COLUMBIA STEEL CASTING CO., INC.

Baghouse 26 Dust Sampling Summary Report

March 2021

Baghouse 26 Dust Sampling Summary Report

Prepared for:
Columbia Steel Casting Co., Inc.
10425 North Bloss Avenue
Portland, Oregon

This document has been prepared by SLR International Corporation (SLR). The material and data in this report were prepared under the supervision and direction of the undersigned.

Mel Bocianowski
Senior Geologist

Sarah Kronholm, P.E.
Principal Engineer

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1. INTRODUCTION

SLR International Corporation (SLR) has prepared this summary report for baghouse dust collected from Baghouse 26 at the Columbia Steel Casting Co., Inc. (Columbia Steel) facility located at 10425 North Bloss Avenue in Portland, Oregon (Site).

As part of compliance with Cleaner Air Oregon, Columbia Steel submitted a request to the Oregon Department of Environmental Quality (DEQ) on September 9, 2020 to remove Baghouse 26 from the Source Test Protocol (Protocol). DEQ approved the request on November 23, 2020 with the requirement to submit a sampling plan for the Baghouse 26 dust. A Sampling and Analysis Plan (SAP) was approved by DEQ on January 20, 2021 (SLR, 2020).

This summary report contains information and procedures for the completed field sampling and analysis for Baghouse 26, including laboratory analytical data validation, to develop site-specific emission factors and calculate Toxic Air Contaminant (TAC) emission rates for Baghouse 26 as part of the Cleaner Air Oregon program.

2. SAMPLING ACTIVITIES

The purpose of the sampling activities described in this summary report was to collect a representative sample of the dust material collected by Baghouse 26 and perform laboratory metals analysis as an alternative to the continuous sampling presented in the Protocol. Columbia Steel requested to remove Baghouse 26 from the Protocol for the following reasons:

- The Toxic Emissions Units (TEUs) controlled by Baghouse 26 would only be operating for 80 minutes during a 12-hour source test run; and
- Continuous sampling of Baghouse 26 across a 12-hour source test run would not provide meaningful emission rate data for the purpose of completing a Cleaner Air Oregon TAC Emissions Inventory.

Based on this request, DEQ agreed that analysis of the baghouse dust material will result in representative air emission estimates for Baghouse 26 per the approved SAP.

2.1 BAGHOUSE 26 DUST MATERIAL DESCRIPTION

Baghouse 26 is a Torit 144FTP pulse jet baghouse, which collects emissions from two Rotoblast shot blasting stations located in the southwest portion of the main foundry building (Building 11). The shot blasting is a dry, abrasive process that uses a steel metal shot. The equipment is an episodic source typically operated for seven hours per week with approximately four minutes per cycle. Each cycle includes two minutes of shot blasting and two minutes of dust collection from the chambers. Dust (fines) from the baghouse is routed into 55-gallon drums and accumulated onsite for proper disposal.

Prior to sampling, it was confirmed that operation during the previous period was typical for the facility regarding processes, products, and raw materials.

2.2 SAMPLE LOCATIONS, TYPES, AND FREQUENCY

Material from Baghouse 26 was collected via a single grab sample from a 55-gallon drum immediately upon drum changeout. Due to the uniformity of the process and the consistency of the generated baghouse material, a single grab sample is considered representative of Baghouse 26. Based on the limited process fluctuations associated with the material, little to no spatial variability is expected in a single drum; therefore, sample material was collected from the approximate center of the material stored in the drum from approximately 4 to 10 inches below the surface.

2.3 SAMPLING PROCEDURES

SLR met with Columbia Steel personnel on February 23, 2021 to complete the Baghouse 26 dust sampling. Upon arrival to the Baghouse 26 area the drum designated for sample collection was full of material and was still connected to the baghouse apparatus. The drum was opened and the observed amount and basic

description of the stored material was noted in field notes. The drum was approximately 95% full of a homogenous fine-grained gray dust material.

Prior to conducting the Baghouse 26 dust sampling, a field equipment blank was collected by pouring de-ionized water over decontaminated sampling equipment (stainless-steel bowl and spoon) and collecting the rinse water into laboratory provided containers per the SAP.

A decontaminated stainless-steel spoon was used to scrape the immediate surface material (to approximately 4 inches) from the approximate center of the drum. Material from approximately 4 to 10 inches was transferred directly into a decontaminated, clean stainless-steel bowl and was thoroughly mixed. The collected material was transferred from the stainless-steel bowl to laboratory-provided containers that were filled as full as possible to minimize headspace. Two dust samples were collected from the composited material for laboratory analysis, an original sample (BH26-022321) and a field duplicate (BH26-022321-DUP), per the SAP.

The samples were labeled and placed in a chilled cooler with frozen ice packs and transported to the analytical laboratory under chain-of-custody (COC). A copy of field sampling notes are included as Appendix A and photographs from the sampling event are included as Appendix B.

2.4 SAMPLING PROCEDURE ALTERATIONS

There were no significant alterations to the sampling procedure described in the SAP.

3. ANALYTICAL DATA SUMMARY

This section presents a summary of the laboratory analytical results, field and laboratory quality assurance procedures, and laboratory data validation.

3.1 LABORATORY ANALYTICAL RESULTS

Collected samples (Baghouse 26 dust and equipment blank) were analyzed for the following analytes, using the corresponding laboratory methods:

- Total metals (arsenic, total chromium, lead, manganese, and nickel) per EPA Method 6020
- Hexavalent chromium per EPA Method 7196A

The samples were submitted to APEX Laboratories in Tigard, Oregon (ORELAP Certification ID: OR100062) for laboratory analysis. Laboratory analytical results are summarized on Table 1 and a copy of the laboratory analytical report is included as Appendix C.

3.2 FIELD QUALITY ASSURANCE

Field quality assurance was maintained through compliance with the SAP, including field measurements and observations, COC procedures, and sample handling procedures.

The field duplicate sample was analyzed for the project analytes and calculated relative percent differences (RPDs) between the original sample and the field duplicate were within control limits developed to meet project data quality objectives (DQOs).

The equipment blank was analyzed for the project analytes. Manganese was measured above the laboratory reporting limit in the field blank sample. In comparison to the concentration of manganese measured in the Baghouse 26 dust sample it does not appear that the presence of manganese in the field blank sample significantly influenced the reported results for the Baghouse 26 dust sample.

3.3 LABORATORY QUALITY ASSURANCE

Per the laboratory report, all sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives and within method specified holding times. An analysis of the laboratory quality control results is presented in Appendix D. Overall data quality is not affected by the minor discrepancies noted in the laboratory quality control documents and data quality was determined to be acceptable for the intended use.

4. TAC EMISSION FACTORS

Quality assured data has been used to calculate the TAC emission factors for Baghouse 26. Emission factors are provided in Table 2.

5. REFERENCES

SLR International Corporation. 2020. Baghouse 26 Dust Sampling and Analysis Plan, Revised. December.

TABLES

Table 1 - Baghouse 26 Dust Analytical Summary
Baghouse 26 Dust Sampling Summary Report
Columbia Steel Casting Co., Inc.
Portland, Oregon

Field Sample ID		BH26-022321		BH26-022321-DUP		BH26-022321-EB	
Lab Sample ID		A1B0698-01		A1B0698-02		A1B0698-03	
Date Collected		2/23/2021		2/23/2021		2/23/2021	
Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Metals per 6020B (Solids)							
ARSENIC	mg/kg	**7.30**		**7.43**		-	
CHROMIUM	mg/kg	**2,010**		**1,980**	Q-42	-	
LEAD	mg/kg	**2.17**		**1.95**		-	
MANGANESE	mg/kg	**17,900**		**18,700**	Q-42	-	
NICKEL	mg/kg	**2,940**		**3,280**	Q-42	-	
Metals per 7196A (Solids)							
HEXAVALENT CHROMIUM	mg/kg	**0.553**	Q-42	**0.326**	J	-	
Metals per 6020B (Aqueous)							
ARSENIC	µg/L	-		-		<1.00	
CHROMIUM	µg/L	-		-		<1.00	
LEAD	µg/L	-		-		<0.200	
MANGANESE	µg/L	-		-		**6.17**	
NICKEL	µg/L	-		-		<2.00	
Metals per 7196A (Aqueous)							
HEXAVALENT CHROMIUM	mg/L	-		-		<0.005	

Notes:

<0.50 indicates not measured above the laboratory reporting limit of 0.5 milligrams per kilogram (mg/kg)

Bold indicates measured above the laboratory reporting limit

Sample BH26-022321 is original sample

Sample BH26-022321-DUP is field duplicate sample

Sample BH26-022321-EB is field equipment blank sample

Laboratory analytical report included as Appendix C and Data Validation Summary included as Appendix D

Laboratory Qualifiers:

J - Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.

Q-42 - Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits.

Table 2 - Baghouse 26 TAC Emission Factors
Baghouse 26 Dust Sampling Summary Report
Columbia Steel Casting Co., Inc.
Portland, Oregon

Toxic Air Contaminant	BH 26 Dust Concentration[(1)] (mg/kg)	Emission Factor[(a)] (lb/ton metal)
ARSENIC	7.37	1.03E-07
CHROMIUM	1,995	2.79E-05
LEAD	2	2.88E-08
MANGANESE	18,300	2.56E-04
NICKEL	3,110	4.35E-05
HEXAVALENT CHROMIUM	0.44	6.15E-09

Calculations:

(a) Emission factor (lb/ton) = (Particulate Matter emission factor [lb/ton metal]) x (BH26 Dust Concentration [mg/kg] / (453,592 mg/lb) / (2.20462 lb/kg)

Particulate Matter emission factor (lb/ton metal) = 0.014 (2)

Notes:

(1) Baghouse 26 Dust Sampling; see Table 1 (average of field sample ID Nos. BH26-022321 and BH26-022321-DUP).

(2) Standard ACDP Permit No. 26-1869-ST-01, Condition 14.

APPENDIX A

SAMPLING FIELD NOTES

FIELD REPORT FORM

DATE: 2/23/2021	PROJECT # 108.00449.00018
Project Name: Baghouse 26 Sampling	Client: CSCC
Contractor: N/A	SLR Staff: CK
Work Objective/Type: Baghouse dust sampling	Weather: P. cloudy, cool
☐ Inspected Site Conditions Before Leaving Property	Page 1 of 1

1033: Chris (SLR) on-site. Check in at office and call Bruce S. (CSCC)
OBJ: collect dust sample from Baghouse 26 + QA/QC samples (Dup and equipment blank).
- Drum is full and ready for swap-out, still connected to Baghouse.

1100: collect Equipment Blank sample (BH26-0232I-EB). Stainless-steel Bowl and spoon rinsed w/ Deionized water and collected in laboratory containers (1-500mL poly unpreserved and 1-500mL poly w/ NO_3)

1102: Drum being swapped out for sample collection, disconnected from Baghouse.

1110: collected dust sample w/ SS spoon into SS Bowl.
Material is fine grained, gray dust w/ some metallic specks (Homogenous throughout).
Drum was ~95% full after opening. Moved surface material (approx. 4-6") and scooped material into Bowl. Gently mixed contents in Bowl to composite.

1115: BH26-0223-21 - 1-8oz jar, unpreserved.
1120: BH26-0232-21-Dup - 1-8oz jar, unpreserved.

Returned unused sample material to drum, lid placed on drum.
Decontaminate sample equipment.

1130: Check out of office, off-site to Apex Labs. Samples in cooler w/ ice packs under chain-of-custody.

1215: Samples dropped off at Apex on standard TAT.

SLR

Soil Sampling Form

Site Name: CSCC	**Location/Area:** Baghouse 26
Sampled By: C. Kramer	Sample ID: BH26-022321
Approx. Air Temperature (C)F 50°	Sample Time: 1115 Sample Date: 02/23/21
Weather Conditions: P. cloudy, cool	Duplicate ID: BH26-022321-DUP @ 1120
	MS/MSD ☐ Yes ☒ No Trip Blank Required: ☐ Yes ☒ No

Location Information

☐ Surface ☐ Boring ☐ Test Pit (floor / sidewall) ☐ Excavation (floor / sidewall) | Sample Depth (ft bgs): 0.5

Water level Depth (ft bgs) NA Frozen Soil Depth (ft bgs) NA

Note- If not known at sample location, list as not determined "ND"

Sample Description - circle applicable classification(s)

GRAVEL (3 – 0.08 IN)	SAND (0.08 – 0.003 IN)	SILT (< 0.003 IN)	CLAY (NO GRAINS VISIBLE)	ORGANIC SOIL	PEAT
GW GP GM GC	SW SP SM SC	ML MH	CL CH	OL/OH	PT

Dust and metal specks

Color gray %Coarse 0 %Fines 100 Peat/Organic Soil Likely Present (Y/N)

Moisture (Dry, Moist, Wet/Saturated) Dry Stained No Odor No

PID NA ppm ☐ Headspace ☐ In-Sampler ☐ In-Situ

Analyses	Check Applicable	Analyses	Check Applicable	Analyses	Check Applicable	Analyses	Check Applicable
VOCs		DRO/RRO		RCRA Metal	X 8023a		
BTEX		PAHs		Lead (only)			
GRO		PCBs		CR III	X 8023a		

Equipment Used: PID/FID(Model\SN) Collection Method grab sample w/ SS spoon and Bowl

Notes/Comments (indicate general location, and possible other relevant conditions not listed above):

Equipment Blank collected @ 11:00 - poured DI water over decontaminated SS-Bowl and SS spoon and poured into laboratory containers (1-500mL poly unpres and 1-500mL poly w/ HNO3)
Sample ID: BH26-022321-EB

Site Name:	**Location/Area:**
Sampled By:	Sample ID:
Approx. Air Temperature (C)	Sample Time: Sample Date:
Weather Conditions:	Duplicate ID:
	MS/MSD ☐ Yes ☐ No Trip Blank Required: ☐ Yes ☐ No

Location Information

☐ Surface ☐ Boring ☐ Test Pit (floor / sidewall) ☐ Excavation (floor / sidewall) | Sample Depth (ft bgs):

Water level Depth (ft bgs) Frozen Soil Depth (ft bgs)

Note- If not known at sample location, list as not determined "ND"

Sample Description - circle applicable classification(s)

GRAVEL (3 – 0.08 IN)	SAND (0.08 – 0.003 IN)	SILT (< 0.003 IN)	CLAY (NO GRAINS VISIBLE)	ORGANIC SOIL	PEAT
GW GP GM GC	SW SP SM SC	ML MH	CL CH	OL/OH	PT

Color %Coarse %Fines Peat/Organic Soil Likely Present (Y/N)

Moisture (Dry, Moist, Wet/Saturated) Stained Odor

PID ppm ☐ Headspace ☐ In-Sampler ☐ In-Situ

Analyses	Check Applicable	Analyses	Check Applicable	Analyses	Check Applicable	Analyses	Check Applicable
VOCs		DRO/RRO		RCRA Metal			
BTEX		PAHs		Lead (only)			
GRO		PCBs					

Equipment Used: PID/FID(Model\SN) Collection Method

Notes/Comments (indicate general location, and possible other relevant conditions not listed above):

Rev. 2016

APPENDIX B

PHOTO LOG

Photo 1: Baghouse 26 collection drum disconnected immediately prior to sampling

Photo 2: Material collected in Baghouse 26 drum

Photo 3: Baghouse 26 dust sampling location (moved surface material)

Photo 4: Baghouse 26 dust compositing for duplicate sample collection

APPENDIX C

LABORATORY ANALYTICAL REPORT

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Friday, March 12, 2021

Sarah Kronholm
SLR International Corp
1800 Blankenship Road, Suite 440
West Linn, OR 97068

RE: A1B0698 - Columbia Steel - Baghouse 26-108.00449.00018

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A1B0698, which was received by the laboratory on 2/23/2021 at 12:15:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: ldomenighini@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample reciept, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	3.8 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

SLR International Corp	Project: **Columbia Steel**	
1800 Blankenship Road, Suite 440	Project Number: **Baghouse 26-108.00449.000**	**Report ID:**
West Linn, OR 97068	Project Manager: **Sarah Kronholm**	**A1B0698 - 03 12 21 1419**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH26-022321	A1B0698-01	Solid	02/23/21 11:15	02/23/21 12:15
BH26-022321-DUP	A1B0698-02	Solid	02/23/21 11:20	02/23/21 12:15
BH26-022321-EB	A1B0698-03	Water	02/23/21 11:00	02/23/21 12:15

Apex Laboratories

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

SLR International Corp	Project:	**Columbia Steel**	
1800 Blankenship Road, Suite 440	Project Number:	**Baghouse 26-108.00449.000**	**Report ID:**
West Linn, OR 97068	Project Manager:	**Sarah Kronholm**	**A1B0698 - 03 12 21 1419**

ANALYTICAL CASE NARRATIVE

Work Order: A1B0698

Amended Report Revision 1:

Reporting to the Method Detection Limits (MDLs)-

This report supersedes all previous reports.

The final report has been amended to report all samples to the MDLs.

Lisa Domenighini
Client Services Manager
3-12-2021

Apex Laboratories

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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ANALYTICAL REPORT

AMENDED REPORT

SLR International Corp	Project: Columbia Steel	
1800 Blankenship Road, Suite 440	Project Number: Baghouse 26-108.00449.000	Report ID:
West Linn, OR 97068	Project Manager: Sarah Kronholm	A1B0698 - 03 12 21 1419

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
BH26-022321 (A1B0698-01)				**Matrix: Solid**				
Batch: 1020881								
Arsenic	**7.30**	0.482	0.963	mg/kg	10	02/26/21 12:14	EPA 6020B	
Lead	**2.17**	0.0963	0.193	mg/kg	10	02/26/21 12:14	EPA 6020B	
BH26-022321 (A1B0698-01RE1)				**Matrix: Solid**				
Batch: 1020881								
Chromium	**2010**	4.82	9.63	mg/kg	100	03/01/21 12:58	EPA 6020B	
Nickel	**2940**	9.63	19.3	mg/kg	100	03/01/21 12:58	EPA 6020B	
BH26-022321 (A1B0698-01RE2)				**Matrix: Solid**				
Batch: 1020881								
Manganese	**17900**	24.1	48.2	mg/kg	500	03/01/21 14:23	EPA 6020B	
BH26-022321-DUP (A1B0698-02)				**Matrix: Solid**				
Batch: 1020881								
Arsenic	**7.43**	0.490	0.980	mg/kg	10	02/26/21 12:19	EPA 6020B	
Lead	**1.95**	0.0980	0.196	mg/kg	10	02/26/21 12:19	EPA 6020B	
BH26-022321-DUP (A1B0698-02RE1)				**Matrix: Solid**				
Batch: 1020881								
Chromium	**1980**	4.90	9.80	mg/kg	100	02/26/21 12:40	EPA 6020B	**Q-42**
Manganese	**18700**	4.90	9.80	mg/kg	100	02/26/21 12:40	EPA 6020B	**Q-42**
Nickel	**3280**	9.80	19.6	mg/kg	100	02/26/21 12:40	EPA 6020B	**Q-42**
BH26-022321-EB (A1B0698-03)				**Matrix: Water**				
Batch: 1030063								
Arsenic	ND	0.500	1.00	ug/L	1	03/02/21 11:54	EPA 6020B	
Chromium	ND	0.500	1.00	ug/L	1	03/02/21 11:54	EPA 6020B	
Lead	ND	0.100	0.200	ug/L	1	03/02/21 11:54	EPA 6020B	
Manganese	**6.17**	0.500	1.00	ug/L	1	03/02/21 11:54	EPA 6020B	
Nickel	ND	1.00	2.00	ug/L	1	03/02/21 11:54	EPA 6020B	

Apex Laboratories

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

SLR International Corp
1800 Blankenship Road, Suite 440
West Linn, OR 97068

Project: **Columbia Steel**
Project Number: **Baghouse 26-108.00449.000**
Project Manager: **Sarah Kronholm**

Report ID:
A1B0698 - 03 12 21 1419

ANALYTICAL SAMPLE RESULTS

Total Hexavalent Chromium by Colorimetric Spectrophotometry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
BH26-022321 (A1B0698-01)				**Matrix: Solid**		**Batch: 1020835**		
Chromium (VI)	**0.553**	0.223	0.446	mg/kg wet	1	02/24/21 15:34	EPA 7196A	**Q-42**
BH26-022321-DUP (A1B0698-02)				**Matrix: Solid**		**Batch: 1020835**		
Chromium (VI)	**0.326**	0.222	0.445	mg/kg wet	1	02/24/21 15:39	EPA 7196A	**J**
BH26-022321-EB (A1B0698-03)				**Matrix: Water**		**Batch: 1020813**		
Chromium (VI)	ND	0.00200	0.00500	mg/L	1	02/23/21 14:49	SM 3500-Cr B	

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

SLR International Corp	Project: Columbia Steel	
1800 Blankenship Road, Suite 440	Project Number: Baghouse 26-108.00449.000	Report ID:
West Linn, OR 97068	Project Manager: Sarah Kronholm	A1B0698 - 03 12 21 1419

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1020881 - EPA 3051A							**Solid**					
Blank (1020881-BLK1)		Prepared: 02/25/21 08:46		Analyzed: 02/26/21 11:32								
EPA 6020B												
Arsenic	ND	0.481	0.962	mg/kg	10	---	---	---	---	---	---	
Chromium	ND	0.481	0.962	mg/kg	10	---	---	---	---	---	---	
Lead	ND	0.0962	0.192	mg/kg	10	---	---	---	---	---	---	
Manganese	ND	0.481	0.962	mg/kg	10	---	---	---	---	---	---	
Nickel	ND	0.962	1.92	mg/kg	10	---	---	---	---	---	---	
LCS (1020881-BS2)		Prepared: 02/25/21 08:46		Analyzed: 02/26/21 14:59								
EPA 6020B												
Arsenic	49.2	0.500	1.00	mg/kg	10	50.0	---	98	80 - 120%	---	---	Q-16
Chromium	49.1	0.500	1.00	mg/kg	10	50.0	---	98	80 - 120%	---	---	Q-16
Lead	45.2	0.100	0.200	mg/kg	10	50.0	---	90	80 - 120%	---	---	Q-16
Manganese	50.6	0.500	1.00	mg/kg	10	50.0	---	101	80 - 120%	---	---	Q-16
Nickel	49.9	1.00	2.00	mg/kg	10	50.0	---	100	80 - 120%	---	---	Q-16
Duplicate (1020881-DUP1)		Prepared: 02/25/21 08:46		Analyzed: 02/26/21 12:29								
QC Source Sample: BH26-022321-DUP (A1B0698-02)												
EPA 6020B												
Arsenic	**7.40**	0.518	1.04	mg/kg	10	---	7.43	---	---	0.3	20%	
Lead	**2.12**	0.104	0.207	mg/kg	10	---	1.95	---	---	9	20%	
Duplicate (1020881-DUP2)		Prepared: 02/25/21 08:46		Analyzed: 02/26/21 12:45								
QC Source Sample: BH26-022321-DUP (A1B0698-02RE1)												
EPA 6020B												
Chromium	**1820**	5.18	10.4	mg/kg	100	---	1980	---	---	8	20%	Q-16
Manganese	**18000**	5.18	10.4	mg/kg	100	---	18700	---	---	4	20%	Q-16
Nickel	**3140**	10.4	20.7	mg/kg	100	---	3280	---	---	4	20%	Q-16
Matrix Spike (1020881-MS1)		Prepared: 02/25/21 08:46		Analyzed: 02/26/21 12:35								
QC Source Sample: BH26-022321-DUP (A1B0698-02)												
EPA 6020B												
Arsenic	60.2	0.510	1.02	mg/kg	10	51.0	7.43	103	75 - 125%	---	---	
Lead	54.8	0.102	0.204	mg/kg	10	51.0	1.95	104	75 - 125%	---	---	

Apex Laboratories

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

SLR International Corp	Project: **Columbia Steel**	
1800 Blankenship Road, Suite 440	Project Number: **Baghouse 26-108.00449.000**	**Report ID:**
West Linn, OR 97068	Project Manager: **Sarah Kronholm**	**A1B0698 - 03 12 21 1419**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1020881 - EPA 3051A							**Solid**					
Matrix Spike (1020881-MS2)		Prepared: 02/25/21 08:46		Analyzed: 02/26/21 12:50								
QC Source Sample: BH26-022321-DUP (A1B0698-02RE1)												
EPA 6020B												
Chromium	1780	5.10	10.2	mg/kg	100	51.0	1980	**-376**	**75 - 125%**	---	---	Q-03, Q-16
Manganese	19000	5.10	10.2	mg/kg	100	51.0	18700	**437**	**75 - 125%**	---	---	Q-03, Q-16
Nickel	3210	10.2	20.4	mg/kg	100	51.0	3280	**-136**	**75 - 125%**	---	---	Q-03, Q-16

Apex Laboratories

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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ANALYTICAL REPORT

AMENDED REPORT

SLR International Corp	Project: Columbia Steel	
1800 Blankenship Road, Suite 440	Project Number: Baghouse 26-108.00449.000	Report ID:
West Linn, OR 97068	Project Manager: Sarah Kronholm	A1B0698 - 03 12 21 1419

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1030063 - EPA 3015A									Water			
Blank (1030063-BLK1)		Prepared: 03/02/21 08:52		Analyzed: 03/02/21 11:34								
EPA 6020B												
Arsenic	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chromium	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Manganese	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Nickel	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Blank (1030063-BLK2)		Prepared: 03/02/21 08:52		Analyzed: 03/02/21 18:58								
EPA 6020B												
Lead	**0.182**	0.100	0.200	ug/L	1	---	---	---	---	---	---	J, B-02
LCS (1030063-BS1)		Prepared: 03/02/21 08:52		Analyzed: 03/02/21 11:39								
EPA 6020B												
Arsenic	57.1	0.500	1.00	ug/L	1	55.6	---	103	80 - 120%	---	---	
Chromium	53.0	0.500	1.00	ug/L	1	55.6	---	95	80 - 120%	---	---	
Lead	53.0	0.100	0.200	ug/L	1	55.6	---	95	80 - 120%	---	---	
Manganese	52.6	0.500	1.00	ug/L	1	55.6	---	95	80 - 120%	---	---	
Nickel	54.7	1.00	2.00	ug/L	1	55.6	---	98	80 - 120%	---	---	
Duplicate (1030063-DUP1)		Prepared: 03/02/21 08:52		Analyzed: 03/02/21 11:59								
QC Source Sample: BH26-022321-EB (A1B0698-03)												
EPA 6020B												
Arsenic	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	20%	
Chromium	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	20%	
Lead	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	
Manganese	**6.23**	0.500	1.00	ug/L	1	---	6.17	---	---	1	20%	
Nickel	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	20%	

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ANALYTICAL REPORT

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SLR International Corp	Project: Columbia Steel	
1800 Blankenship Road, Suite 440	Project Number: Baghouse 26-108.00449.000	Report ID:
West Linn, OR 97068	Project Manager: Sarah Kronholm	A1B0698 - 03 12 21 1419

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Hexavalent Chromium by Colorimetric Spectrophotometry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1020813 - Method Prep: Aq							Water					
Blank (1020813-BLK1)		Prepared: 02/23/21 14:15		Analyzed: 02/23/21 14:48								
SM 3500-Cr B												
Chromium (VI)	ND	0.00200	0.00500	mg/L	1	---	---	---	---	---	---	
LCS (1020813-BS1)		Prepared: 02/23/21 14:15		Analyzed: 02/23/21 14:48								
SM 3500-Cr B												
Chromium (VI)	0.103	0.00200	0.00500	mg/L	1	0.100	---	103	89 - 111%	---	---	
Duplicate (1020813-DUP1)		Prepared: 02/23/21 14:15		Analyzed: 02/23/21 14:49								
QC Source Sample: BH26-022321-EB (A1B0698-03)												
SM 3500-Cr B												
Chromium (VI)	ND	0.00200	0.00500	mg/L	1	---	ND	---	---	---	20%	
Matrix Spike (1020813-MS1)		Prepared: 02/23/21 14:15		Analyzed: 02/23/21 14:50								
QC Source Sample: BH26-022321-EB (A1B0698-03)												
SM 3500-Cr B												
Chromium (VI)	0.103	0.00204	0.00510	mg/L	1	0.100	ND	103	85 - 115%	---	---	

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SLR International Corp	Project: Columbia Steel	
1800 Blankenship Road, Suite 440	Project Number: Baghouse 26-108.00449.000	Report ID:
West Linn, OR 97068	Project Manager: Sarah Kronholm	A1B0698 - 03 12 21 1419

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Hexavalent Chromium by Colorimetric Spectrophotometry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1020835 - EPA 3060A												**Soil**
Blank (1020835-BLK1)		Prepared: 02/24/21 07:48		Analyzed: 02/24/21 15:33								
EPA 7196A												
Chromium (VI)	ND	0.225	0.450	mg/kg wet	1	---	---	---	---	---	---	
LCS (1020835-BS1)		Prepared: 02/24/21 07:48		Analyzed: 02/24/21 15:34								
EPA 7196A												
Chromium (VI)	16.8	0.225	0.450	mg/kg wet	1	20.0	---	84	80 - 120%	---	---	
Duplicate (1020835-DUP1)		Prepared: 02/24/21 07:48		Analyzed: 02/24/21 15:36								
QC Source Sample: BH26-022321 (A1B0698-01)												
EPA 7196A												
Chromium (VI)	ND	0.224	0.448	mg/kg wet	1	---	0.553	---	---	***	**20%**	Q-04
Matrix Spike (1020835-MS1)		Prepared: 02/24/21 07:48		Analyzed: 02/24/21 15:37								
QC Source Sample: BH26-022321 (A1B0698-01)												
EPA 7196A												
Chromium (VI)	11.4	0.222	0.445	mg/kg wet	1	19.8	0.553	**55**	**75 - 125%**	---	---	Q-01
Matrix Spike (1020835-MS2)		Prepared: 02/24/21 07:48		Analyzed: 02/24/21 15:37								
QC Source Sample: BH26-022321 (A1B0698-01)												
EPA 7196A												
Chromium (VI)	1620	22.2	44.5	mg/kg wet	100	1620	ND	100	75 - 125%	---	---	
Post Spike (1020835-PS1)		Prepared: 02/24/21 07:48		Analyzed: 02/24/21 15:38								
QC Source Sample: BH26-022321 (A1B0698-01)												
EPA 7196A												
Chromium (VI)	422			ug/L	1	398	12.5	103	85 - 115%		---	

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ANALYTICAL REPORT

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SLR International Corp	Project: **Columbia Steel**	
1800 Blankenship Road, Suite 440	Project Number: **Baghouse 26-108.00449.000**	**Report ID:**
West Linn, OR 97068	Project Manager: **Sarah Kronholm**	**A1B0698 - 03 12 21 1419**

SAMPLE PREPARATION INFORMATION

Total Metals by EPA 6020B (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1030063							
A1B0698-03	Water	EPA 6020B	02/23/21 11:00	03/02/21 08:54	45mL/50mL	45mL/50mL	1.00

Prep: EPA 3051A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1020881							
A1B0698-01	Solid	EPA 6020B	02/23/21 11:15	02/25/21 08:46	0.519g/50mL	0.5g/50mL	0.96
A1B0698-01RE1	Solid	EPA 6020B	02/23/21 11:15	02/25/21 08:46	0.519g/50mL	0.5g/50mL	0.96
A1B0698-01RE2	Solid	EPA 6020B	02/23/21 11:15	02/25/21 08:46	0.519g/50mL	0.5g/50mL	0.96
A1B0698-02	Solid	EPA 6020B	02/23/21 11:20	02/25/21 08:46	0.51g/50mL	0.5g/50mL	0.98
A1B0698-02RE1	Solid	EPA 6020B	02/23/21 11:20	02/25/21 08:46	0.51g/50mL	0.5g/50mL	0.98

Total Hexavalent Chromium by Colorimetric Spectrophotometry

Prep: EPA 3060A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1020835							
A1B0698-01	Solid	EPA 7196A	02/23/21 11:15	02/24/21 07:48	2.5234g/111mL	2.5g/111mL	0.99
A1B0698-02	Solid	EPA 7196A	02/23/21 11:20	02/24/21 07:48	2.5304g/111mL	2.5g/111mL	0.99

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1020813							
A1B0698-03	Water	SM 3500-Cr B	02/23/21 11:00	02/23/21 14:15	25mL/25mL	25mL/25mL	1.00

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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

B-02	Analyte detected in an associated blank at a level between one-half the MRL and the MRL. (See Notes and Conventions below.)
J	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-03	Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample.
Q-04	Spike recovery and/or RPD is outside control limits due to a non-homogeneous sample matrix.
Q-16	Reanalysis of an original Batch QC sample.
Q-42	Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits. (Refer to the QC Section of Analytical Report.)

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported.

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

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REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation)
EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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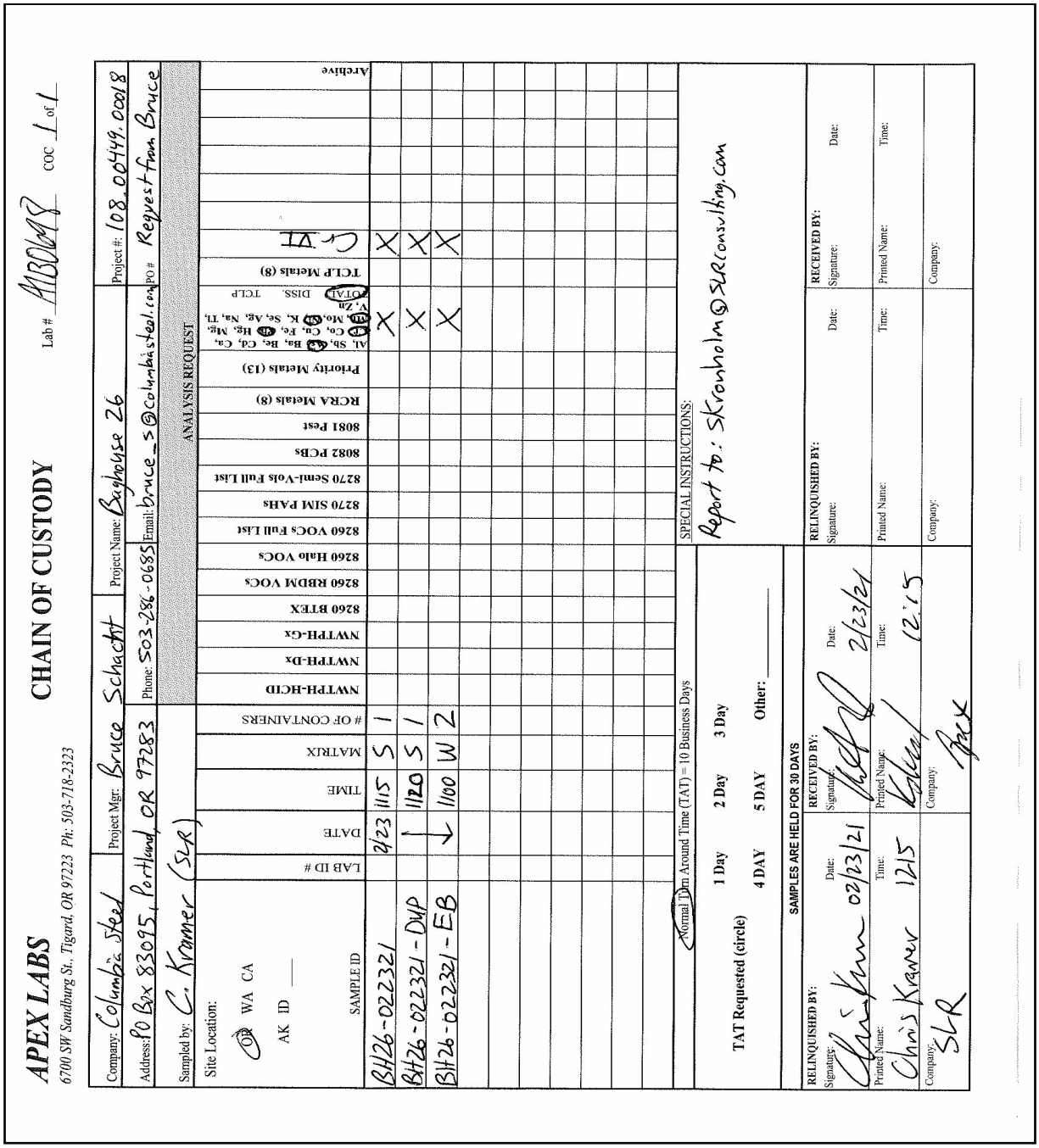

APEX LABS — **CHAIN OF CUSTODY** — Lab # A1B0698 — COC 1 of 1

6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

Company: Columbia Steel | Project Mgr: Bruce Schacht | Project Name: Baghouse 26 | Project #: 108.00449.0018

Address: PO Box 83095, Portland, OR 97283 | Phone: 503-256-0685 | Email: bruce_s@columbiasteel.com | PO #: Request from Bruce

Sampled by: C. Kramer (SLR)

Site Location: OR WA CA / AK ID ___

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS
BH26-022321		2/23	1115	S	1
BH26-022321-DUP		"	1120	S	1
BH26-022321-EB		"	1100	W	2

ANALYSIS REQUEST

NWTPH-HCID			
NWTPH-Dx			
NWTPH-Gx			
8260 BTEX			
8260 RBDM VOCs			
8260 Halo VOCs			
8260 VOCs Full List			
8270 SIM PAHs			
8270 Semi-Vols Full List			
8082 PCBs			
8081 Pest			
RCRA Metals (8)			
Priority Metals (13)			
Al, Sb, Ba, Be, Cd, Ca, Co, Cr, Fe, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn	X	X	X
TOTAL DISS. TCLP			
TCLP Metals (8)			
GYP	X	X	X
Archive			

SPECIAL INSTRUCTIONS: Report to: skronholm@slrconsulting.com

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ___

SAMPLES ARE HELD FOR 30 DAYS

	RELINQUISHED BY:	RECEIVED BY:	
Signature:			Date:
Printed Name:			Time:
Company:			

	RELINQUISHED BY:	RECEIVED BY:	
Signature:			Date:
Printed Name:			Time:
Company:			

	RELINQUISHED BY:	RECEIVED BY:	
Signature:			Date:
Printed Name:			Time:
Company:			

	RELINQUISHED BY:	RECEIVED BY:	
Signature:		Signature:	Date:
Printed Name:		Printed Name:	Time:
Company:		Company:	

	RELINQUISHED BY:	RECEIVED BY:	
Signature:	Chris Kramer	Signature:	Date: 2/23/21
Printed Name:	Chris Kramer	Printed Name:	Time: 1215
Company:	SLR	Company:	

Apex Laboratories

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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SLR International Corp	Project: **Columbia Steel**	
1800 Blankenship Road, Suite 440	Project Number: **Baghouse 26-108.00449.0001**	**Report ID:**
West Linn, OR 97068	Project Manager: **Sarah Kronholm**	**A1B0698 - 03 12 21 1419**

APEX LABS COOLER RECEIPT FORM

Client: Columbia Steel Element WO#: A1 B0698

Project/Project #: Baghouse 26/108.00449.00018

Delivery Info:

Date/time received: 2/23/21 @ 12:15 By: MD

Delivered by: Apex____Client__X__ESS____FedEx____UPS____Swift____Senvoy____SDS____Other____

Cooler Inspection Date/time inspected: 2/23/21 @ 12:15 By: MD

Chain of Custody included? Yes X No ____ Custody seals? Yes____ No X

Signed/dated by client? Yes X No ____

Signed/dated by Apex? Yes X No ____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	3.8						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	Y						
Ice type: (Gel/Real/Other)	Gel						
Condition:	Good						

Cooler out of temp? (Y/(N)) Possible reason why:

Green dots applied to out of temperature samples? Yes/(No)

Out of temperature samples form initiated? Yes/(No)

Sample Inspection: Date/time inspected: 2/23/21 @ 12:20 By: MD

All samples intact? Yes X No ___ Comments:

Bottle labels/COCs agree? Yes X No ___ Comments:

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments:

Do VOA vials have visible headspace? Yes ___ No ___ NA X

Comments

Water samples: pH checked: Yes X No___NA___ pH appropriate? Yes X No___NA____

Comments:

Additional information:

Labeled by: S Witness: S Cooler Inspected by: S

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Lisa Domenighini, Client Services Manager

APPENDIX D

LABORATORY DATA QUALITY REVIEW SUMMARY

Laboratory Data Quality Review Summary – Baghouse 26 Dust Sampling

Client Sample IDs: BH26-022321; BH26-022321-DUP; BH26-022321-EB

Lab Report: Apex Laboratories; A1B0698 AMENDED FINAL 03 12 21 1419_SLR_Columbia Steel. As indicated in Analytical Case Narrative the final report has been amended to report all samples to the MDLs.

Table 1 – Field and Laboratory Quality Control Sample Summary

Parameter	Method	Blank	Spike	Duplicate	LCS	Equipment Blank	Field Duplicate
Metals (solids)	6020B	X	X	X	X	X	X
Hexavalent Chromium (soil)	7196A	X	X	X	X	X	X
Metals (water)	6020B	X		X	X	X	X
Hexavalent Chromium (water)	7196A	X	X	X	X	X	X

X – Analyzed at appropriate frequency and within quality control limits unless otherwise noted
NA – Not required; see additional details below

Laboratory report L1318277 was reviewed by checking the items listed below. Where relevant, the most recent version of U.S. EPA's *National Functional Guidelines for Inorganic Superfund Methods Data Review* and/or *National Functional Guidelines for Organic Superfund Methods Data Review* were used to evaluate data quality.

- Reviewing chain of custody (COC) records for completeness, signatures, and dates;
- Verifying that samples were properly preserved and holding time requirements were met;
- Verifying that Method Blanks, Laboratory Control Samples (LCS), Matrix Spikes (MS), and Laboratory Duplicates were analyzed at the appropriate frequencies and were within quality control acceptance limits;
- Evaluating the relative percent differences (RPDs) between original and duplicate samples including Laboratory and Field Duplicate samples, as available;
- Verifying that reporting limits were properly reported based on sample dilution requirements; and,
- Providing an overall assessment of sample and laboratory data quality and qualifying sample results if necessary.

Sample and data quality were observed to meet the applicable requirements. Minor discrepancies and other notes are summarized below.

- Initial final lab report was reported to the Method Reporting Limit (MRL). Amended final lab report was requested to be reported to the Method Detection Limit (MDL).
- Field duplicate results were within QC limits for RPD with the following exception:
    - Hexavalent chromium (RPD of 52%); however, as results were < 5x the detection limit and absolute difference between the sample and duplicate were < detection limit no qualification is necessary.
- Concentrations that were measured between the MRL and the MDL were appropriately flagged by the laboratory with J-flag (Estimated Result. Result detected below the lowest point of the calibration curve, but above specified MDL).
- Laboratory blank detections were within QC limits (i.e. Non Detect) with the following exceptions:
    - Lead in the aqueous QC results was detected in the laboratory blank at a concentration between one-half the MRL and the MRL. Sample results flagged for blank contamination are potentially biased high if the sample results are less than ten times the level found in the blank (for inorganic analyses). Lead was not measured above the MRL in the original sample.
- LCS QC results were within control limits.
- Laboratory Duplicate QC results were within control limits, with the following exceptions:
    - Hexavalent chromium in soil QC results was qualified as either the sample or the sample duplicate has a reportable result for this analyte, while the other is Non Detect (ND). Precision is also assessed using field duplicate results which measured MDL reportable results for the original and duplicate sample.
- MS QC results were within control limits, with the following exceptions:
    - Chromium, manganese, and nickel for soil QC results were qualified for spike recovery outside control limits due to the high concentration of analyte present in the sample.
    - Hexavalent chromium for soil QC results was qualified for spike recovery outside acceptance limits (55% out range 75 to 125%), a secondary MS sample was run for hexavalent chromium which resulted in spike recovery of 100%.
    - No MS QC results were included for aqueous QC results for 6020B metals. The laboratory reporting notes indicate that non-client batch QC sample results are not provided in the report. It was assumed that the non-reported QC samples were analyzed at the appropriate frequencies, and that no issues affecting data quality were identified, but this cannot be confirmed based on the information provided in the lab report.
    - Data are not qualified based on MS/MSD results alone and corresponding LCS were all within QC limits, as noted above.

Overall data quality is not affected by the minor discrepancies noted above, and data quality was determined to be acceptable for the intended use.