

August 17, 2021

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

RE: TVA Cumberland Fossil Plant Project/0777010 – Analytical Report
RJ Lee Group Project Number COH1062903-1

Dear Mr. Quinn,

RJ Lee Group, Inc. (RJLG) Monroeville laboratory received 4 samples on August 10, 2021 associated with Tennessee Valley Authority (TVA) Cumberland Fossil Plant. The samples were logged into RJ Lee Group project number COH1062903-1 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 sample receipt confirmation form, 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,



Elizabeth A. Fischer
Geologist

Attachments: Chain of Custody Forms
Mineral Identification Report
Polarized Light Microscopy Images, Bench Sheets,
QC Tabulation (when applicable)

Appendix A
Chain of Custody Forms

Chain of Custody

RJ Lee Group Work Order #: COH1062903-1
 Project Name/Case #: Cumberland Fossil Plant

Received From:	Relinquished To:
Roy Quinn TVA Cumberland Fossil Plant 815 Cumberland City Road Cumberland City, TN 37050 United States Email: jrquinn@tva.gov Main: 423-751-3753	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
10545663	CUF-SED-UT0.5-CORCC-0.0/0.4-20210729	08/10/2021 9:49 AM EDT
10545664	CUF-SED-UT0.5-CORRB-0.0/0.5-20210729	08/10/2021 9:49 AM EDT
10545665	CUF-SED-UT0.5-CORLB-0.0/0.3-20210729	08/10/2021 9:49 AM EDT
10545666	CUF-SED-UT0.5-DUP01-20210729	08/10/2021 9:49 AM EDT

	Received From: Roy Quinn	Method of Shipment: Federal Express
	Company: TVA Cumberland Fossil Plant	Date: 08/10/2021
	Received By: Brianna Zidek	Package Condition Upon Receipt: Sealed
	Company: RJ Lee Group, Inc.	Date: 08/10/2021

	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:

RJ Lee Group
Sample Receipt and Log in Check List

Client:	Tennessee Valley Authority	Date Received:	8/10/2021	Log in Date:	8/10/2021
Time Received:	9:49 AM	By:	Brianna Zidek	COC# :	CUF_SED_20210729_1C
Project:	COH1062903-1	# Coolers Received	1	Means of Shipment:	FedEx
Air Bill:	2823 4274 0459				

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?		NA	
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?	✓		
Were there any discrepancies among samples and COC?		✓	
Is the COC completely filled out?	✓		
Was the COC relinquished properly?	✓		

List any anomalies associated with Sample Receipt

NA
BZ 8/10/21

Analyst Signature: Bri Zidek 8/10/21

Manager Signature: Glynn Spader 08/10/2021



Tennessee Valley Authority

TVA Environmental Investigations

COH 1062903-0

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:	CUF_SED 20210729_1C		
1 of 1 Pages			
Task Desc:	CUF_SED		

Required Ship to Lab:		Required Project Information:		Required Sampler Information:	
Lab Name:	RJ Lee Group, Inc.	Site ID #:	CUMBERLAND FOSSIL PLANT	Sampler: Tyler Baker	
Lab Address:	350 Hochberg Road Monroeville, PA 15146	Project #:	0777010	Sampling Company: TVA	
		Site Address:	815 Cumberland City Road	Address: TVA Chickamauga Power Service Center, 4601 N. Access Road, 37415	
		City:	Cumberland City	State, Zip:	TN, 37763
		Site PM Name:	Roy Quinn	City/State:	Chattanooga, TN 37415
		Phone/Fax:	423-751-3753	Phone:	423-876-6733
		Site PM Email:	lquinn@tva.gov	Sampling Team Number:	1
				Send EDD/Hard Copy to:	tva_deliverables@envstd.com
Lab Manager Contact Information					
Lab PM:	Monica Carse				
Phone/Fax:	724.325.1776				
Lab Email:	MCarse@rjleegroup.com				

Analysis Turnaround Time	
<input type="checkbox"/> CALENDAR DAYS	<input checked="" type="checkbox"/> WORKING DAYS
TAT if different from Below _____	
<input type="checkbox"/> 24 Hours <input type="checkbox"/> 3 Business Days <input type="checkbox"/> 5 Business Days <input checked="" type="checkbox"/> 10 Business Days (Standard)	

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth		MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis
			Start Depth	End Depth									
1	CUF-SED-UT0.5-CORCC-0.0/0.4-20210729	SED-UT0.5	0.0	0.4	SED	C	N	7/29/2021	1235	1		<input type="checkbox"/>	X
2	CUF-SED-UT0.5-CORRB-0.0/0.5-20210729	SED-UT0.5	0.0	0.5	SED	G	N	7/29/2021	1305	1		<input type="checkbox"/>	X
3	CUF-SED-UT0.5-CORLB-0.0/0.3-20210729	SED-UT0.5	0.0	0.3	SED	G	N	7/29/2021	1445	1		<input type="checkbox"/>	X
4	CUF-SED-UT0.5-DUP01-20210729	SED-UT0.5	NA	NA	SED	N/A	FD	7/29/2021	N/A	1		<input type="checkbox"/>	X
5												<input type="checkbox"/>	X
6												<input type="checkbox"/>	X
7												<input type="checkbox"/>	X
8												<input type="checkbox"/>	X
9												<input type="checkbox"/>	X
10												<input type="checkbox"/>	X
11												<input type="checkbox"/>	X
12												<input type="checkbox"/>	X
13												<input type="checkbox"/>	X

Additional Comments/Special Instructions:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Sample Receipt Conditions			
Tyler Baker / TVA	8-9-21	0610	BuZin	8/10/21	9:49	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
						<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
						<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
						<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
						<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
						<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
SHIPPING METHOD:						SAMPLER NAME AND SIGNATURE			
Fedex						Tyler Baker			
Custody Seal 510379						Temperature in °C			
						Sample on Ice?			
						Sample Intact?			
						Trip Blank?			

TVA

CGH 1062903-~~1~~ BZ 8/17/21

COOLER No.:	1	of	1
COC No:	CUF SED 20210729 1C		
1 of 1 Pages			
Task Desc:	CUF SED		

Rev-01
+fbaker
08122

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

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	RJ Lee Group, Inc.	Site ID #:	CUMBERLAND FOSSIL PLANT	Sampler:	Tyler Baker
Lab Address:	350 Hochberg Road Monroeville, PA 15146	Project #:	0777010	Sampling Company:	TVA
		Site Address:	815 Cumberland City Road	Address:	TVA Chickamauga Power Service Center, 4601 N. Access Road, 37415
		City:	Cumberland City State, Zip: TN, 37763	City/State:	Chattanooga, TN 37415 Phone: 423-678-6733
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Monica Carse	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	724 325 1776	Site PM Email:	rquinn@tva.gov	Send EDD/Hard Copy to:	tva_deliverables@envsrd.com
Lab Email:	MCarse@rjleegroup.com				Analysis Turnaround Time

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth		MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MAINTAINED
			Depth Unit	Feet								
			Start Depth	End Depth								
1	CUF-SED-UT0.5-CORCC-0.0/0.4-20210729	SED-UT0.5	0.0	0.4	SED	C	N	7/29/2021	1235	1		<input type="checkbox"/>
2	CUF-SED-UT0.5-CORRB-0.0/0.5-20210729	SED-UT0.5	0.0	0.5	SED	G	N	7/29/2021	1305	1		<input type="checkbox"/>
3	CUF-SED-UT0.5-CORLB-0.0/0.3-20210729	SED-UT0.5	0.0	0.3	SED	G	N	7/29/2021	1445	1		<input type="checkbox"/>
4	CUF-SED-UT0.5-DUP01-20210729	SED-UT0.5	NA	NA	SED	NA	FD	7/29/2021	N/A	1		<input type="checkbox"/>
5												<input type="checkbox"/>
6												<input type="checkbox"/>
7												<input type="checkbox"/>
8												<input type="checkbox"/>
9												<input type="checkbox"/>
10												<input type="checkbox"/>
11												<input type="checkbox"/>
12												<input type="checkbox"/>
13												<input type="checkbox"/>

Additional Comments/Special Instructions:

RELINQUISHED BY / AFFILIATION		DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Sample Receipt Conditions			
Tyler Baker / TVA		8-9-21	1610	Baker	8/10/21	9:49	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
							<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
							<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
							<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
							<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
SHIPPING METHOD		SAMPLER NAME AND SIGNATURE					Temperature in °C	Sample on Ice?	Sample intact?	Trip Blank?
Fedex		Tyler Baker <i>Tyler Baker</i>								

Custody Seal 510379

Sample #	Customer Sample #	Work Order	Login Date	Date And Time Received	Protocol Assigned	Due Date	Delivery Tracking #
10545663	CUF-SED-UT0.5-CORCC-0.0/0.4-20210729	COH1062903-1	08/10/2021 10:21	08/10/2021 09:49	Fly Ash Determination by PLM	08/17/2021 10:18	2823 4274 0459
10545664	CUF-SED-UT0.5-CORRB-0.0/0.5-20210729	COH1062903-1	08/10/2021 10:21	08/10/2021 09:49	Fly Ash Determination by PLM	08/17/2021 10:18	2823 4274 0459
10545665	CUF-SED-UT0.5-CORLB-0.0/0.3-20210729	COH1062903-1	08/10/2021 10:21	08/10/2021 09:49	Fly Ash Determination by PLM	08/17/2021 10:18	2823 4274 0459
10545666	CUF-SED-UT0.5-DUP01-20210729	COH1062903-1	08/10/2021 10:21	08/10/2021 09:49	Fly Ash Determination by PLM	08/17/2021 10:18	2823 4274 0459

Appendix B
Mineral Identification Report

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: 08/16/2021
Sample Received Date: 08/10/2021
RJLG Project: COH1062903-1
Customer COC: CUF_SED_20210729_1C
Purchase Order: 4663341
Analytical Method: Fly Ash Determination by PLM

Customer Sample # :	RJLG ID	Date Analyzed	Date Collected	Area % Fly Ash	Non-Fly Ash Components	Comments
CUF-SED-UT0.5-CORCC-0.0/0.4-20210729	10545663	08/13/2021	07/29/2021	25%	Clay Mica Misc. Silicates Organic Particulate	Grey Sediment
CUF-SED-UT0.5-CORLB-0.0/0.3-20210729	10545665	08/13/2021	07/29/2021	40%	Clay Mica Misc. Silicates Opaques Quartz	Grey Sediment
CUF-SED-UT0.5-CORRB-0.0/0.5-20210729	10545664	08/13/2021	07/29/2021	24%	Clay Mica Opaques Organic Particulate Quartz	Grey Sediment
CUF-SED-UT0.5-DUP01-20210729	10545666	08/13/2021	07/29/2021	39%	Clay Mica Opaques Organic Particulate Quartz	Grey 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.

Opakes – 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.

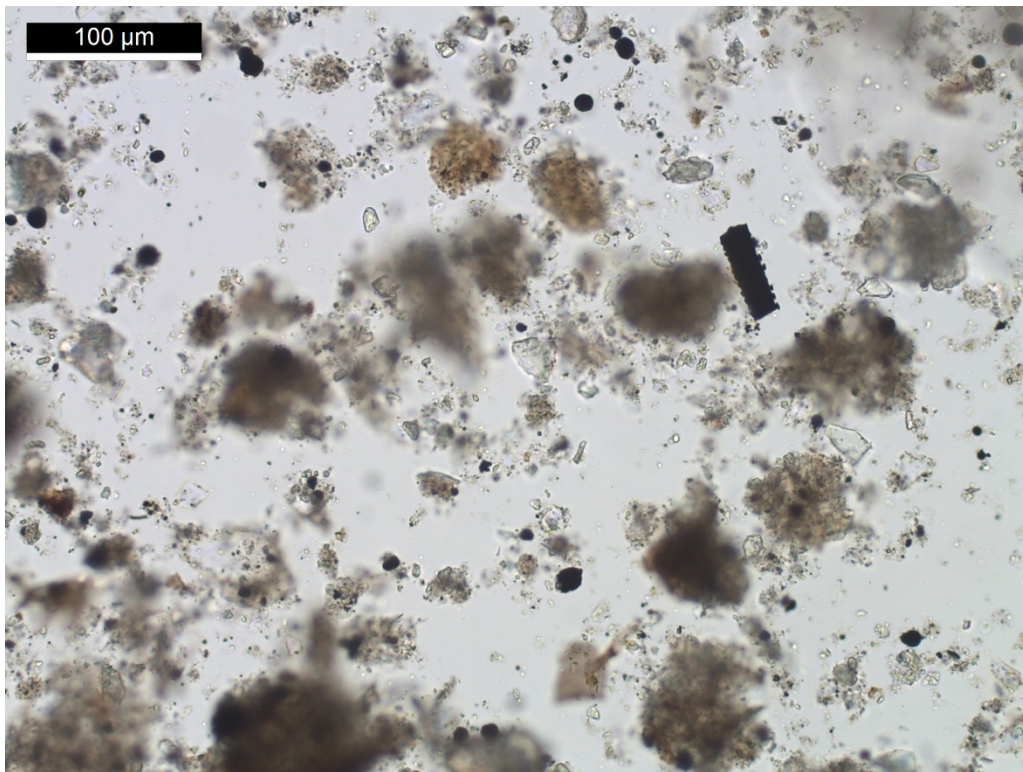
Amphibole – Elongated anisotropic particulate with moderate to high relief.

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.

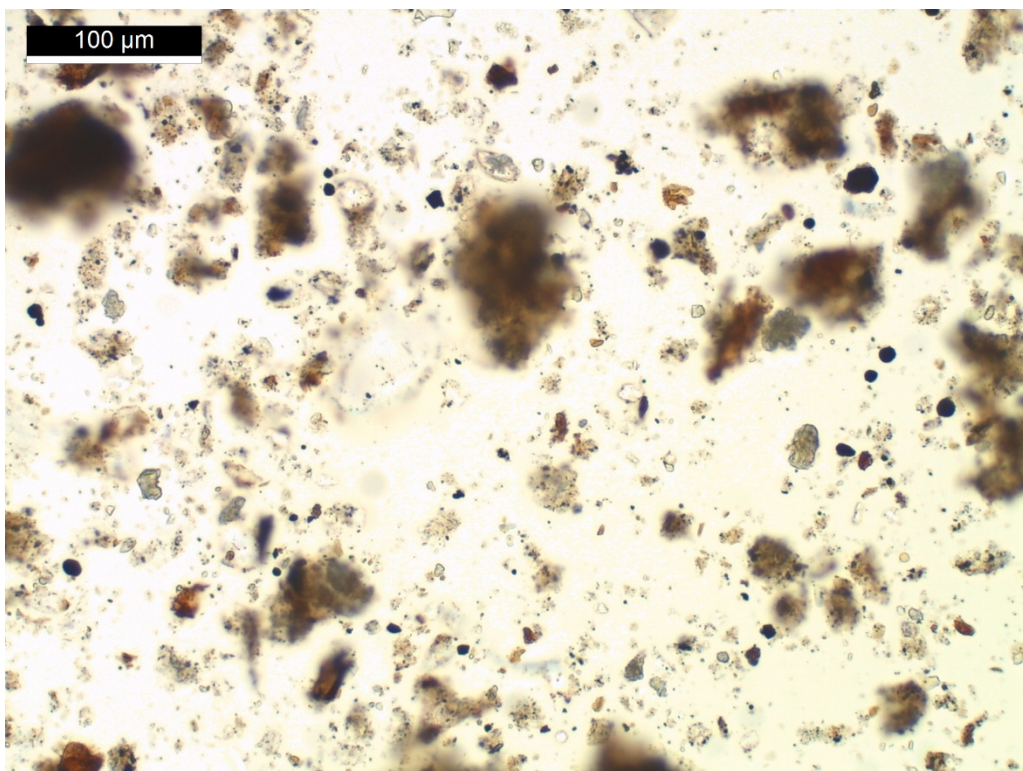
ND – No Fly Ash detected.

Appendix C
Polarized Light Microscopy Images
Bench Sheets
QC Tabulation



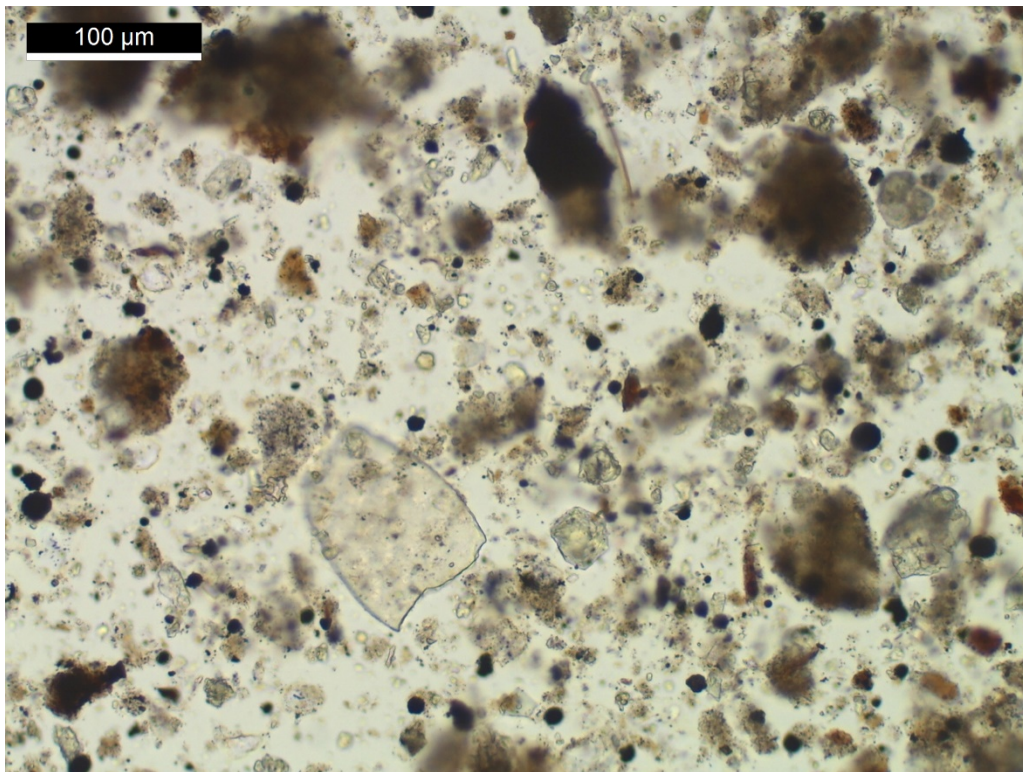
Sample CUF-SED-UT0.5-CORCC-0.0/0.4-20210729. RJLG ID 10545663.

Photomicrograph of sample in plane polarized light illustrating overall sample appearance.



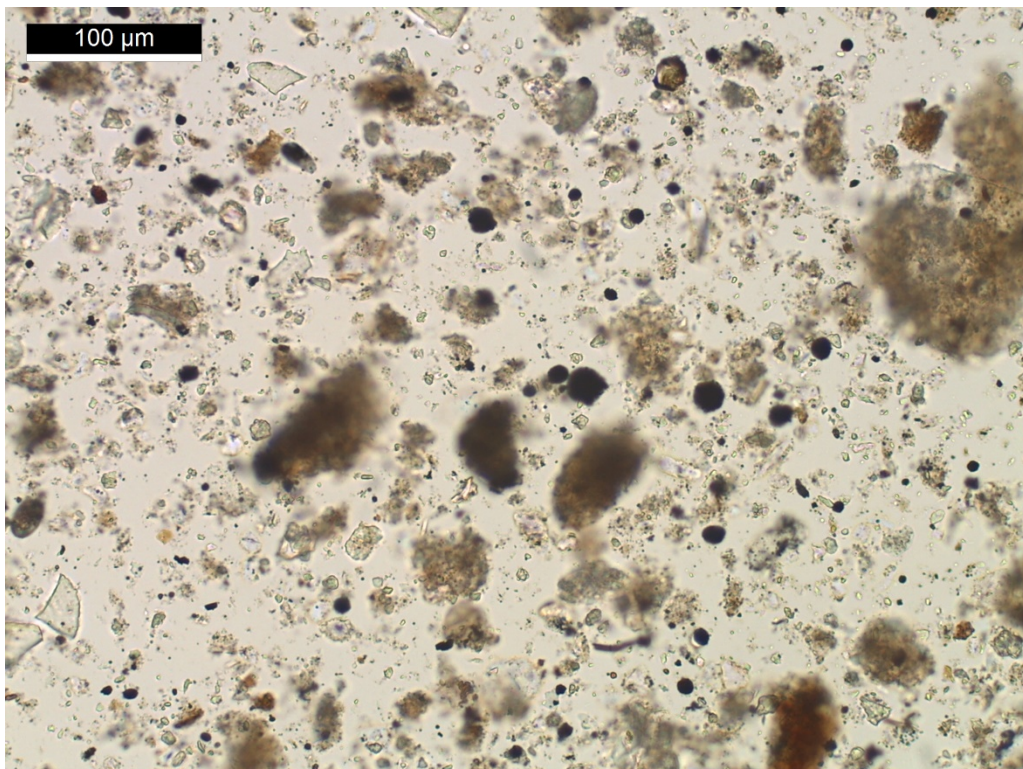
Sample CUF-SED-UT0.5-CORRB-0.0/0.5-20210729. RJLG ID 10545664.

Photomicrograph of sample in plane polarized light illustrating overall sample appearance.



Sample CUF-SED-UT0.5-CORLB-0.0/0.3-20210729. RJLG ID 10545665.

Photomicrograph of sample in plane polarized light illustrating overall sample appearance.



Sample CUF-SED-UT0.5-DUP01-20210729. RJLG ID 10545666.

Photomicrograph of sample in plane polarized light illustrating overall sample appearance.

Fly Ash Bench Sheet

RJLG ID: 10545663

Customer Sample # : CUF-SED-UT0.5-CORCC-0.0/0.4-20210729

Slide 1: 5 Slide 2: 7 Slide 3: 7 Slide 4: 6 Fly Ash % 25%

Non-Fly Ash
Components

Clay
Mica
Misc. Silicates
Organic Particulate

Other Components:

Results Comments:

Grey Sediment

Analysis Date: 2021-08-13

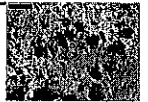
Analysis Time: 09:09

Result Last Modified By: George Hammond

Result Last Modified On: 2021-08-13 09:09:24.357

Images:

Image Path: \\hq-fs-1\Department\pool28-PA_Optical\2021 Completed Projects\TVA_Cumberland Fossil Plant



Initials:

GH

Date:

08/13/21

Fly Ash Bench Sheet

RJLG ID: 10545664

Customer Sample # : CUF-SED-UT0.5-CORRB-0.0/0.5-20210729

Slide 1: 8 Slide 2: 6 Slide 3: 5 Slide 4: 5 Fly Ash % 24%

Non-Fly Ash
Components

Clay
Mica
Opaques
Organic Particulate
Quartz

Other Components:

Results Comments:

Grey Sediment

Analysis Date: 2021-08-13

Analysis Time: 10:47

Result Last Modified By: George Hammond

Result Last Modified On: 2021-08-13 10:47:33.643

Images:

Image Path: \\hq-fs-1\Department\pool28-PA_Optical\2021 Completed Projects\TVA_Cumberland Fossil Plant



Initials:

GH

Date:

08/13/21



Fly Ash Bench Sheet

RJLG ID: 10545665

Customer Sample # : CUF-SED-UT0.5-CORLB-0.0/0.3-20210729

Slide 1: 12 Slide 2: 6 Slide 3: 14 Slide 4: 8 Fly Ash % 40%

Non-Fly Ash
Components

Clay
Mica
Misc. Silicates
Opagues
Quartz

Other Components:

Results Comments:

Grey Sediment

Analysis Date: 2021-08-13

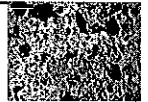
Analysis Time: 11:41

Result Last Modified By: George Hammond

Result Last Modified On: 2021-08-13 14:03:04.657

Images:

Image Path: \\hq-fs-1\Department\pool28-PA_Optical\2021 Completed Projects\TVA_Cumberland Fossil Plant



Initials:

GH

Date:

08/13/21

Fly Ash Bench Sheet

RJLG ID: 10545666

Customer Sample # : CUF-SED-UT0.5-DUP01-20210729

Slide 1: 13 Slide 2: 7 Slide 3: 7 Slide 4: 12 Fly Ash % 39%

Non-Fly Ash
Components

Clay
Mica
Opaques
Organic Particulate
Quartz

Other Components:

Results Comments:

Grey Sediment

Analysis Date: 2021-08-13

Analysis Time: 14:25

Result Last Modified By: George Hammond

Result Last Modified On: 2021-08-13 14:25:35.377

Images:

Image Path: \\hq-fs-1\Department\pool28-PA_Optical\2021 Completed Projects\TVA_Cumberland Fossil Plant



Initials:

GH

Date:

08/13/21