



Greg Lewicki And Associates, PLLC

3375 West Powers Circle Littleton, CO 80123

August 20, 2018

Colorado Division of Reclamation, Mining, and Safety
1313 Sherman St, Room 215
Denver, CO 80203

RE: Detroit City Mine; DRMS File No. M-2017-003 - Waste Rock Sample

Colorado Calumet Co, Inc. has conducted a tunnel rock sampling and lab testing as it continues development at the Detroit City Mine. This sample was taken roughly 450 feet in, at the end of the drift tunnel. The results of the whole rock analysis and acid-base accounting (ABA) are attached.

Please contact me if you have any further questions or concerns.

Sincerely,

Ben Langenfeld, P.E.
Greg Lewicki and Associates



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Phoenix, AZ 85020

Project Name: No Project
Work Order: **X8G0200**
Reported: 18-Jul-18 16:36

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received	Notes
F43	X8G0200-01	Rock	15-Jun-18 08:00	DT	11-Jul-2018	

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

Analyses were performed in accordance with SVL standard operating procedures and calibrations were performed and met SVL internal QC criteria.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

Case Narrative: X8G0200

07/17/18 HB - Samples were pulverized for metals analysis.



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Client Sample ID: **F43**SVL Sample ID: **X8G0200-01 (Rock)**

Sample Report Page 1 of 1

Sampled: 15-Jun-18 08:00
Received: 11-Jul-18
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010D	Arsenic	12.3	mg/kg	2.5	0.6		X829006	DJS	07/17/18 11:53	
EPA 6010D	Barium	135	mg/kg	0.20	0.18		X829006	DJS	07/17/18 12:33	M1
EPA 6010D	Cadmium	5.34	mg/kg	0.20	0.06		X829006	DJS	07/17/18 11:53	
EPA 6010D	Chromium	56.5	mg/kg	0.60	0.20		X829006	DJS	07/17/18 11:53	
EPA 6010D	Lead	169	mg/kg	0.8	0.3		X829006	DJS	07/17/18 11:53	
EPA 6010D	Selenium	< 4.0	mg/kg	4.0	1.1		X829006	DJS	07/17/18 12:33	
EPA 6010D	Silver	< 0.50	mg/kg	0.50	0.20		X829006	DJS	07/17/18 11:53	
EPA 7471B	Mercury	< 0.033	mg/kg	0.033	0.011		X829092	MWD	07/18/18 13:23	H3

Acid/Base Accounting & Sulfur Forms

ASTM E-1915-05	Total Carbon	< 0.100	%	0.100	0.055		X828184	AGF	07/12/18 10:51	
ASTM E1915-11	Carbon, Organic	< 0.200	%	0.200	0.110		N/A		07/12/18 15:02	
Modified Sobek	ABA	-37.9	TCaCO3/kT	0.6			N/A		07/13/18 13:39	
Modified Sobek	AGP	43.6	TCaCO3/kT	0.6			N/A		07/13/18 13:39	
Modified Sobek	ANP	5.7	TCaCO3/kT	0.3			X828210	AGF	07/13/18 11:00	
Modified Sobek	Non-extractable Sulfur	< 0.01	%	0.01	0.008		X828196	AGF	07/13/18 13:16	
Modified Sobek	Non-Sulfate Sulfur	1.40	%	0.02	0.02	2	X828196	AGF	07/13/18 13:39	D2
Modified Sobek	Pyritic Sulfur	1.40	%	0.02			N/A		07/13/18 13:39	
Modified Sobek	Sulfate Sulfur	0.70	%	0.02			N/A		07/13/18 13:39	
Modified Sobek	Total Sulfur	2.12	%	0.02	0.02	2	X828196	AGF	07/12/18 10:28	D2

Classical Chemistry Parameters

ASA 9	Specific conductance@25°C	0.21	mmhos/cm	0.005			X829019	AGF	07/16/18 13:59	
LECO	Total Inorganic Carbon	< 0.100	%	0.100	0.055		X828185	AGF	07/12/18 15:02	

Percent Solids / Percent Moisture

Percent Solids	% Solids	99.9	%	0.1			X829035	JAA	07/17/18 10:15	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

Dianne Gardner
Project Manager



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Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010D	Arsenic	mg/kg	<2.5	0.6	2.5	X829006	17-Jul-18	
EPA 6010D	Barium	mg/kg	<0.20	0.18	0.20	X829006	17-Jul-18	
EPA 6010D	Cadmium	mg/kg	<0.20	0.06	0.20	X829006	17-Jul-18	
EPA 6010D	Chromium	mg/kg	<0.60	0.20	0.60	X829006	17-Jul-18	
EPA 6010D	Lead	mg/kg	<0.8	0.3	0.8	X829006	17-Jul-18	
EPA 6010D	Selenium	mg/kg	<4.0	1.1	4.0	X829006	17-Jul-18	
EPA 6010D	Silver	mg/kg	<0.50	0.20	0.50	X829006	17-Jul-18	
EPA 7471B	Mercury	mg/kg	<0.033	0.011	0.033	X829092	18-Jul-18	

Acid/Base Accounting & Sulfur Forms

ASTM E-1915-05	Total Carbon	%	<0.100	0.055	0.100	X828184	12-Jul-18	
Modified Sobek	ANP	TCaCO ₃ /kT	<0.3		0.3	X828210	13-Jul-18	
Modified Sobek	Non-extractable Sulfur	%	<0.01	0.008	0.01	X828196	13-Jul-18	
Modified Sobek	Non-extractable Sulfur	%	<0.01	0.008	0.01	X828196	16-Jul-18	
Modified Sobek	Non-Sulfate Sulfur	%	<0.01	0.008	0.01	X828196	13-Jul-18	
Modified Sobek	Total Sulfur	%	<0.01	0.008	0.01	X828196	12-Jul-18	

Classical Chemistry Parameters

ASA 9	Specific conductance@25°C	mmhos/cm	<0.005		0.005	X829019	16-Jul-18	
LECO	Total Inorganic Carbon	%	<0.100	0.055	0.100	X828185	12-Jul-18	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010D	Arsenic	mg/kg	95.1	100	95.1	80 - 120	X829006	17-Jul-18	
EPA 6010D	Barium	mg/kg	100	100	100	80 - 120	X829006	17-Jul-18	
EPA 6010D	Cadmium	mg/kg	93.8	100	93.8	80 - 120	X829006	17-Jul-18	
EPA 6010D	Chromium	mg/kg	98.5	100	98.5	80 - 120	X829006	17-Jul-18	
EPA 6010D	Lead	mg/kg	94.6	100	94.6	80 - 120	X829006	17-Jul-18	
EPA 6010D	Selenium	mg/kg	94.6	100	94.6	80 - 120	X829006	17-Jul-18	
EPA 6010D	Silver	mg/kg	4.66	5.00	93.3	80 - 120	X829006	17-Jul-18	
EPA 7471B	Mercury	mg/kg	0.843	0.833	101	80 - 120	X829092	18-Jul-18	

Acid/Base Accounting & Sulfur Forms

ASTM E-1915-05	Total Carbon	%	1.02	1.00	102	80 - 120	X828184	12-Jul-18	
Modified Sobek	ANP	TCaCO ₃ /kT	1070	1000	107	80 - 120	X828210	13-Jul-18	
Modified Sobek	Total Sulfur	%	0.83	1.00	83.4	80 - 120	X828196	12-Jul-18	

Classical Chemistry Parameters

ASA 9	Specific conductance@25°C	mmhos/cm	0.54	0.529	102	90 - 110	X829019	16-Jul-18	
LECO	Total Inorganic Carbon	%	0.422	0.500	84.4	80 - 120	X828185	12-Jul-18	



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Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch ID	Analyzed	Notes
Acid/Base Accounting & Sulfur Forms									
ASTM E-1915-05	Total Carbon	%	<0.100	<0.100	UDL	20	X828184	12-Jul-18	
Modified Sobek	ANP	TCaCO ₃ /kT	<0.3	<0.3	UDL	20	X828210	13-Jul-18	
Modified Sobek	Non-extractable Sulfur	%	<0.01	<0.01	UDL	20	X828196	13-Jul-18	
Modified Sobek	Non-extractable Sulfur	%	<0.01	<0.01	UDL	20	X828196	16-Jul-18	
Modified Sobek	Non-Sulfate Sulfur	%	1.35	1.40	3.7	20	X828196	13-Jul-18	D2
Modified Sobek	Total Sulfur	%	1.90	2.12	10.7	20	X828196	12-Jul-18	D2
Classical Chemistry Parameters									
ASA 9	Specific conductance@25°C	mmhos/cm	0.20	0.21	4.7	20	X829019	16-Jul-18	
LECO	Total Inorganic Carbon	%	<0.100	<0.100	UDL	20	X828185	12-Jul-18	
Percent Solids / Percent Moisture									
Percent Solids	% Solids	%	99.9	99.9	0.1	20	X829035	17-Jul-18	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Recovery	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010D	Arsenic	mg/kg	109	12.3	100	97.2	75 - 125	X829006	17-Jul-18	
EPA 6010D	Barium	mg/kg	268	135	100	133	75 - 125	X829006	17-Jul-18	M1
EPA 6010D	Cadmium	mg/kg	101	5.34	100	95.7	75 - 125	X829006	17-Jul-18	
EPA 6010D	Chromium	mg/kg	150	56.5	100	93.7	75 - 125	X829006	17-Jul-18	
EPA 6010D	Lead	mg/kg	258	169	100	89.3	75 - 125	X829006	17-Jul-18	
EPA 6010D	Selenium	mg/kg	94.6	<4.0	100	94.6	75 - 125	X829006	17-Jul-18	
EPA 6010D	Silver	mg/kg	5.13	<0.50	5.00	94.1	75 - 125	X829006	17-Jul-18	
EPA 7471B	Mercury	mg/kg	0.337	<0.033	0.333	96.3	75 - 125	X829092	18-Jul-18	

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	% Rec.	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods											
EPA 6010D	Arsenic	mg/kg	113	109	100	100	2.9	20	X829006	17-Jul-18	
EPA 6010D	Barium	mg/kg	264	268	100	129	1.4	20	X829006	17-Jul-18	M1
EPA 6010D	Barium	mg/kg	268	268	100	133	0.0	20	X829006	17-Jul-18	
EPA 6010D	Cadmium	mg/kg	98.1	101	100	92.8	2.9	20	X829006	17-Jul-18	
EPA 6010D	Chromium	mg/kg	148	150	100	91.3	1.6	20	X829006	17-Jul-18	
EPA 6010D	Lead	mg/kg	251	258	100	82.6	2.6	20	X829006	17-Jul-18	
EPA 6010D	Selenium	mg/kg	94.1	94.6	100	94.1	0.5	20	X829006	17-Jul-18	
EPA 6010D	Silver	mg/kg	5.10	5.13	5.00	93.5	0.6	20	X829006	17-Jul-18	
EPA 7471B	Mercury	mg/kg	0.340	0.337	0.333	97.3	1.0	20	X829092	18-Jul-18	



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Notes and Definitions

D2	Sample required dilution due to high concentration of target analyte.
H3	Sample was received and/or analysis requested past holding time.
M1	Matrix spike recovery was high, but the LCS recovery was acceptable.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
0.30R>S	% recovery not applicable; spike level is less than 30% of the sample concentration
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable
