.8	F	25.4	22.7	10.8	10.1	20.9	4.3	–	4.3	none
				4/30/2019	166	103.4	F	15.8	16.5	5.6	4.5	10.1	2.3	–	2.3	none
				4/30/2019	166	96.2	F	16.0	16.9	3.2	1.9	5.1	1.9	–	1.9	none
Holston River Adjacent 1 (HRA1)	Redear Sunfish	JSF-FH-RS-HRA1-F-20190515 JSF-FH-RS-HRA1-O-20190515 JSF-FH-RS-HRA1-L-20190515	N N N	5/15/2019	211	193.0	M	37.9	36.7	–	–	–	1.8	–	1.8	none
				5/15/2019	185	124.3	M	20.4	22.1	–	–	–	1.2	–	1.2	none
				5/22/2019	187	131.1	F	18.0	17.2	9.3	8.7	18.0	1.5	–	1.5	none
				5/22/2019	190	126.8	F	19.9	21.4	3.5	3.3	6.8	1.0	–	1.0	none
Holston River Adjacent 2 (HRA2)	Redear Sunfish	JSF-FH-RS-HRA2-F-20190507 JSF-FH-RS-HRA2-O-20190507 JSF-FH-RS-HRA2-L-20190507	N N N	5/7/2019	178	137.5	F	23.1	21.4	8.4	4.8	13.2	2.9	–	2.9	none
		JSF-FH-RS-F-DUP02-20190515 JSF-FH-RS-O-DUP02-20190515 JSF-FH-RS-L-DUP02-20190515	FD FD FD	5/15/2019	242	251.2	F	35.0	37.6	12.0	9.3	21.3	5.2	–	5.2	none
Holston River Downstream (HRD)	Redear Sunfish	JSF-FH-RS-HRD-F-20190430 JSF-FH-RS-HRD-O-20190430 JSF-FH-RS-HRD-L-20190430	N N N	4/30/2019	174	115.0	F	14.0	14.9	6.2	4.6	10.8	3.4	–	3.4	none
				5/7/2019	218	219.8	F	28.1	31.2	11.2	9.2	20.4	2.1	–	2.1	none
				5/7/2019	194	167.0	F	24.8	26.9	8.6	9.0	17.6	3.3	–	3.3	none
				5/7/2019	194	164.3	F	24.5	25.1	12.0	10.8	22.8	3.3	–	3.3	none
				5/7/2019	175	120.2	F	19.3	20.6	7.1	5.0	12.1	3.0	–	3.0	none
				5/7/2019	191	121.3	F	21.9	19.7	5.1	5.2	10.3	1.6	–	1.6	none

See notes on last page.

TABLE B.3 – Fish Measurements and Observations
John Sevier Fossil Plant
April - July 2019

Sampling Reach	Species	Sample IDs[1]	Sample Type[2]	Sample Date	Fish Length[3] (mm)	Fish Weight[4] (g)	Sex	Tissue Weights[5,6,7] Left Fillet Lab (g)	Right Fillet Archive (g)	Ovary Lab (g)	Ovary Archive (g)	Ovary Total (g)	Liver Lab (g)	Liver Archive (g)	Liver Total (g)	Abnormality[8]
Holston River Upstream (HRU)	Gizzard Shad	JSF-FH-SH-HRU-WF-20190430	N	4/30/2019	155-200 (13)	696	–	–	–	–	–	–	–	–	–	none
Holston River Adjacent 1 (HRA1)	Gizzard Shad	JSF-FH-SH-HRA1-WF-20190430	N	4/30/2019	170-205 (12)	856	–	–	–	–	–	–	–	–	–	none
Holston River Adjacent 2 (HRA2)	Gizzard Shad	JSF-FH-SH-HRA2-WF-20190430	N	4/30/2019	160-195 (15)	868	–	–	–	–	–	–	–	–	–	none
		JSF-FH-SH-WF-DUP01-20190430	FD	4/30/2019	160-195 (15)	850	–	–	–	–	–	–	–	–	–	none
Holston River Downstream (HRD)	Gizzard Shad	JSF-FH-SH-HRD-WF-20190430	N	4/30/2019	160-180 (15)	833	–	–	–	–	–	–	–	–	–	none

Notes:

–	measurement or observation not applicable
g	gram
mm	millimeter
ID	Identification
IM	immature eggs/ovaries or fish had spawned

1. Sample Naming Convention
   Sample Naming Convention for Normal Samples (N): Plant Acronym - Matrix Acronym - Species Acronym - Sampling Reach Identifier - Tissue Identifier - yyyymmdd
   Sample Naming Convention for Field Duplicate Samples (FD): Plant Acronym - Matrix Acronym - Species Acronym - Tissue Identifier - Duplicate Number - yyyymmdd
   Species Acronym: BG=Bluegill, CC=Channel Catfish, LB=Largemouth Bass, SB=Smallmouth Bass, RS=Redear Sunfish, SH=Shad
   Tissue Identifier: F=Fillet, O=Ovary, L=Liver, WF=Whole Fish
   Sample date (yyyymmdd) is the earliest collection date among the fish contributing to a composite.
2. Sample Type: N=Normal Environmental Sample, FD=Field Duplicate; N*=ovary tissue sample *JSF-FH-CC-O-DUP02-20190430* is designated as a Normal Environmental Sample because it does not have an associated parent sample.
3. Fish length for gizzard shad is the range (minimum and maximum) in total length for fish included in a composite sample. The parenthetical number denotes the number of fish included in a composite sample.
4. Fish weight for gizzard shad is the total weight of the fish composite sample.
5. Tissues denoted as Lab were allocated to a composite sample for analytical analysis.
6. Tissues denoted as Archive were retained as individual samples and archived for potential future analysis, if needed.
7. Livers from bluegill and redear sunfish were retained whole and allocated to a composite sample for analytical analysis.
8. Fish were observed for abnormalities, such as scoliosis, blind eye, parasites, fungus, or lesions.

TABLE B.4 – Fish Tissue Analytical Results
John Sevier Fossil Plant
April - July 2019

Species	Sampling Reach ID [1]	Sample Date [2]	Sample ID	Parent Sample ID	Sample Type [3]	Level of Review [4]	Moisture	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Lead	Lithium	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Vanadium	Zinc
							%	mg/kg wet weight																				
Bluegill	HRU	5/7/2019	JSF-FH-BG-HRU-F-20190507		N	Final-Verified	81.0	<0.020	<0.029	<0.029	<0.032	<0.66	<0.010	400 J	<0.084	<0.018	<0.27	<0.029	<0.020	0.18 J	<0.034	<0.039	0.35	<0.011	0.34 J	<0.012	<0.032	5.8
			JSF-FH-BG-HRU-O-20190507		N	Final-Verified	64.5	<0.019	0.049 J	0.16	<0.031	<0.65	<0.010	147 J	<0.082	0.042 J	1.4	<0.028	<0.020	0.0095 U*	0.041 J	0.046 U*	1.1	<0.010	0.31 J	<0.012	<0.031	31.8
			JSF-FH-BG-HRU-L-20190507		N	Final-Verified	76.4	<0.019	0.14	0.057 J	<0.030	<0.64	0.15	107 U*	<0.081	0.15	1.3	<0.028	<0.019	0.20	0.19	0.039 U*	1.6	<0.010	<0.15	0.021 J	0.064 J	22.2
		5/7/2019	JSF-FH-BG-F-DUP02-20190507	JSF-FH-BG-HRU-F-20190507	FD	Final-Verified	80.1	<0.021	0.033 J	<0.030	<0.032	<0.68	<0.011	410 J	<0.086	<0.019	<0.28	<0.029	<0.021	0.21 J	<0.035	<0.040	0.36	<0.011	0.32 J	<0.013	<0.033	6.4
			JSF-FH-BG-O-DUP02-20190507	JSF-FH-BG-HRU-O-20190507	FD	Final-Verified	65.5	<0.021	0.075 J	0.17	<0.033	<0.69	<0.011	117 U*	0.087 UJ	0.055 J	1.5	<0.030	<0.021	0.022 U*	0.062 J	<0.040	1.5	<0.011	0.29 J	<0.013	<0.033	31.6
			JSF-FH-BG-L-DUP02-20190507	JSF-FH-BG-HRU-L-20190507	FD	Final-Verified	78.1	<0.021	0.21	0.037 J	<0.033	<0.69	0.14	106 U*	<0.087	0.28	1.5	<0.029	<0.021	0.21	0.19	0.043 U*	2.4	<0.011	<0.16	0.018 J	0.080 J	23.7
	HRA1	5/22/2019	JSF-FH-BG-HRA1-F-20190522		N	Final-Verified	80.4	<0.021	0.062 J	<0.031	<0.033	<0.70	0.019 J	242 J	<0.088	<0.019	0.38 J	<0.030	<0.021	0.043 J	<0.036	<0.041	0.23	<0.011	0.18 J	<0.013	<0.033	5.6
			JSF-FH-BG-HRA1-O-20190522		N	Final-Verified	67.4	<0.019	0.064 J	0.079 J	<0.031	<0.64	<0.010	154 J	<0.082	0.036 J	1.1	<0.028	<0.020	0.011 U*	0.044 J	<0.038	0.83	<0.010	0.24 J	<0.012	<0.031	25.5
			JSF-FH-BG-HRA1-L-20190522		N	Final-Verified	78.4	<0.021	0.15	0.043 J	<0.033	<0.70	0.041 J	122 U*	<0.088	0.18	1.4	<0.030	<0.021	0.091	0.17	<0.041	1.0	<0.011	<0.16	<0.013	0.065 J	23.3
	HRA2	5/7/2019	JSF-FH-BG-HRA2-F-20190507		N	Final-Verified	81.2	<0.020	0.037 J	<0.029	<0.032	<0.67	<0.011	170 J	0.16 J	<0.018	<0.27	<0.029	<0.020	0.21 J	<0.034	0.065 U*	0.40	<0.011	<0.15	<0.012	<0.032	6.1
			JSF-FH-BG-HRA2-O-20190507		N	Final-Verified	69.4	<0.020	0.044 J	0.31	<0.032	<0.68	<0.011	131 U*	<0.086	0.052 J	1.1	<0.029	<0.021	0.016 U*	0.059 J	<0.040	1.9	<0.011	0.34 J	<0.013	<0.032	30.7
			JSF-FH-BG-HRA2-L-20190507		N	Final-Verified	77.9	<0.019	0.11	0.050 J	<0.030	<0.64	0.13	133 U*	0.081 UJ	0.20	1.4	<0.028	<0.020	0.089	0.16	0.042 U*	2.8	<0.010	0.15 J	0.025 J	0.10 J	20.6
	HRD	5/7/2019	JSF-FH-BG-HRD-F-20190507		N	Final-Verified	81.6	<0.020	0.039 J	<0.030	<0.032	<0.67	<0.011	348 J	<0.085	<0.018	<0.27	<0.029	<0.021	0.19 J	<0.035	<0.040	0.29	<0.011	0.31 J	<0.013	<0.032	5.7
			JSF-FH-BG-HRD-O-20190507		N	Final-Verified	66.8	<0.020	0.059 J	0.20	<0.031	<0.65	<0.010	138 J	<0.082	0.067 J	1.0	<0.028	<0.020	0.013 U*	0.046 J	<0.038	1.3	<0.010	0.35 J	<0.012	<0.031	33.1
			JSF-FH-BG-HRD-L-20190507		N	Final-Verified	78.4	<0.019	0.12	0.031 J	<0.030	<0.64	0.13	75.0 U*	<0.081	0.22	1.5	<0.027	<0.019	0.10	0.16	<0.038	1.8	<0.010	<0.15	0.023 J	0.12	22.0
		5/7/2019	JSF-FH-BG-F-DUP01-20190507	JSF-FH-BG-HRD-F-20190507	FD	Final-Verified	82.0	<0.020	<0.029	<0.029	<0.032	<0.67	<0.010	150 J	<0.085	<0.018	<0.27	<0.029	<0.020	0.21 J	<0.034	<0.039	0.29	<0.011	<0.15	<0.012	<0.032	6.5
			JSF-FH-BG-O-DUP01-20190507	JSF-FH-BG-HRD-O-20190507	FD	Final-Verified	66.1	<0.020	0.048 J	0.15	<0.031	<0.65	<0.010	134 U*	<0.083	0.049 J	1.3	<0.028	<0.020	0.018 U*	0.039 J	<0.038	1.0	<0.010	0.36 J	<0.012	<0.031	30.5
			JSF-FH-BG-L-DUP01-20190507	JSF-FH-BG-HRD-L-20190507	FD	Final-Verified	78.5	<0.020	0.14	0.034 J	<0.032	<0.67	0.13	78.5 U*	<0.085	0.17	1.4	<0.029	<0.020	0.12	0.17	0.040 U*	1.6	<0.011	<0.15	0.016 J	0.12	23.8
Channel Catfish	HRU	4/30/2019	JSF-FH-CC-HRU-F-20190430		N	Final-Verified	76.7	<0.021	0.048 J	<0.030	<0.033	<0.69	<0.011	75.0 U*	<0.087	0.042 J	<0.28	<0.030	<0.021	0.23 J	<0.035	<0.041	0.18	<0.011	<0.16	<0.013	<0.033	5.1
			JSF-FH-CC-HRU-L-20190430		N	Final-Verified	80.4	<0.020	0.043 J	<0.030	<0.032	<0.68	0.027 J	51.2 U*	<0.086	0.18	2.2	0.045 U*	<0.021	0.26 J	0.18	<0.040	1.5	<0.011	<0.16	<0.013	0.20	25.6
		4/30/2019	JSF-FH-CC-F-DUP02-20190430	JSF-FH-CC-HRU-F-20190430	FD	Final-Verified	77.9	<0.020	<0.029	<0.029	<0.032	<0.66	<0.010	67.5 U*	<0.084	0.021 J	0.32 J	<0.029	<0.020	0.42 J	<0.034	<0.039	0.16 J	<0.011	<0.15	<0.012	<0.032	6.0
			JSF-FH-CC-O-DUP02-20190430	N/A	N*	Final-Verified	59.9	<0.020	<0.029	0.19	<0.031	<0.66	<0.010	1,060 J	<0.084	0.065 J	1.1	<0.028	<0.020	0.031 J	<0.034	0.10 U*	0.90	<0.011	1.3	<0.012	<0.032	38.4
			JSF-FH-CC-L-DUP02-20190430	JSF-FH-CC-HRU-L-20190430	FD	Final-Verified	81.5	<0.020	0.036 J	<0.029	<0.031	<0.65	0.029 J	49.0 U*	<0.083	0.11	1.8	0.050 U*	<0.020	1.0 J	0.16	<0.039	1.3	<0.011	<0.15	<0.012	0.27	21.2
	HRA1	5/7/2019	JSF-FH-CC-HRA1-F-20190507		N	Final-Verified	80.6	<0.021	<0.030	<0.030	<0.033	<0.69	<0.011	74.6 U*	<0.087	<0.019	<0.28	<0.030	<0.021	0.25 J	<0.035	<0.041	0.13 J	<0.011	<0.16	<0.013	<0.033	5.4
			JSF-FH-CC-HRA1-O-20190507		N	Final-Verified	58.2	<0.021	<0.030	0.13	<0.033	<0.70	<0.011	945 J	<0.088	0.068 J	1.0	<0.030	<0.021	0.021 J	<0.036	<0.041	0.89	<0.011	1.6	<0.013	<0.033	46.0
			JSF-FH-CC-HRA1-L-20190507		N	Final-Verified	80.4	<0.020	<0.029	<0.029	<0.031	<0.66	0.024 J	47.9 U*	<0.084	0.12	1.6	0.053 U*	<0.020	0.37 J	0.13	<0.039	1.1	<0.011	<0.15	<0.012	0.21	21.0
		5/7/2019	JSF-FH-CC-F-DUP01-20190507	JSF-FH-CC-HRA1-F-20190507	FD	Final-Verified	80.4	<0.020	<0.029	<0.030	<0.032	<0.68	<0.011	77.5 U*	<0.086	0.026 J	0.34 J	<0.029	<0.021	0.25 J	<0.035	<0.040	0.13 J	<0.011	<0.16	<0.013	<0.032	5.7
			JSF-FH-CC-L-DUP01-20190507	JSF-FH-CC-HRA1-L-20190507	FD	Final-Verified	79.9	<0.020	0.030 J	<0.028	<0.031	<0.65	0.053 J	35.1 U*	<0.082	0.16	2.3	0.079 U*	<0.020	0.44 J	0.15	<0.038	1.3	<0.010	<0.15	0.012 J	0.40	22.4
	HRA2	6/11/2019	JSF-FH-CC-HRA2-F-20190611		N	Final-Verified	81.0	<0.020	<0.029	<0.029	<0.032	<0.67	<0.011	156 J	<0.085	0.024 J	<0.27	<0.029	<0.020	0.19 J	<0.034	<0.039	0.15 J	<0.011	0.16 J	<0.012	<0.032	6.1
			JSF-FH-CC-HRA2-L-20190611		N	Final-Verified	80.7	<0.020	0.064 J	<0.029	<0.031	<0.66	0.077 J	48.4 U*	<0.084	0.18	2.4	0.11 U*	<0.020	0.43 J	0.19	<0.039	1.4	<0.011	<0.15	<0.012	0.62	24.3
	HRD	6/19/2019	JSF-FH-CC-HRD-F-20190619		N	Final-Verified	79.6	<0.021	0.083 J	<0.031	<0.033	<0.70	0.039 J	96.3 U*	<0.088	<0.019	0.72 J	<0.030	<0.021	0.070 J	<0.036	0.39 U*	0.17	<0.011	<0.16	<0.013	<0.033	6.3
			JSF-FH-CC-HRD-L-20190619		N	Final-Verified	78.8	<0.021	0.079 J	0.031 J	<0.033	<0.69	0.092 J	80.1 U*	<0.087	0.20	2.9	0.20	<0.021	0.74 J	0.27	<0.040	1.4	<0.011	<0.16	<0.013	0.73	26.5
Largemouth Bass	HRU	4/9/2019	JSF-FH-LB-HRU-F-20190409		N	Final-Verified	81.0	<0.020	<0.029	<0.030	<0.032	<0.68	<0.011	245 J	<0.086	<0.018	0.28 J	<0.029	<0.021	0.79 J	<0.035	0.047 U*	0.24	<0.011	0.20 J	<0.013	<0.032	4.1 J
			JSF-FH-LB-HRU-O-20190409		N	Validated	67.9	<0.021	0.032 J	<0.030	<0.032	<0.69	<0.011	106 U*	<0.087	0.049 J	1.8	<0.029	<0.021	0.082 J	<0.035	<0.040	0.74	0.011 UJ	0.16 J	<0.013	<0.033	32.7
			JSF-FH-LB-HRU-L-20190409		N	Validated	81.7	<0.020	0.033 J	<0.030	<0.032	<0.68	0.047 J	109 U*	<0.086	0.11	7.5 J	<0.029	<0.021	0.46 J	0.15	<0.040	0.94	0.011 UJ	<0.16	<0.013	0.23 J	23.3
		4/9/2019	JSF-FH-LB-F-DUP02-20190409	JSF-FH-LB-HRU-F-20190409	FD	Final-Verified	81.7	<0.020	<0.029	<0.030	<0.032	<0.68	<0.011	211 J	<0.086	<0.019	<0.28	<0.029	<0.021	0.74 J	<0.035	<0.040	0.22	<0.011	0.18 J	<0.013	<0.032	4.3 J
			JSF-FH-LB-O-DUP02-20190409	JSF-FH-LB-HRU-O-20190409	FD	Validated	69.3	<0.021	0.042 J	0.053 J	<0.033	<0.70	<0.011	107 U*	<0.088	0.058 J	1.3	<0.030	<0.021	0.087 J	<0.036	<0.041	0.79	0.011 UJ	0.20 J	<0.013	<0.033	35.9
			JSF-FH-LB-L-DUP02-20190409	JSF-FH-LB-HRU-L-20190409	FD	Validated	81.1	<0.020	0.057 J	<0.029	<0.031	<0.65	0.072 J	98.5 U*	<0.083	0.14	19.6 J	<0.028	<0.020	0.64 J	0.17	<0.038	1.1	0.087	<0.15	<0.012	0.53 J	32.5
Smallmouth Bass	HRA1	4/9/2019	JSF-FH-SB-HRA1-F-20190409		N	Final-Verified	79.6	<0.021	0.24	<0.030	<0.033	<0.69	<0.011	146 J	<0.087	<0.019	0.35 J	<0.030	<0.021	0.59 J	<0.035	0.050 U*	0.26	<0.011	<0.16	<0.013	<0.033	3.3 J
			JSF-FH-SB-HRA1-O-20190409		N	Final-Verified	59.5	<0.021	0.52	0.032 J	<0.033	<0.69	<0.011	66.1 U*	<0.088	0.021 J	1.3	<0.030	<0.021	0.025 J	<0.035	0.042 U*	0.66	<0.011	<0.16	<0.013	<0.033	31.0
			JSF-FH-SB-HRA1-L-20190409		N	Validated	80.0	<0.019	0.71	<0.028	<0.030	<0.64	0.076 J	93.5 U*	<0.081	0.052 J	1.4	<0.027	<0.019	0.29 J	0.084 J	0.039 U*	0.93	0.010 UJ	<0.15	<0.012	0.10 J	19.1
Largemouth Bass	HRA2	4/9/2019	JSF-FH-LB-HRA2-F-20190409		N	Final-Verified	81.2	<0.020	0.14	<0.029	<0.032	<0.67	<0.011	91.4 U*	<0.085	<0.018	<0.27	<0.029	<0.020	0.54 J	<0.034	0.12 U*	0.18	<0.011	<0.15	<0.012	<0.032	4.5
			JSF-FH-LB-HRA2-O-20190409		N	Final-Verified	67.7	<0.019	0.26	<0.028	<0.031	<0.65	<0.010	97.1 U*	<0.082	0.057 J	1.6	<0.028	<0.020	0.024 J	<0.033	0.040 U*	0.68	<0.010	0.16 J	<0.012	<0.031	34.4
			JSF-FH-LB-HRA2-L-20190409		N	Validated	79.8	<0.021	0.36	<0.030	<0.032	<0.68	0.028 J	89.8 U*	<0.087	0.14	8.0	<0.029	<0.021	0.22 J	0.17	0.069 U*	0.87	0.011 UJ	<0.16	<0.013	0.052 J	25.4
	HRD	4/10/2019	JSF-FH-LB-HRD-F-20190410		N	Final-Verified	81.4	<0.021	0.13	<0.030	<0.033	<0.69	<0.011	155 J	0.098 J	<0.019	0.41 J	<0.030	<0.021	0.70 J	<0.036	0.058 U*	0.23	<0.011	<0.16	<0.013	<0.033	3.9 J
			JSF-FH-LB-HRD-O-20190410		N	Validated	69.2	<0.019	0.19	<0.028	<0.031	<0.64	<0.010	83.0 U*	<0.082	0.043 J	1.3 J	<0.028	<0.020	0.095 J	<0.033	<0.038	0.63	0.010 UJ	<0.15	<0.012	<0.031	27.0
			JSF-FH-LB-HRD-L-20190410		N	Validated	80.6	<0.020	0.28	<0.030	<0.032	<0.68	0.16	110 U*	<0.086	0.12	11.7	<0.029	<0.021	0.60 J	0.17	<0.040	1.1	0.011 UJ	<0.16	<0.013	0.12	28.0
		4/10/2019	JSF-FH-LB-F-DUP01-20190410	JSF-FH-LB-HRD-F-20190410	FD	Final-Verified	80.6	<0.020	0.17	<0.030	<0.032	<0.67	<0.011	178 J	<0.085	<0.018	<0.27	<0.029	<0.021	0.58 J	<0.035	<0.040	0.23	<0.011	<0.16	<0.013	<0.032	4.4 J
			JSF-FH-LB-O-DUP01-20190410	JSF-FH-LB-HRD-O-20190410	FD	Validated	67.6	<0.020	0.30	<0.029	<0.031	<0.65	<0.010	116 U*	0.084 J	0.056 J	4.3 J	<0.028	<0.020	0.047 J	<0.033	0.042 U*	0.93	0.010 UJ	0.17 J	<0.012	<0.031	35.4
			JSF-FH-LB-L-DUP01-20190410	JSF-FH-LB-HRD-L-20190410	FD	Validated	79.9	<0.020	0.39	<0.029	<0.031	<0.66	0.054 J	91.2 U*	<0.084	0.12	11.7	<0.028	<0.020	0.28 J	0.17	<0.039	0.98	0.011 UJ	<0.15	<0.012	0.11	28.3

See notes on last page.

TABLE B.4 – Fish Tissue Analytical Results
John Sevier Fossil Plant
April - July 2019

Species	Sampling Reach ID [1]	Sample Date [2]	Sample ID	Parent Sample ID	Sample Type [3]	Level of Review [4]	Moisture	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Lead	Lithium	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Vanadium	Zinc
							%	Analysis (mg/kg wet weight)																				
Redear Sunfish	HRU	4/30/2019	JSF-FH-RS-HRU-F-20190430		N	Validated	81.7	<0.019	<0.028	0.037 J	<0.030	<0.64	<0.010	486 J	<0.081	<0.017	<0.26	<0.027	<0.019	0.21 J	<0.033	<0.038	0.39	0.010 UJ	0.39 J	<0.012	<0.030	5.6
			JSF-FH-RS-HRU-O-20190430		N	Validated	65.8	<0.020	0.081 J	0.15	<0.031	<0.66	<0.010	171 J	<0.083	0.018 J	0.91	<0.028	<0.020	0.016 J	0.036 J	<0.039	0.86	0.011 UJ	0.29 J	<0.012	<0.031	34.0
			JSF-FH-RS-HRU-L-20190430		N	Final-Verified	79.7	<0.039	0.27	0.057 UJ	<0.062	<1.3	0.074 J	87.0 U*	<0.17	0.11 J	1.2 J	<0.056	<0.040	0.16	0.15 J	<0.077	1.7	<0.021	0.30 UR	<0.024	0.19 J	20.3
		4/30/2019	JSF-FH-RS-F-DUP01-20190430	JSF-FH-RS-HRU-F-20190430	FD	Validated	82.4	<0.020	<0.028	<0.029	<0.031	<0.66	<0.010	213 J	<0.083	<0.018	<0.27	<0.028	<0.020	0.21 J	<0.034	<0.039	0.35	0.011 UJ	<0.15	<0.012	<0.031	6.4
			JSF-FH-RS-O-DUP01-20190430	JSF-FH-RS-HRU-O-20190430	FD	Final-Verified	64.8	<0.020	0.059 J	0.11 J	<0.032	<0.67	<0.010	175	<0.085	0.031 J	0.74 J	<0.029	<0.020	0.018 U*	0.037 J	<0.039	0.92	<0.011	0.33 J	<0.012	<0.032	30.7
			JSF-FH-RS-L-DUP01-20190430	JSF-FH-RS-HRU-L-20190430	FD	Final-Verified	80.4	<0.041	0.11 J	0.060 UJ	<0.065	<1.4	0.035 J	78.8 U*	<0.17	0.13 J	1.2 J	<0.059	<0.042	0.12	0.14 J	<0.081	1.2	<0.022	0.32 UR	<0.026	0.15 J	19.2
	HRA1	5/15/2019	JSF-FH-RS-HRA1-F-20190515		N	Validated	82.2	<0.020	0.035 J	<0.029	<0.032	<0.67	<0.011	122 U*	<0.085	<0.018	<0.27	<0.029	<0.020	0.072 J	<0.034	<0.040	0.35	0.011 UJ	<0.15	<0.013	<0.032	6.1
			JSF-FH-RS-HRA1-O-20190515		N	Validated	68.5	<0.020	0.052 J	0.096 J	<0.032	<0.68	<0.011	262 J	<0.086	0.033 J	0.78 J	<0.029	<0.021	0.027 J	0.035 J	<0.040	0.91	0.011 UJ	0.30 J	<0.013	<0.032	26.2
			JSF-FH-RS-HRA1-L-20190515		N	Final-Verified	80.1	<0.038	0.61	0.056 UJ	<0.060	<1.3	0.053 J	83.3 U*	<0.16	0.54	2.2	<0.055	<0.039	0.15	0.27	<0.075	2.1	<0.020	0.29 UR	<0.024	0.19 J	20.5
	HRA2	5/7/2019	JSF-FH-RS-HRA2-F-20190507		N	Validated	80.3	<0.020	0.032 J	<0.029	<0.031	<0.66	<0.010	248 J	<0.084	<0.018	<0.27	<0.029	<0.020	0.19 J	<0.034	0.051 U*	0.39	0.011 UJ	0.17 J	<0.012	<0.032	6.8
			JSF-FH-RS-HRA2-O-20190507		N	Validated	67.3	<0.021	<0.030	0.51	<0.033	<0.70	<0.011	149 J	<0.088	0.033 J	0.77 J	<0.030	<0.021	0.010 J	<0.036	<0.041	1.2	0.011 UJ	0.38 J	<0.013	<0.033	30.2
			JSF-FH-RS-HRA2-L-20190507		N	Final-Verified	79.3	<0.041	0.086 J	0.11 J	<0.065	<1.4	0.039 J	103 U*	<0.17	0.17 J	1.1 J	<0.059	<0.042	0.076 U*	0.13 J	<0.081	1.8 J	<0.022	0.32 UR	<0.025	0.066 J	19.0
		5/15/2019	JSF-FH-RS-F-DUP02-20190515	JSF-FH-RS-HRA2-F-20190507	FD	Validated	81.9	<0.020	0.24 J	0.076 J	<0.031	<0.66	<0.010	123 U*	<0.084	<0.018	<0.27	<0.028	<0.020	0.39 J	<0.034	<0.039	0.60	0.011 UJ	<0.15	<0.012	<0.032	7.7
			JSF-FH-RS-O-DUP02-20190515	JSF-FH-RS-HRA2-O-20190507	FD	Final-Verified	61.4	<0.042	0.69 J	0.38 J	<0.066	<1.4	<0.022	164 J	<0.18	0.078 J	1.2 J	<0.060	<0.042	0.024 U*	<0.072	<0.082	1.8	<0.022	0.43 J	<0.026	<0.067	33.0
			JSF-FH-RS-L-DUP02-20190515	JSF-FH-RS-HRA2-L-20190507	FD	Final-Verified	80.4	<0.042	1.2 J	0.25 J	<0.066	<1.4	0.12 J	90.8 U*	<0.18	0.27	8.4 J	<0.060	<0.042	0.17	0.18 J	<0.082	3.3 J	<0.022	0.32 UR	<0.026	0.38	22.3
	HRD	4/30/2019	JSF-FH-RS-HRD-F-20190430		N	Validated	82.2	<0.021	0.085 J	0.056 J	<0.033	<0.69	0.025 J	710 J	<0.088	<0.019	0.73 J	<0.030	<0.021	0.24 J	<0.036	<0.041	0.56	0.011 UJ	0.65	<0.013	<0.033	8.3
			JSF-FH-RS-HRD-O-20190430		N	Validated	66.8	<0.019	<0.028	0.26	<0.031	<0.64	<0.010	197 J	<0.082	0.032 J	0.73 J	<0.028	<0.020	0.017 J	0.037 J	<0.038	1.7	0.010 UJ	0.40 J	<0.012	<0.031	32.9
			JSF-FH-RS-HRD-L-20190430		N	Final-Verified	79.9	<0.039	0.095 J	0.083 J	<0.062	<1.3	0.081 J	66.1 U*	<0.17	0.15 J	1.0 J	<0.056	<0.040	0.12	0.12 J	<0.077	1.9	<0.021	0.30 UR	0.028 J	0.14 J	17.4
Gizzard Shad	HRU	4/30/2019	JSF-FH-SH-HRU-WF-20190430		N	Final-Verified	76.7	<0.10	<0.15	5.0 J	<0.16	<3.4	<0.054	8,110	0.89 J	0.36 J	1.5 J	0.40 J	0.34 J	0.034 U*	<0.18	0.41 J	0.31 J	<0.055	7.2 J	<0.064	0.22 J	17.0 J
	HRA1	4/30/2019	JSF-FH-SH-HRA1-WF-20190430		N	Final-Verified	77.4	<0.10	<0.15	4.9 J	<0.17	<3.5	<0.055	17,200	<0.44	0.18 J	<1.4	0.28 J	<0.11	0.039 U*	<0.18	<0.21	0.39 J	<0.056	15.6 J	<0.065	<0.17	19.8 J
	HRA2	4/30/2019	JSF-FH-SH-HRA2-WF-20190430		N	Final-Verified	79.0	<0.10	<0.15	3.2 J	<0.16	<3.4	<0.053	9,660	<0.43	0.17 J	<1.4	0.18 U*	<0.10	0.034 U*	<0.17	<0.20	0.38 J	<0.054	11.6 J	<0.063	<0.16	15.1 J
		4/30/2019	JSF-FH-SH-WF-DUP01-20190430	JSF-FH-SH-HRA2-WF-20190430	FD	Final-Verified	78.4	<0.10	<0.15	3.6 J	<0.16	<3.5	<0.055	10,700	<0.44	0.19 J	<1.4	0.21 J	0.14 J	0.035 U*	<0.18	<0.20	0.32 J	<0.056	12.4 J	<0.065	<0.17	18.3 J
	HRD	4/30/2019	JSF-FH-SH-HRD-WF-20190430		N	Final-Verified	78.6	<0.099	0.15 J	4.3 J	<0.16	<3.3	<0.052	12,000	0.54 J	0.24 J	<1.3	0.40 J	0.16 J	0.038 U*	<0.17	0.23 J	0.37 J	<0.053	14.3 J	<0.061	0.21 J	20.0 J

Notes:

<	Analyte was not detected at a concentration greater than the Method Detection Limit.
%	percent
ID	Identification
J	Quantitation is approximate due to limitations identified during data validation.
mg/kg	milligrams per kilogram
N/A	tissue not analyzed / not available
U*	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. Sampling Reach ID: HRU=Holston River Upstream, HRA1=Holston River Adjacent 1, HRA2=Holston River Adjacent 2, and HRD=Holston River Downstream. Sampling reaches are shown on Exhibits A.1 and A.1a in Appendix A. Table B.1, in Appendix B, provides a summary of the sampling reaches.
2. Sample Date is the earliest collection date among the fish contributing to a composite.
3. Sample Type: N=Normal Environmental Sample, FD=Field Duplicate Sample; N*=ovary tissue sample *JSF-FH-CC-O-DUP02-20190430* is designated as a Normal Environmental Sample because it does not have an associated parent sample.
4. Level of review is defined in the Quality Assurance Project Plan.