April 12, 2019

Roy Quinn
TVA Cumberland Fossil Plant
815 Cumberland City Road
Cumberland City, TN 37050

RE: TVA Kingston Fossil Plant Project/18019897 – Analytical Report
RJ Lee Group Project Number AOH1053460-0

Dear Mr. Quinn,

RJ Lee Group, Inc. (RJLG) Monroeville laboratory received 12 samples on April 2, 2019 associated with Tennessee Valley Authority (TVA) Kingston Fossil Plant. The samples were logged into RJ Lee Group project number AOH1053460-0 and assigned RJLG sample numbers as indicated in Appendix A.

The samples were received in good condition with all custody seals in place and intact. Attached in Appendix A is the signed sample receipt confirmation form, revised COC and sample receipt check list.

These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified to return the samples covered in this report, RJ Lee Group will store them for a period of ninety (90) days before discarding.

Should you have any questions regarding this information, please do not hesitate to contact us.

Sincerely,

Bryan R. Bandli, PhD
Principal Investigator

Attachments: Chain of Custody Forms
Mineral Identification Report

Appendix A

Chain of Custody Forms

Chain of Custody
RJ Lee Group Work Order #: AOH1053460-0
Project Name/Case #: Kingston Fossil Plant/18019897

Received From:	Relinquished To:
Dennis Mihalek Stantec 601 Grassmere Park Road Suite Nashville, TN 37211 United States Main: 615-885-1144	RJLee Group, Inc. 350 Hochberg Road Monroeville, PA 15146 United States Main: 724-325-1776 Fax: 724-325-1775

Sample ID	Client Sample ID	Date Received
10474248	KIF-BS-BG07-0.0/0.5-20190312	04/02/2019 8:49 AM EDT
10474249	KIF-BS-BG03-0.0/0.5-20190313	04/02/2019 8:49 AM EDT
10474250	KIF-BS-BG02-0.0/0.5-20190314	04/02/2019 8:49 AM EDT
10474251	KIF-BS-BG05-0.0/0.5-20190318	04/02/2019 8:49 AM EDT
10474252	KIF-BS-BG04-0.0/0.5-20190319	04/02/2019 8:49 AM EDT
10474253	KIF-BS-BG11-0.0/0.5-20190322	04/02/2019 8:49 AM EDT
10474254	KIF-BS-BG10-0.0/0.5-20190325	04/02/2019 8:49 AM EDT
10474255	KIF-BS-BG08-0.0/0.5-20190326	04/02/2019 8:49 AM EDT
10474256	KIF-BS-BG09-0.0/0.5-20190326	04/02/2019 8:49 AM EDT
10474257	KIF-BS-BG12-0.0/0.5-20190327	04/02/2019 8:49 AM EDT
10474258	KIF-BS-BG01-0.0/0.5-20190328	04/02/2019 8:49 AM EDT
10474259	KIF-BS-DUP03-20190326	04/02/2019 8:49 AM EDT
10474260	QC_KIF-BS-BG02-0.0/0.5-20190314	04/02/2019 8:49 AM EDT

	Received From: Dennis Mihalek	*Method of Shipment: Federal Express*	
	Company: Stantec		**Date:** 04/02/2019
	Received By: Monica Carse	*Package Condition Upon Receipt: Sealed*	
	Company: RJ Lee Group, Inc.		**Date:** 04/02/2019

	Relinquished	*Method of Shipment:*	
	Company:		**Date:**
	Received By:	*Package Condition Upon Receipt:*	
	Company:		**Date:**

	Relinquished	*Method of Shipment:*	
	Company:		**Date:**
	Received By:	*Package Condition Upon Receipt:*	
	Company:		**Date:**

350 Hochberg Road, Monroeville, PA 15146
Phone: (724) 325-1776 | Fax: (724) 733-1799

RJ Lee Group
Sample Receipt and Log in Check List

Client:	Tennessee Valley Authority	Date Received:	4/2/2019	Log in Date:	4/5/2019
Time Received:	8:49 AM	By:	Monica Carse	COC# :	KIF_BS_20190312_1C_REV1
Project:	AOH1053460-0	# Coolers Received	1	Means of Shipment:	FedEx
Air Bill:	7748 4866 5115				

As Received Screen	Yes	No	Comments
Were the Coolers received in good condition?	✓		
Was there evidence of tampering?		✓	
Are Custody Seals intact and in good condition?	✓		
Were Coolers received between 2 and 4 degrees C?	N/A		
Were all samples intact?	✓		
Were all samples accurately labeled?	✓		
Was the COC received in good condition?	✓		
Did the sample ID on COC match the ID on the sample jars?		X	See Below
Were there any discrepancies among samples and COC?	X		See Below
Is the COC completely filled out?	✓		
Was the COC relinquished properly?	✓		

List any anomalies associated with Sample Receipt

E-mail sent regarding sample received and not listed on the COC:

I received some samples this morning. See attached copy of COC. I received a sample identified as: KIF-BS-DUP03-20190326 which is not listed on the chain of custody. Are we to analyze this sample? If so, I will need a revised COC which includes this sample. Please verify.

Analyst Signature: M. Carse 04-05-19

Manager Signature: 04/09/19

A0H1053460 0

TVA Environmental Investigations

Tennessee Valley Authority

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

COOLER No.:	1 of 1
COC No:	KIF_BS_20190312_1C_Rev1
____ of ____ Pages	
Task Desc:	KIF_BS

Required Ship to Lab:

Lab Name:	RJ Lee Group, Inc.
Lab Address:	350 Hochberg Road Monroeville, PA 15146

Lab Manager Contact Information

Lab PM:	Monica Carse
Phone/Fax:	724.325.1776
Lab Email:	MCarse@rjleegroup.com

Required Project Information:

Site ID #:	Kingston Fossil Plant		
Project #:	16019697		
Site Address	2735 Roane State Highway		
City	Harriman	State, Zip:	TN, 37763
Site PM Name:	Roy Quinn		
Phone/Fax:	423-751-3753		
Site PM Email:	jrquinn@tva.gov		

Required Sampler Information

Sampler:	J. Andrew, S. Bolden & A. Koerber		
Sampling Company:	Stantec		
Address	Warehouse Row North 1110 Market Street, Suite		
City/State	Chattanooga TN	Phone:	(423)800-5347
Sampling Team Number:	1		
Send EDD/Hard Copy to:	tva_deliverables@envsid.com		

Analysis Turnaround Time

- CALENDAR DAYS
- WORKING DAYS

TAT if different from Below _____

- 24 Hours
- 3 Business Days
- 5 Business Days
- 10 Business Days (Standard)

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth (Depth Unit)	Sample Depth: End Depth (Select Unit)	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: MACKGROUNDSOIL_PLM	Preserve: None	Filtered: N
1	KIF-BS-BG07-0.0/0.5-20190312	BG-07	0.0	0.5	BS	G	N	3/12/2019	1630	1			X		
2	KIF-BS-BG03-0.0/0.5-20190313	BG-03	0.0	0.5	BS	G	N	3/13/2019	1632	1			X		
3	KIF-BS-BG02-0.0/0.5-20190314	BG-02	0.0	0.5	BS	G	N	3/14/2019	1600	1			X		
4	KIF-BS-BG05-0.0/0.5-20190318	BG-05	0.0	0.5	BS	G	N	3/18/2019	1450	1			X		
5	KIF-BS-BG04-0.0/0.5-20190319	BG-04	0.0	0.5	BS	G	N	3/19/2019	1158	1			X		
6	KIF-BS-BG11-0.0/0.5-20190322	BG-11	0.0	0.5	BS	G	N	3/22/2019	0955	1			X		
7	KIF-BS-BG10-0.0/0.5-20190325	BG-10	0.0	0.5	BS	G	N	3/25/2019	1635	1			X		
8	KIF-BS-BG08-0.0/0.5-20190326	BG-08	0.0	0.5	BS	G	N	3/26/2019	1141	1			X		
9	KIF-BS-BG09-0.0/0.5-20190326	BG-09	0.0	0.5	BS	G	N	3/26/2019	1520	1			X		
10	KIF-BS-BG12-0.0/0.5-20190327	BG-12	0.0	0.5	BS	G	N	3/27/2019	1356	1			X		
11	KIF-BS-BG01-0.0/0.5-20190328	BG-01	0.0	0.5	BS	G	N	3/28/2019	1216	1			X		
12	KIF-BS-DUP03-20190326	—	—	—	BS	G	FD	3/26/2019	—	1			X		
13															

AK 3/28/2019

AK 3/28/2019

AK 3/28/2019

AK 3/28/2019

Additional Comments/Special Instructions:

AK 3/28/2019

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Alex Koerber (Stantec)	3/28/2019	1400	Stantec	3/28/19	1400
(STANTEC) DJM 4/1/19	4/1/19	1900	DJM 4/1/19		

SHIPPING METHOD: FED-EX DJM 4/1/19

SAMPLER NAME AND SIGNATURE

Suame Bolden

Alex Koerber

Jim Andrew

Sample Receipt Conditions

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
Yes / No	Yes / No	Yes / No	Yes / No
Yes / No	Yes / No	Yes / No	Yes / No
Yes / No	Yes / No	Yes / No	Yes / No
Yes / No	Yes / No	Yes / No	Yes / No

Rec'd By: M. Carse 04-02-19 08:49 am (samples rec'd)

Rev. COC rec'd 04-05-19 10:28 am

Form TVA 30067A

Appendix B

Mineral Identification Report

RJ LeeGroup, Inc.

Mineral Identification

Polarized Light Microscopy (PLM) Laboratory Report

Roy Quinn
TVA Cumberland Fossil Plant
815 Cumberland City Road
Cumberland City , TN 37050 United States
Email: jrquinn@tva.gov
Main: 423-751-3753

Report Date: 04/09/2019
Sample Received Date: 04/02/2019
RJLG Project: AOH1053460-0
Customer COC: KIF_BS_20190312_1C_REV1
Purchase Order: 4663338
Analytical Method: Fly Ash Determination by PLM

Customer Sample # :	RJLG ID	Date Analyzed	Date Collected	Area % Fly Ash	Non-Fly Ash Components	Comments
KIF-BS-BG01-0.0/0.5-20190328	10474258	04/09/2019	03/28/2019	3%	Clay Opaques Quartz	Tan sediment
KIF-BS-BG02-0.0/0.5-20190314	10474250	04/09/2019	03/14/2019	4%	Clay Opaques Quartz	Brown sediment
KIF-BS-BG03-0.0/0.5-20190313	10474249	04/09/2019	03/13/2019	2%	Clay Mica Opaques Quartz	Light brown sediment
KIF-BS-BG04-0.0/0.5-20190319	10474252	04/09/2019	03/19/2019	ND	Clay Mica Opaques Quartz	Light brown sediment
KIF-BS-BG05-0.0/0.5-20190318	10474251	04/09/2019	03/18/2019	2%	Clay Mica Opaques Quartz	Brown sediment
KIF-BS-BG07-0.0/0.5-20190312	10474248	04/09/2019	03/12/2019	1%	Clay Opaques Quartz	Red-brown sediment

Customer Sample # :	RJLG ID	Date Analyzed	Date Collected	Area % Fly Ash	Non-Fly Ash Components	Comments
KIF-BS-BG08-0.0/0.5-20190326	10474255	04/09/2019	03/26/2019	3%	Clay Opaques Quartz	Brown sediment
KIF-BS-BG09-0.0/0.5-20190326	10474256	04/09/2019	03/26/2019	5%	Clay Opaques Quartz	Tan sediment
KIF-BS-BG10-0.0/0.5-20190325	10474254	04/09/2019	03/25/2019	4%	Clay Mica Opaques Quartz	Brown sediment
KIF-BS-BG11-0.0/0.5-20190322	10474253	04/09/2019	03/22/2019	2%	Clay Mica Opaques Quartz	Light brown sediment
KIF-BS-BG12-0.0/0.5-20190327	10474257	04/09/2019	03/27/2019	4%	Clay Opaques Quartz	Orange sediment
KIF-BS-DUP03-20190326	10474259	04/09/2019	03/26/2019	3%	Clay Opaques Quartz	Tan sediment
QC_KIF-BS-BG02-0.0/0.5-20190314	10474260	04/09/2019	03/14/2019	4%	NA	Brown sediment

Disclaimer Notes

* Samples will be returned to client immediately upon the release of final report.
* These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.
* This test report relates to the items tested.
* Any reproduction of this document must include the entire document in order for the report to be valid.
* This report may not be used to claim product endorsement by NVLAP Lab Code 101208-0 or any agency of the U.S. Government.
* Sample(s) for this project were analyzed at our: Monroeville, PA (AIHA # 100364, NVLAP # 101208-0, NY ELAP # 10884) facility.
* If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results is limited to the reported values.
* For the purposes of this method, Fly Ash is defined as any particle consistent with Coal Ash.
* The method reporting level is 1% and anything <1% is considered a not-detected.

Quartz – Angular anisotropic particulate with low relief.
Feldspar – Angular to blocky anisotropic particulate, low to moderate relief, biaxial, can have polysynthetic twinning.
Clay – Sheet silicates with polycrystalline or display non-uniform extinction with low to moderate relief, and zero to low birefringence. Clay also refers to particles that are less than 2.0 microns.
Opaques – Opaque is a generic term for a particle that does not transmit light. Opaque minerals are distinguished from opaque bottom ash based on morphology of fracture.
Fly Ash – Isotropic to opaque spheres, agglomeration of spheres, and angular ash particles.
Organic Particulate – Pollen, plant and insect matter, and carbonaceous matter.
Carbonates – High birefringent, can be rhombohedral, with high relief.
Diatoms – Silica rich isotropic particles with various morphologies.
Mica – Sheet silicate with moderate to high relief and low birefringence, mono-crystalline, and normal extinction.
Miscellaneous Silicate – Isotropic and anisotropic silicates, with low to high relief, identification unsure and beyond the scope of the method to identify.
Amphibole – Elongated anisotropic particulate with moderate to high relief.
Coal – Irregular to angular particles with moderate opacity, edges and thin particles are reddish brown in color.
<1% Fly Ash – Fly Ash observed, none counted.
ND – No Fly Ash detected.