



Greg Lewicki And Associates, PLLC

3375 West Powers Circle Littleton, CO 80123

June 29, 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 400 feet in. 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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Paul S. Harter, PC
1599 E. Orangetown Ave, Suite 125
Phoenix, AZ 85020

Project Name: No Project
Work Order: **X8E0735**
Reported: 11-Jun-18 13:27

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received	Notes
F32	X8E0735-01	Rock	23-May-18 00:00	DM	31-May-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: X8E0735

06/01/18 HB - samples were pulverized for metals analysis



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Client Sample ID: **F32**

Sampled: 23-May-18 00:00

SVL Sample ID: **X8E0735-01 (Rock)**

Received: 31-May-18

Sampled By: DM

Sample Report Page 1 of 1

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	< 2.5	mg/kg	2.5	0.6		X823014	DJS	06/11/18 12:33	
EPA 6010D	Barium	87.0	mg/kg	0.20	0.18		X823014	DJS	06/11/18 12:33	
EPA 6010D	Cadmium	3.62	mg/kg	0.20	0.06		X823014	DJS	06/11/18 12:33	
EPA 6010D	Chromium	56.6	mg/kg	0.60	0.20		X823014	DJS	06/11/18 12:33	
EPA 6010D	Lead	24.2	mg/kg	0.8	0.3		X823014	DJS	06/11/18 12:33	
EPA 6010D	Selenium	< 4.0	mg/kg	4.0	1.1		X823014	DJS	06/11/18 12:33	
EPA 6010D	Silver	1.11	mg/kg	0.50	0.20		X823014	DJS	06/11/18 12:33	
EPA 7471B	Mercury	< 0.033	mg/kg	0.033	0.011		X823001	MWD	06/04/18 17:02	

Acid/Base Accounting & Sulfur Forms

ASTM E-1915-05	Total Carbon	< 0.100	%	0.100	0.055		X822239	AGF	06/01/18 13:02	
ASTM E1915-11	Carbon, Organic	< 0.200	%	0.200	0.110		N/A		06/04/18 11:39	
Modified Sobek	ABA	-10.9	TCaCO3/kT	0.3			N/A		06/05/18 14:01	
Modified Sobek	AGP	19.5	TCaCO3/kT	0.3			N/A		06/05/18 14:01	
Modified Sobek	ANP	8.6	TCaCO3/kT	0.3			X823023	AGF	06/04/18 15:04	
Modified Sobek	Non-extractable Sulfur	< 0.01	%	0.01	0.008		X822238	AGF	06/05/18 13:47	
Modified Sobek	Non-Sulfate Sulfur	0.63	%	0.01	0.008		X822238	AGF	06/05/18 14:01	
Modified Sobek	Pyritic Sulfur	0.63	%	0.01			N/A		06/05/18 14:01	
Modified Sobek	Sulfate Sulfur	0.07	%	0.01			N/A		06/05/18 14:01	
Modified Sobek	Total Sulfur	0.70	%	0.01	0.008		X822238	AGF	06/01/18 13:02	

Classical Chemistry Parameters

ASA 9	Specific conductance@25°C	0.14	mmhos/cm	0.005			X822180	AGF	06/01/18 15:23	
LECO	Total Inorganic Carbon	< 0.100	%	0.100	0.055		X822241	AGF	06/04/18 11:39	

Percent Solids / Percent Moisture

Percent Solids	% Solids	100	%	0.1			X823017	JAA	06/05/18 09:50	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

Kirby Gray
Technical Director



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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	X823014	11-Jun-18	
EPA 6010D	Barium	mg/kg	<0.20	0.18	0.20	X823014	11-Jun-18	
EPA 6010D	Cadmium	mg/kg	<0.20	0.06	0.20	X823014	11-Jun-18	
EPA 6010D	Chromium	mg/kg	<0.60	0.20	0.60	X823014	11-Jun-18	
EPA 6010D	Lead	mg/kg	<0.8	0.3	0.8	X823014	11-Jun-18	
EPA 6010D	Selenium	mg/kg	<4.0	1.1	4.0	X823014	11-Jun-18	
EPA 6010D	Silver	mg/kg	<0.50	0.20	0.50	X823014	11-Jun-18	
EPA 7471B	Mercury	mg/kg	<0.033	0.011	0.033	X823001	04-Jun-18	

Acid/Base Accounting & Sulfur Forms

ASTM E-1915-05	Total Carbon	%	<0.100	0.055	0.100	X822239	01-Jun-18	
Modified Sobek	ANP	TCaCO3/kT	<0.3		0.3	X823023	04-Jun-18	
Modified Sobek	Non-extractable Sulfur	%	<0.01	0.008	0.01	X822238	05-Jun-18	
Modified Sobek	Non-Sulfate Sulfur	%	<0.01	0.008	0.01	X822238	05-Jun-18	
Modified Sobek	Total Sulfur	%	<0.01	0.008	0.01	X822238	01-Jun-18	

Classical Chemistry Parameters

ASA 9	Specific conductance@25°C	mmhos/cm	<0.005		0.005	X822180	01-Jun-18	
LECO	Total Inorganic Carbon	%	<0.100	0.055	0.100	X822241	04-Jun-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	115	100	115	80 - 120	X823014	11-Jun-18	
EPA 6010D	Barium	mg/kg	114	100	114	80 - 120	X823014	11-Jun-18	
EPA 6010D	Cadmium	mg/kg	113	100	113	80 - 120	X823014	11-Jun-18	
EPA 6010D	Chromium	mg/kg	115	100	115	80 - 120	X823014	11-Jun-18	
EPA 6010D	Lead	mg/kg	115	100	115	80 - 120	X823014	11-Jun-18	
EPA 6010D	Selenium	mg/kg	112	100	112	80 - 120	X823014	11-Jun-18	
EPA 6010D	Silver	mg/kg	5.83	5.00	117	80 - 120	X823014	11-Jun-18	
EPA 7471B	Mercury	mg/kg	0.847	0.833	102	80 - 120	X823001	04-Jun-18	

Acid/Base Accounting & Sulfur Forms

ASTM E-1915-05	Total Carbon	%	0.974	1.00	97.4	80 - 120	X822239	01-Jun-18	
Modified Sobek	ANP	TCaCO3/kT	1020	1000	102	80 - 120	X823023	04-Jun-18	
Modified Sobek	Total Sulfur	%	0.93	1.00	92.7	80 - 120	X822238	01-Jun-18	

Classical Chemistry Parameters

ASA 9	Specific conductance@25°C	mmhos/cm	0.52	0.529	98.2	90 - 110	X822180	01-Jun-18	
LECO	Total Inorganic Carbon	%	0.428	0.500	85.6	80 - 120	X822241	04-Jun-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	X822239	01-Jun-18	
Modified Sobek	ANP	TCaCO ₃ /kT	9.1	8.6	5.7	20	X823023	04-Jun-18	
Modified Sobek	Non-extractable Sulfur	%	<0.01	<0.01	UDL	20	X822238	05-Jun-18	
Modified Sobek	Non-Sulfate Sulfur	%	0.66	0.63	4.7	20	X822238	05-Jun-18	
Modified Sobek	Total Sulfur	%	0.77	0.70	9.7	20	X822238	01-Jun-18	
Classical Chemistry Parameters									
ASA 9	Specific conductance@25°C	mmhos/cm	0.16	0.16	4.0	20	X822180	01-Jun-18	
LECO	Total Inorganic Carbon	%	<0.100	<0.100	UDL	20	X822241	04-Jun-18	
Percent Solids / Percent Moisture									
Percent Solids	% Solids	%	80.1	80.2	0.1	20	X823017	05-Jun-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	113	<2.5	100	112	75 - 125	X823014	11-Jun-18	
EPA 6010D	Barium	mg/kg	5430	2360	100	0.30R>S	75 - 125	X823014	11-Jun-18	D2,M3
EPA 6010D	Cadmium	mg/kg	110	<0.20	100	110	75 - 125	X823014	11-Jun-18	
EPA 6010D	Chromium	mg/kg	118	14.5	100	104	75 - 125	X823014	11-Jun-18	
EPA 6010D	Lead	mg/kg	108	3.4	100	105	75 - 125	X823014	11-Jun-18	
EPA 6010D	Selenium	mg/kg	111	<4.0	100	111	75 - 125	X823014	11-Jun-18	
EPA 6010D	Silver	mg/kg	7.09	1.47	5.00	112	75 - 125	X823014	11-Jun-18	
EPA 7471B	Mercury	mg/kg	0.283	<0.033	0.333	81.2	75 - 125	X823001	04-Jun-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	111	113	100	110	2.3	20	X823014	11-Jun-18	
EPA 6010D	Barium	mg/kg	5870	5430	100	0.30R>S	7.6	20	X823014	11-Jun-18	D2,M3
EPA 6010D	Barium	mg/kg	5640	5430	100	0.30R>S	3.8	20	X823014	11-Jun-18	D2
EPA 6010D	Cadmium	mg/kg	107	110	100	107	2.5	20	X823014	11-Jun-18	
EPA 6010D	Chromium	mg/kg	114	118	100	99.7	3.5	20	X823014	11-Jun-18	
EPA 6010D	Lead	mg/kg	105	108	100	102	2.7	20	X823014	11-Jun-18	
EPA 6010D	Selenium	mg/kg	108	111	100	108	3.1	20	X823014	11-Jun-18	
EPA 6010D	Silver	mg/kg	7.30	7.09	5.00	117	2.9	20	X823014	11-Jun-18	
EPA 7471B	Mercury	mg/kg	0.290	0.283	0.333	83.2	2.3	20	X823001	04-Jun-18	



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Notes and Definitions

D2	Sample required dilution due to high concentration of target analyte.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS 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
