
ATTACHMENT II-G

SURFACE WATER HYDROLOGY

Surface runoff from the proposed Cahaba Resources, LLC. - Carter Mine drains into Black Creek. Black Creek drains into Hurricane Creek. Hurricane Creek ultimately flows into the Black Warrior River. Hurricane Creek lies in subwatershed 120 of hydrologic unit code 03160112 as defined by the USDA Natural Resources Conservation Service.

Five sediment control structures are proposed for this facility. These sediment basins are awaiting approval (since January 2014) from ADEM. Sediment basins 002P, 003P, and 006P will drain into Black Creek, whereas sediment basin 027P will drain into an unnamed tributary of Black Creek. All basins are proposed as permanent water impoundments, fish and wildlife habitat. Hurricane Creek is publicly owned and is perennial. The use of Hurricane Creek is classified as "Fish and Wildlife" by Chapter 335-6-11 in "Water Use Classifications For Interstate and Intrastate Waters" as taken from the Water Quality Program at ADEM. Chapter 335-6-10 in this reference states the best usage of the "Fish & Wildlife" classification is fishing, the propagation of fish, aquatic life, and wildlife, and any other usage except utilization as a supply for drinking or food processing, or for swimming and water contact sports.

Baseline surface water quality and quantity for the unnamed tributary of Hurricane Creek is characterized in this report by samples taken at downstream Surface Water Monitoring Site CRCMSW-1 and upstream Surface Water Monitoring Site CRCMSW-2 whose

locations are shown on the attached Mine Site Location Map. Both sites have been monitored strictly as baseline sampling for this proposed permit. Both surface water monitoring sites have been sampled on eight occasions by the PERC Engineering Water Laboratory between the dates 08-26-14 and 03-26-15. All surface water samples collected by the PERC Engineering Laboratory were taken by the 'grab' method. Flowrate measurements collected by the PERC Engineering Laboratory were taken according to ASTM D3858 "Standard Practice for Open Channel Flow Measurement of Water by Velocity - Area Method" or other equally valid methods. All samples analyzed by the PERC Engineering Laboratory are according to ASTM standards. Parameters tested on all occasions include pH, total iron, total manganese, total suspended solids, specific conductance, sulfates, acidity, and alkalinity.

In addition, a split of two samples of both the upstream monitoring site and the downstream monitoring site (one sample for the high flow and one sample for the low flow) was sent to CH2MHILL where the following analysis was conducted according to ASTM standards: Antimony, Arsenic, Barium, Cadmium, Lead, Selenium, Thallium, Mercury, and Cyanide to satisfy ADEM 2C monitoring requirements. It is assumed that this analysis is valid. See attached results of surface water analysis.

All parameters mentioned above were plotted vs. stream flow (in CF5M) to characterize water quality in the receiving stream at different flowrates prior to mining by Cahaba Resources, LLC. at this proposed facility. Baseline conditions at the 7Q2, Average, and 2 yr. flowrates are given in the Determination of the Probable Hydrologic Consequences

(Attachment II-H).

Surface Water Monitoring Site CRCMSW-1 drains approximately 3.356 square miles. In general, slope conditions within this watershed are variable but predominantly moderate. Elevations range from over 620 feet MSL at the drainage divide to approximately 310 feet MSL at CRCMSW-1. The pre-mine land use within the drainage area of Surface Water Monitoring Site CRCMSW-1 has been estimated at approximately 22.29 percent previously disturbed, and 77.71 percent undeveloped forest as referenced from the Coaling and Brookwood U.S.G.S. 7.5 minute Quadrangles and updated utilizing information from the Alabama Surface Mining Commission.

As stated above, this watershed is significantly disturbed by previous surface coal mining (pre-law), and the existing water quality is indicative of coal related impact upon the stream with the notable exception of Conductivity. Specific conductivity values are remarkably lower (on the order of TEN TIMES lower) than adjacent streams. However, this stream currently exhibits pH's in the 6-8 range and an average alkalinity which is much higher than the acidity, indicating a net positive acid-base potential in the overburden that has been disturbed within this watershed. The stream also exhibits moderate to very high mineralization (manganese) and very high levels of sulfates, further confirming that the impact is coal related.

A topsoil waiver is proposed for this facility.

The "Hydrologic Assessment, Eastern Coal Province Area 23, Alabama" was utilized to determine the dominant soil associations for this watershed. They are the 'Ruston-Cuthbert-Shubuta' association. A description of this dominant group is as follows:

RUSTON SERIES:

The Ruston series consists of deep, well drained, moderately permeable, reddish soils that formed in thick beds of loamy marine or stream deposits. This deep, well drained soil is on broad ridgetops and plateaus of the Coastal Plain uplands. Slopes are smooth and concave. This soil is low in natural fertility and organic matter content. Reaction ranges from medium acid to very strongly acid, unless the surface layer has been limed. Permeability and available water capacity are moderate. Tilt is good and the soil can be worked throughout a wide range in moisture content.

CUTHBERT SERIES

In the Cuthbert series are moderately well drained soils that developed in beds of sands, silt, and clay on rough, highly dissected uplands of the Coastal Plain. These soils have a thin subsoil of strong-brown, firm silty clay. Except in eroded areas, the surface layer is dark grayish-brown fine sandy loam. The Cuthbert soils occur with the Ruston, Savannah, and Guin soils and have a thinner, finer textured subsoil than all those soils. They do not have the fragipan of Savannah soils, nor the high gravel content of Guin soils. The native vegetation consists chiefly of red, post, blackjack, and scarlet oaks, hickory, and some

loblolly and shortleaf pines. About half of the acreage has been cleared.

SHUBUTA SERIES

In the Shubuta series are deep, moderately well drained or well drained soils on uplands of the Coastal Plain. The soils are gently sloping to moderately steep and are on ridgetops and side slopes. The color of the subsoil ranges from strong brown to red, and the texture ranges from silty clay loam to clay. These soils are strongly acid, and their organic matter and natural fertility are low. Crops grown on them make fair response to lime and fertilizer. Water enters these soils readily and moves slowly through the profile. The root zone is moderately deep. The available moisture capacity is low; and plants may be damaged by lack of water during even a short period of drought.

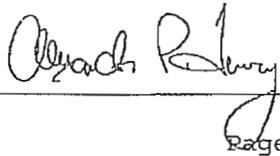
PERC ENGINEERING CO., INC.
P.O. Box 1712
Jasper, Alabama 35502
(205) 384-5553

Sample Number : 170863
Client : Cahaba Resources, LLC
Facility : Carter Mine
Job Number :
NPDES Permit # :
Basin, Stream, Well ID: CRCMSW-1
Code : s
Date Taken : 08/26/2014
Sampled By : jdc
Time Taken : 1325
Depth or Flow : 19.52cfs
Tests to be done : pH, Fe, Mn, Cond, SO4, Acid, Alk,
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	8	mg/l	Heath Brown	08/27/2014	1350	305.1 (1)
Alkalinity	14	mg/l	Heath Brown	08/27/2014	1425	310.1 (1)
Conductivity	187	us/cm	Heath Brown	08/27/2014	1455	120.1 (1)
Iron	0.21	mg/l	Danny C. Mays	08/29/2014	1445	236.1 (1)
Manganese	1.61	mg/l	Danny C. Mays	08/29/2014	1405	243.1 (1)
pH	6.41	s.u.	Johnny Collier	08/26/2014	1325	150.1 (1)
Report			Sherri Fields	09/02/2014		
Sulfate	67	mg/l	Heath Brown	08/27/2014	1325	8051 (3)
TSS	1	mg/l	Heath Brown	08/27/2014	1035	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
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- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

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Heath Brown

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Sample Number : 171302
Client : Cahaba Resources, LLC
Facility : Carter Mine
Job Number :
NPDES Permit # :
Basin, Stream, Well ID: CRCMSW-1
Code : S
Date Taken : 09/26/2014
Sampled By : jdc
Time Taken : 1420
Depth or Flow : 18.8 cfs
Tests to be done : pH, Cond, Fe, Mn, SO4, Acid, Alk,
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	4	mg/l	Michael Roell	09/30/2014	1545	305.1 (1)
Alkalinity	26	mg/l	Michael Roell	09/30/2014	1400	310.1 (1)
Conductivity	70	us/cm	Heath Brown	10/03/2014	1530	120.1 (1)
Iron	0.69	mg/l	Danny C. Mays	09/30/2014	0955	236.1 (1)
Manganese	0.05	mg/l	Danny C. Mays	09/30/2014	1040	243.1 (1)
pH	6.25	s.u.	Johnny Collier	09/26/2014	1420	150.1 (1)
Report			Sherri Fields	10/13/2014		
Sulfate	62	mg/l	Heath Brown	10/10/2014	1445	8051 (3)
TSS	<1	mg/l	Heath Brown	09/30/2014	1405	160.2 (1)

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APPROVED BY: *Michael Roell*

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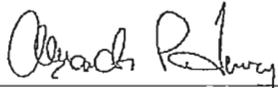
(205) 384-5553

Sample Number : 171832
 Client : Cahaba Resources, LLC
 Facility : Carter Mine
 Job Number :
 NPDES Permit # :
 Basin, Stream, Well ID: CRCMSW-1
 Code : s
 Date Taken : 10/29/2014
 Sampled By : jdc
 Time Taken : 1240
 Depth or Flow : 18.91cfs
 Tests to be done : pH, Fe, Mn, Cond, SO4, Acid, Alk,
 Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	18	mg/l	Michael Roell	10/31/2014	1100	305.1 (1)
Alkalinity	24	mg/l	Michael Roell	10/31/2014	1015	310.1 (1)
Conductivity	63	us/cm	Heath Brown	10/31/2014	1430	120.1 (1)
Iron	0.52	mg/l	Danny C. Mays	10/30/2014	1105	236.1 (1)
Manganese	0.04	mg/l	Danny C. Mays	10/30/2014	1155	243.1 (1)
pH	6.49	s.u.	Johnny Collier	10/29/2014	1240	150.1 (1)
Report			Sherri Fields	11/05/2014		
Sulfate	64	mg/l	Heath Brown	11/04/2014	0900	8051 (3)
TSS	1	mg/l	Heath Brown	10/29/2014	1245	160.2 (1)

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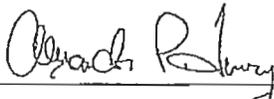
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P.O. Box 1712
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Sample Number : 172247
Client : Cahaba Resources, LLC
Facility : Carter Mine
Job Number :
NPDES Permit # :
Basin, Stream, Well ID: CRCMSW-1
Code : s
Date Taken : 11/24/2014
Sampled By : jdc
Time Taken : 1405
Depth or Flow : 19.51cfs
Tests to be done : pH, Cond, Fe, Mn, SO4, Acid, Alk,
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	16	mg/l	Heath Brown	12/02/2014	0815	305.1 (1)
Alkalinity	20	mg/l	Heath Brown	12/02/2014	0930	310.1 (1)
Conductivity	62	us/cm	Heath Brown	12/02/2014	1330	120.1 (1)
Iron	0.85	mg/l	Danny C. Mays	12/04/2014	1500	236.1 (1)
Manganese	0.10	mg/l	Danny C. Mays	12/04/2014	1600	243.1 (1)
pH	6.49	s.u.	Johnny Collier	11/24/2014	1405	150.1 (1)
Report			Sherri Fields	12/05/2014		
Sulfate	62	mg/l	Heath Brown	12/02/2014	1350	8051 (3)
TSS	4	mg/l	Heath Brown	11/25/2014	1350	160.2 (1)

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Sample Number : 172749
 Client : Cahaba Resources, LLC
 Facility : Carter Mine
 Job Number :
 NPDES Permit # :
 Basin, Stream, Well ID: CRCMSW-1
 Code : s
 Date Taken : 12/26/2014
 Sampled By : jdc
 Time Taken : 1600
 Depth or Flow : 20.43cfs
 Tests to be done : pH, Cond, SO4, Fe, Mn, Acid, Alk,
 Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	4	mg/l	Michael Roell	12/30/2014	1435	305.1 (1)
Alkalinity	16	mg/l	Heath Brown	12/30/2014	1315	310.1 (1)
Conductivity	80	us/cm	Johnny Collier	12/26/2014	1600	120.1 (1)
Iron	0.72	mg/l	Danny C. Mays	01/02/2015	1345	236.1 (1)
Manganese	0.12	mg/l	Danny C. Mays	01/02/2015	1325	243.1 (1)
pH	7.10	s.u.	Johnny Collier	12/26/2014	1600	150.1 (1)
Report			Sherri Fields	01/07/2015		
Sulfate	59	mg/l	Heath Brown	01/02/2015	1530	8051 (3)
TSS	1	mg/l	Heath Brown	12/30/2014	1515	160.2 (1)

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Sample Number : 172998
 Client : Cahaba Resources, LLC
 Facility : Carter Mine
 Job Number :
 NPDES Permit # :
 Basin, Stream, Well ID: CRCMSW-1
 Code : s
 Date Taken : 01/13/2015
 Sampled By : jdc
 Time Taken : 1055
 Depth or Flow : 20.65cfs
 Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,
 Report, TSS, F2CMetals Al

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	4	mg/l	Heath Brown	01/16/2015	0805	305.1 (1)
Alkalinity	20	mg/l	Heath Brown	01/16/2015	0910	310.1 (1)
Conductivity	95	us/cm	Johnny Collier	01/13/2015	1130	120.1 (1)
Iron	0.67	mg/l	Danny C. Mays	01/19/2015	1430	236.1 (1)
Manganese	0.08	mg/l	Danny C. Mays	01/19/2015	1500	243.1 (1)
pH	7.20	s.u.	Johnny Collier	01/13/2015	1130	150.1 (1)
Report			Sherri Fields	02/04/2015		
Sulfate	57	mg/l	Heath Brown	01/16/2015	1350	8051 (3)
TSS	1	mg/l	Heath Brown	01/14/2015	1110	160.2 (1)

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APPROVED BY: *Heath Brown*

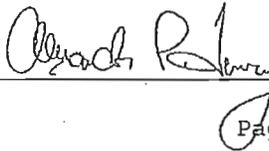
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Sample Number : 173633
Client : Cahaba Resources, LLC
Facility : Carter Mine
Job Number :
NPDES Permit # :
Basin, Stream, Well ID: CRCMSW-1
Code : s
Date Taken : 02/27/2015
Sampled By : jdc
Time Taken : 1555
Depth or Flow : 20.11cfs
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,
Report, TSS, F2CM Al

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	6	mg/l	Heath Brown	03/09/2015	1045	305.1 (1)
Alkalinity	16	mg/l	Heath Brown	03/09/2015	1450	310.1 (1)
Conductivity	58	us/cm	Heath Brown	03/02/2015	1500	120.1 (1)
Iron	0.37	mg/l	Danny C. Mays	03/03/2015	1430	236.1 (1)
Manganese	0.07	mg/l	Danny C. Mays	03/03/2015	1530	243.1 (1)
pH	6.90	s.u.	Johnny Collier	02/27/2015	1555	150.1 (1)
Report			Sherri Fields	03/18/2015		
Sulfate	54	mg/l	Heath Brown	03/09/2015	0830	8051 (3)
TSS	2	mg/l	Heath Brown	03/02/2015	1440	160.2 (1)

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Sample Number : 174078
Client : Cahaba Resources, LLC
Facility : Carter Mine
Job Number :
NPDES Permit # :
Basin, Stream, Well ID: CRCMSW-1
Code : s
Date Taken : 03/26/2015
Sampled By : jdc
Time Taken : 1150
Depth or Flow : 6.33 cfs
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	10	mg/l	Heath Brown	03/27/2015	1415	305.1 (1)
Alkalinity	12	mg/l	Heath Brown	03/27/2015	1445	310.1 (1)
Conductivity	127	us/cm	Johnny Collier	03/26/2015	1150	120.1 (1)
Iron	1.00	mg/l	Danny C. Mays	04/01/2015	1500	236.1 (1)
Manganese	1.46	mg/l	Danny C. Mays	04/01/2015	1430	243.1 (1)
pH	6.55	s.u.	Johnny Collier	03/26/2015	1150	150.1 (1)
Report			Sherri Fields	04/03/2015		
Sulfate	53	mg/l	Heath Brown	03/27/2015	1330	8051 (3)
TSS	3	mg/l	Heath Brown	03/27/2015	1305	160.2 (1)

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Allyson R. Henry

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Sample Number : 170862
 Client : Cahaba Resources, LLC
 Facility : Carter Mine
 Job Number :
 NPDES Permit # :
 Basin, Stream, Well ID: CRCMSW-2
 Code : s
 Date Taken : 08/26/2014
 Sampled By : jdc
 Time Taken : 1120
 Depth or Flow : 0.559cfs
 Tests to be done : pH, Fe, Mn, Cond, SO4, Acid, Alk,
 Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	6	mg/l	Heath Brown	08/27/2014	1350	305.1 (1)
Alkalinity	28	mg/l	Heath Brown	08/27/2014	1425	310.1 (1)
Conductivity	81	us/cm	Heath Brown	08/27/2014	1455	120.1 (1)
Iron	0.78	mg/l	Danny C. Mays	08/29/2014	1445	236.1 (1)
Manganese	0.08	mg/l	Danny C. Mays	08/29/2014	1405	243.1 (1)
pH	6.68	s.u.	Johnny Collier	08/26/2014	1120	150.1 (1)
Report			Sherri Fields	09/02/2014		
Sulfate	<1	mg/l	Heath Brown	08/27/2014	1325	8051 (3)
TSS	1	mg/l	Heath Brown	08/27/2014	1035	160.2 (1)

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PERC ENGINEERING CO., INC.
P.O. Box 1712
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Sample Number : 171299
Client : Cahaba Resources, LLC
Facility : Carter Mine
Job Number :
NPDES Permit # :
Basin, Stream, Well ID: CRCMSW-2
Code : s
Date Taken : 09/26/2014
Sampled By : jdc
Time Taken : 1220
Depth or Flow : 0.51 cfs
Tests to be done : pH, Cond, Fe, Mn, SO4, Acid, Alk,
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	<2	mg/l	Michael Roell	09/30/2014	1545	305.1 (1)
Alkalinity	64	mg/l	Michael Roell	09/30/2014	1400	310.1 (1)
Conductivity	69	us/cm	Heath Brown	10/03/2014	1530	120.1 (1)
Iron	0.68	mg/l	Danny C. Mays	09/30/2014	0955	236.1 (1)
Manganese	0.06	mg/l	Danny C. Mays	09/30/2014	1040	243.1 (1)
pH	7.20	s.u.	Johnny Collier	09/26/2014	1220	150.1 (1)
Report			Sherri Fields	10/13/2014		
Sulfate	<1	mg/l	Heath Brown	10/10/2014	1445	8051 (3)
TSS	<1	mg/l	Heath Brown	09/30/2014	1405	160.2 (1)

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Sample Number : 171802
 Client : Cahaba Resources, LLC
 Facility : Carter Mine
 Job Number :
 NPDES Permit # :
 Basin, Stream, Well ID: CRCMSW-2
 Code : s
 Date Taken : 10/27/2014
 Sampled By : jdc
 Time Taken : 1340
 Depth or Flow : 1.31 cfs
 Tests to be done : pH, Cond, Fe, Mn, SO4, Acid, Alk,
 Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	22	mg/l	Michael Roell	10/31/2014	1100	305.1 (1)
Alkalinity	22	mg/l	Michael Roell	10/31/2014	1015	310.1 (1)
Conductivity	61	us/cm	Heath Brown	10/31/2014	1430	120.1 (1)
Iron	0.43	mg/l	Danny C. Mays	10/30/2014	1105	236.1 (1)
Manganese	0.05	mg/l	Danny C. Mays	10/30/2014	1155	243.1 (1)
pH	5.95	s.u.	Johnny Collier	10/27/2014	1340	150.1 (1)
Report			Sherri Fields	11/05/2014		
Sulfate	<1	mg/l	Heath Brown	11/04/2014	0900	8051 (3)
TSS	1	mg/l	Heath Brown	10/28/2014	1240	160.2 (1)

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P.O. Box 1712

Jasper, Alabama 35502

(205) 384-5553

Sample Number : 172248
 Client : Cahaba Resources, LLC
 Facility : Carter Mine
 Job Number :
 NPDES Permit # :
 Basin, Stream, Well ID: CRCMSW-2
 Code : s
 Date Taken : 11/24/2014
 Sampled By : jdc
 Time Taken : 1430
 Depth or Flow : 2.66 cfs
 Tests to be done : pH, Cond, Fe, Mn, SO4, Acid, Alk,
 Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	20	mg/l	Heath Brown	12/02/2014	0815	305.1 (1)
Alkalinity	26	mg/l	Heath Brown	12/02/2014	0930	310.1 (1)
Conductivity	61	us/cm	Heath Brown	12/02/2014	1330	120.1 (1)
Iron	0.77	mg/l	Danny C. Mays	12/04/2014	1500	236.1 (1)
Manganese	0.09	mg/l	Danny C. Mays	12/04/2014	1600	243.1 (1)
pH	6.05	s.u.	Johnny Collier	11/24/2014	1430	150.1 (1)
Report			Sherri Fields	12/05/2014		
Sulfate	<1	mg/l	Heath Brown	12/02/2014	1350	8051 (3)
TSS	1	mg/l	Heath Brown	11/25/2014	1350	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

APPROVED BY: _____

PERC ENGINEERING CO., INC.

P.O. Box 1712

Jasper, Alabama 35502

(205) 384-5553

Sample Number : 172750
 Client : Cahaba Resources, LLC
 Facility : Carter Mine
 Job Number :
 NPDES Permit # :
 Basin, Stream, Well ID: CRCMSW-2
 Code : s
 Date Taken : 12/26/2014
 Sampled By : jdc
 Time Taken : 1445
 Depth or Flow : 3.58 cfs
 Tests to be done : pH, Cond, SO4, Fe, Mn, Acid, Alk,
 Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	4	mg/l	Michael Roell	12/30/2014	1435	305.1 (1)
Alkalinity	16	mg/l	Heath Brown	12/30/2014	1315	310.1 (1)
Conductivity	180	us/cm	Johnny Collier	12/26/2014	1445	120.1 (1)
Iron	0.75	mg/l	Danny C. Mays	01/02/2015	1345	236.1 (1)
Manganese	0.11	mg/l	Danny C. Mays	01/02/2015	1325	243.1 (1)
pH	6.95	s.u.	Johnny Collier	12/26/2014	1445	150.1 (1)
Report			Sherri Fields	01/07/2015		
Sulfate	<1	mg/l	Heath Brown	01/02/2015	1530	8051 (3)
TSS	1	mg/l	Heath Brown	12/30/2014	1515	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

APPROVED BY: _____

PERC ENGINEERING CO., INC.
P.O. Box 1712
Jasper, Alabama 35502
(205) 384-5553

Sample Number : 172995
Client : Cahaba Resources, LLC
Facility : Carter Mine
Job Number :
NPDES Permit # :
Basin, Stream, Well ID: CRCMSW-2
Code : S
Date Taken : 01/13/2015
Sampled By : jdc
Time Taken : 0955
Depth or Flow : 3.34 cfs
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,
Report, TSS, F2CMetals Al

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	4	mg/l	Heath Brown	01/16/2015	0805	305.1 (1)
Alkalinity	20	mg/l	Heath Brown	01/16/2015	0910	310.1 (1)
Conductivity	155	us/cm	Johnny Collier	01/13/2015	0955	120.1 (1)
Iron	0.64	mg/l	Danny C. Mays	01/19/2015	1430	236.1 (1)
Manganese	0.09	mg/l	Danny C. Mays	01/19/2015	1500	243.1 (1)
pH	6.85	s.u.	Johnny Collier	01/13/2015	0955	150.1 (1)
Report			Sherri Fields	02/04/2015		
Sulfate	<1	mg/l	Heath Brown	01/16/2015	1350	8051 (3)
TSS	1	mg/l	Heath Brown	01/14/2015	1110	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

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PERC ENGINEERING CO., INC.

P.O. Box 1712

Jasper, Alabama 35502

(205) 384-5553

Sample Number : 173632
 Client : Cahaba Resources, LLC
 Facility : Carter Mine
 Job Number :
 NPDES Permit # :
 Basin, Stream, Well ID: CRCMSW-2
 Code : s
 Date Taken : 02/27/2015
 Sampled By : jdc
 Time Taken : 1525
 Depth or Flow : 2.22 cfs
 Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,
 Report, TSS, F2CM Al

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	10	mg/l	Heath Brown	03/09/2015	1045	305.1 (1)
Alkalinity	14	mg/l	Heath Brown	03/09/2015	1450	310.1 (1)
Conductivity	58	us/cm	Heath Brown	03/02/2015	1500	120.1 (1)
Iron	0.36	mg/l	Danny C. Mays	03/03/2015	1430	236.1 (1)
Manganese	0.08	mg/l	Danny C. Mays	03/03/2015	1530	243.1 (1)
pH	5.79	s.u.	Johnny Collier	02/27/2015	1525	150.1 (1)
Report			Sherri Fields	03/18/2015		
Sulfate	<1	mg/l	Heath Brown	03/09/2015	0830	8051 (3)
TSS	2	mg/l	Heath Brown	03/02/2015	1440	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

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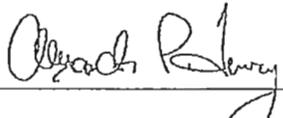
PERC ENGINEERING CO., INC.
P.O. Box 1712
Jasper, Alabama 35502
(205) 384-5553

Sample Number : 174079
Client : Cahaba Resources, LLC
Facility : Carter Mine
Job Number :
NPDES Permit # :
Basin, Stream, Well ID: CRCMSW-2
Code : s
Date Taken : 03/26/2015
Sampled By : jdc
Time Taken : 1312
Depth or Flow : 4.22 cfs
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	6	mg/l	Heath Brown	03/27/2015	1415	305.1 (1)
Alkalinity	20	mg/l	Heath Brown	03/27/2015	1445	310.1 (1)
Conductivity	90	us/cm	Johnny Collier	03/26/2015	1312	120.1 (1)
Iron	0.65	mg/l	Danny C. Mays	04/01/2015	1500	236.1 (1)
Manganese	0.08	mg/l	Danny C. Mays	04/01/2015	1430	243.1 (1)
pH	6.83	s.u.	Johnny Collier	03/26/2015	1312	150.1 (1)
Report			Sherri Fields	04/03/2015		
Sulfate	<1	mg/l	Heath Brown	03/27/2015	1330	8051 (3)
TSS	1	mg/l	Heath Brown	03/27/2015	1305	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
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- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
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Page

ANALYTICAL REPORT

For:
PERC Engineering Co., Inc - Carter Mine
1606 Highway 78 West
Jasper, AL 35501

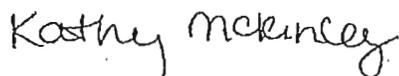
ASL Report #: P1419

Project ID: 921378.OTC

Attn: Sherri Fields

cc:
Paul Henry/phenny@percengineering.com

Authorized and Released By:



Laboratory Project Manager

Kathy McKinley

(541) 758-0235 ext.23144

March 17, 2015

All analyses performed by CH2M HILL are clearly indicated. Any subcontracted analyses are included as appended reports as received from the subcontracted laboratory. The results included in this report only relate to the samples listed on the following Sample Cross-Reference page. This report shall not be reproduced except in full, without the written approval of the laboratory.

Any unusual difficulties encountered during the analysis of your samples are discussed in the attached case narratives.



Accredited in accordance with NELAP:
Oregon (100022)
Louisiana (05031)

ASL Report #: P1419

Sample Receipt Comments

We certify that the test results meet all NELAP requirements.

Sample Cross-Reference

ASL Sample ID	Client Sample ID	Date/Time Collected	Date Received
P141901	173632-SW2	02/27/15 15:25	03/03/15
P141902	173633-SW1	02/27/15 15:55	03/03/15



CASE NARRATIVE METALS ANALYSIS

Lab Name: CH2M HILL ASL

ASL SDG#: P1419

Project: PERC Engineering Co., Inc

Project #: 921378.OTC

With the exceptions noted as flags, footnotes, or detailed in the section below; standard operating procedures were followed in the analysis of the samples and no problems were encountered or anomalies observed.

All laboratory quality control samples were within established control limits, with any exceptions noted below, or in the associated QC summary forms.

Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. For diluted samples, the reporting limits are adjusted for the dilution required.

Calculations are performed before rounding to minimize errors in calculated values.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the section below, or in the sample receipt documentation.

All analyses were performed in accordance with 40 CFR Part 136.

Method(s):

E200.8, IC-ICPMS: E200.2, FLDFLT

E245.1

Analytical Exception(s):

E200.8, IC-ICPMS:

Analysis time for client sample 173632-SW2

Arsenic species: 14:03

Total/Dissolved Arsenic: 14:33/14:38

Other ICPMS analytes: 15:48

Analysis time for client sample 173633-SW1

Arsenic species: 14:16

Total/Dissolved Arsenic: 14:44/14:49

Other ICPMS analytes: 15:54

E245.1:

Analysis time for client sample 173632-SW2

Total Mercury: 14:36

Analysis time for client sample 173633-SW1

Total Mercury: 14:41

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information				Lab Information			
Client Sample ID: 173632-SW2				Lab Sample ID: P141901			
Project Name: PERC Engineering Co., Inc				Date Received: 03/03/15			
Sample Date: 02/27/15				Report Revision No: 0			
Sample Time: 15:25							
Type: Grab							
Matrix: Water							

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Metals									
Aluminum	1	3.17	10.0	174		ug/L	E200.8	E200.2	03/04/15
Antimony	1	0.031	0.50	0.064	J	ug/L	E200.8	E200.2	03/04/15
Arsenic (CC)	1	0.030	0.50	0.24	J	ug/L	E200.8	E200.2	03/04/15
Beryllium	1	0.025	0.50	0.028	J	ug/L	E200.8	E200.2	03/04/15
Cadmium	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	03/04/15
Chromium	1	0.10	1.00	0.39	J	ug/L	E200.8	E200.2	03/04/15
Copper	1	0.50	2.00	0.65	J	ug/L	E200.8	E200.2	03/04/15
Lead	1	0.041	0.50	0.17	J	ug/L	E200.8	E200.2	03/04/15
Mercury	1	0.045	0.10	0.045	U	ug/L	E245.1	METHOD	03/11/15
Nickel	1	0.025	0.50	1.23		ug/L	E200.8	E200.2	03/04/15
Silver	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	03/04/15
Thallium	1	0.025	0.20	0.025	U	ug/L	E200.8	E200.2	03/04/15
Zinc	1	2.50	10.0	3.71	J	ug/L	E200.8	E200.2	03/04/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Client Sample ID: 173632-SW2	Lab Sample ID: P141901F
Project Name: PERC Engineering Co., Inc	Date Received: 03/03/15
Sample Date: 02/27/15	Report Revision No: 0
Sample Time: 15:25	
Type: Grab	
Matrix: Water	

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Dissolved Metals									
Arsenic (CC)	1	0.030	0.50	0.17	J	ug/L	E200.8	FLDFLT	03/13/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information				Lab Information			
Client Sample ID: 173633-SW1				Lab Sample ID: P141902			
Project Name: PERC Engineering Co., Inc				Date Received: 03/03/15			
Sample Date: 02/27/15				Report Revision No: 0			
Sample Time: 15:55							
Type: Grab							
Matrix: Water							

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Metals									
Aluminum	1	3.17	10.0	188		ug/L	E200.8	E200.2	03/04/15
Antimony	1	0.031	0.50	0.059	J	ug/L	E200.8	E200.2	03/04/15
Arsenic (CC)	1	0.030	0.50	0.22	J	ug/L	E200.8	E200.2	03/04/15
Beryllium	1	0.025	0.50	0.026	J	ug/L	E200.8	E200.2	03/04/15
Cadmium	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	03/04/15
Chromium	1	0.10	1.00	0.37	J	ug/L	E200.8	E200.2	03/04/15
Copper	1	0.50	2.00	0.63	J	ug/L	E200.8	E200.2	03/04/15
Lead	1	0.041	0.50	0.21	J	ug/L	E200.8	E200.2	03/04/15
Mercury	1	0.045	0.10	0.045	U	ug/L	E245.1	METHOD	03/11/15
Nickel	1	0.025	0.50	1.19		ug/L	E200.8	E200.2	03/04/15
Silver	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	03/04/15
Thallium	1	0.025	0.20	0.025	U	ug/L	E200.8	E200.2	03/04/15
Zinc	1	2.50	10.0	5.09	J	ug/L	E200.8	E200.2	03/04/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Client Sample ID: 173633-SW1	Lab Sample ID: P141902F
Project Name: PERC Engineering Co., Inc	Date Received: 03/03/15
Sample Date: 02/27/15	Report Revision No: 0
Sample Time: 15:55	
Type: Grab	
Matrix: Water	

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Dissolved Metals									
Arsenic (CC)	1	0.030	0.50	0.17	J	ug/L	E200.8	FLOFLT	03/13/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information		Lab Information	
Project Name: PERC Engineering Co., Inc		Method Blank ID: WB1-0304	
Sample Date: N/A		Date Received: N/A	
Sample Time: N/A		Report Revision No: 0	
Type: QC			
Matrix: Water			

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Metals									
Aluminum	1	3.17	10.0	3.71	J	ug/L	E200.8	E200.2	03/04/15
Antimony	1	0.031	0.50	0.031	U	ug/L	E200.8	E200.2	03/04/15
Arsenic (CC)	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	03/04/15
Beryllium	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	03/04/15
Cadmium	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	03/04/15
Chromium	1	0.10	1.00	0.10	U	ug/L	E200.8	E200.2	03/04/15
Copper	1	0.50	2.00	0.50	U	ug/L	E200.8	E200.2	03/04/15
Lead	1	0.041	0.50	0.041	U	ug/L	E200.8	E200.2	03/04/15
Nickel	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	03/04/15
Silver	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	03/04/15
Thallium	1	0.025	0.20	0.025	U	ug/L	E200.8	E200.2	03/04/15
Zinc	1	2.50	10.0	2.50	U	ug/L	E200.8	E200.2	03/04/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Sample Date: N/A Sample Time: N/A Type: QC Matrix: Water	Method Blank ID: WB1-0311 Date Received: N/A Report Revision No: 0

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Metals									
Mercury	1	0.045	0.10	0.045	U	ug/L	E245.1	METHOD	03/11/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information		Lab Information	
Project Name: PERC Engineering Co., Inc		Method Blank ID: WB10-0313	
Sample Date: N/A		Date Received: N/A	
Sample Time: N/A		Report Revision No: 0	
Type: QC			
Matrix: Water			

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Dissolved Metals									
Arsenic (CC)	1	0.030	0.50	0.030	U	ug/L	E200.8	FLDFLT	03/13/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Type: QC Matrix: Water	Blank Spike ID: BS10W0313 Report Revision No: 0 Dilution Factor: 1

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
Metals							
Arsenic (CC)	20.0	19.8	ug/L	99	E200.8	FLDFLT	03/13/15

*=See case narrative
 U=Not detected at specified detection limit
 E=Estimated value above calibration range
 J=Estimated value below reporting limit

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Type: QC Matrix: Water	Blank Spike ID: BS1W0304 Report Revision No: 0 Dilution Factor: 10

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
Metals							
Aluminum	500	514	ug/L	103	E200.8	E200.2	03/04/15
Antimony	500	478	ug/L	96	E200.8	E200.2	03/04/15
Arsenic (CC)	50.0	49.8	ug/L	100	E200.8	E200.2	03/04/15
Beryllium	500	496	ug/L	99	E200.8	E200.2	03/04/15
Cadmium	500	503	ug/L	101	E200.8	E200.2	03/04/15
Chromium	500	495	ug/L	99	E200.8	E200.2	03/04/15
Copper	500	446	ug/L	89	E200.8	E200.2	03/04/15
Lead	500	479	ug/L	96	E200.8	E200.2	03/04/15
Nickel	500	481	ug/L	96	E200.8	E200.2	03/04/15
Silver	250	238	ug/L	95	E200.8	E200.2	03/04/15
Thallium	500	499	ug/L	100	E200.8	E200.2	03/04/15
Zinc	500	494	ug/L	99	E200.8	E200.2	03/04/15

*=See case narrative

U=Not detected at specified detection limit

E=Estimated value above calibration range

J=Estimated value below reporting limit

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Type: QC Matrix: Water	Blank Spike ID: BS1W0311 Report Revision No: 0 Dilution Factor: 1

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
Metals							
Mercury	1.00	1.01	ug/L	101	E245.1	METHOD	03/11/15

*=See case narrative

U=Not detected at specified detection limit

E=Estimated value above calibration range

J=Estimated value below reporting limit

CH2M HILL ASL

EB150317-10:38-P1419-M

1100 NE Circle Blvd., Suite 300
 Corvallis, OR 97330
 Tel 541-768-3120 Fax 541-752-0276

Page 13 of 19

CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: 173632-SW2	Lab Sample ID: P141901
Project Name: PERC Engineering Co., Inc	Date Received: 3/3/2015
Sampling Date: 2/27/2015	Report Revision No.: 0
Sampling Time: 3:25:00 PM	
Type: Grab	
Matrix: Water	

Analyte	MDL	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
<i>Metals</i>							
Arsenic, AsIII	0.13	0.50	0.13	U	ug/L	IC-ICPMS	3/16/2015
Arsenic, AsV	0.15	0.50	0.15	U	ug/L	IC-ICPMS	3/16/2015

U=Not detected at specified detection limits
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: 173633-SW1	Lab Sample ID: P141902
Project Name: PERC Engineering Co., Inc	Date Received: 3/3/2015
Sampling Date: 2/27/2015	Report Revision No.: 0
Sampling Time: 3:55:00 PM	
Type: Grab	
Matrix: Water	

Analyte	MDL	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
<i>Metals</i>							
Arsenic, AsIII	0.13	0.50	0.13	U	ug/L	IC-ICPMS	3/16/2015
Arsenic, AsV	0.15	0.50	0.15	U	ug/L	IC-ICPMS	3/16/2015

U=Not detected at specified detection limits
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: Method Blank	Lab Sample ID: WB1-0316
Project Name: PERC Engineering Co., Inc	Date Received: NA
Sampling Date: NA	Report Revision No.: 0
Sampling Time: NA	
Type: QC	
Matrix: Water	

Analyte	MDL	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
<i>Metals</i>							
Arsenic, AsIII	0.13	0.50	0.13	U	ug/L	IC-ICPMS	3/16/2015
Arsenic, AsV	0.15	0.50	0.15	U	ug/L	IC-ICPMS	3/16/2015

U=Not detected at specified detection limits
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: Blank Spike	Lab Sample ID: BS1W0316
Project Name: PERC Engineering Co., Inc	Date Received: NA
Type: QC	Report Revision No.: 0
Matrix: Water	

Analyte	% Recovery	Analysis Method	Date Analyzed
<i>Metals</i>			
Arsenic, AsIII	112	IC-ICPMS	3/16/2015
Arsenic, AsV	107	IC-ICPMS	3/16/2015

U=Not detected at specified detection limits
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative



SDG ID: P1419

Date Received: 3/3/15

Client/Project: PERC ENGR

Received By: KF

Were custody seals intact and on the outside of the cooler? Yes No N/A

Shipping Record: Hand Delivered On File COC

Radiological Screening for DoD Yes No N/A

Packing Material: Hand Delivered Ice Blue Ice Box

Temp OK? (<6C) Therm ID: TH173 Exp. 5/15 0.7°C Yes No N/A

Was a Chain of Custody (CoC) Provided? Yes No N/A

Was the CoC correctly filled out (If No, document below) Yes No N/A

Did sample labels agree with COC? (If No, document below) Yes No N/A

Did the CoC list a correct bottle count and the preservative types (No=Correct on CoC) Yes No N/A

Were the sample containers in good condition (broken or leaking)? Yes No N/A

Was enough sample volume provided for analysis? (If No, document below) Yes No N/A

Containers supplied by ASL? Yes No N/A

Any sample with < 1/2 holding time remaining? If so contact LPM Yes No N/A

Samples have multi-phase? If yes, document on SRER Yes No N/A

All water VOCs free of air bubbles? No, document on SRER Yes No N/A

pH of all samples met criteria on receipt? If "No", preserve and document below. Yes No N/A

Dissolved/Soluble metals filtered in the field? Yes No N/A

Dissolved/Soluble metals have sediment in bottom of container? If so document below. Yes No N/A

Preservation Adjustment

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials/Time	24 hour pH check Initials/Time

Did pH of all metals samples preserved upon receipt meet criteria 24 hours after preservation? Yes No

Sample Exception Report (The following exceptions were noted)

Mercury method on COC was E245.2, used method E245.1

Client was notified on: Client contact:

Resolution to Exception:

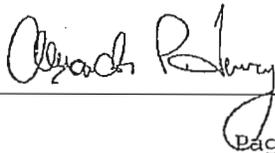
PERC ENGINEERING CO., INC.
P.O. Box 1712
Jasper, Alabama 35502
(205) 384-5553

Sample Number : 173632
Client : Cahaba Resources, LLC
Facility : Carter Mine
Job Number :
NPDES Permit # :
Basin, Stream, Well ID: CRCMSW-2
Code : s
Date Taken : 02/27/2015
Sampled By : jdc
Time Taken : 1525
Depth or Flow : 2.22 cfs
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,
Report, TSS, F2CM Al

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	10	mg/l	Heath Brown	03/09/2015	1045	305.1 (1)
Alkalinity	14	mg/l	Heath Brown	03/09/2015	1450	310.1 (1)
Conductivity	58	us/cm	Heath Brown	03/02/2015	1500	120.1 (1)
Iron	0.36	mg/l	Danny C. Mays	03/03/2015	1430	236.1 (1)
Manganese	0.08	mg/l	Danny C. Mays	03/03/2015	1530	243.1 (1)
pH	5.79	s.u.	Johnny Collier	02/27/2015	1525	150.1 (1)
Report			Sherri Fields	03/18/2015		
Sulfate	<1	mg/l	Heath Brown	03/09/2015	0830	8051 (3)
TSS	2	mg/l	Heath Brown	03/02/2015	1440	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

APPROVED BY: _____


Page



ANALYTICAL REPORT

For:
PERC Engineering Co., Inc
1606 Highway 78 West
Jasper, AL 35501

ASL Report #: P1090
Project ID: 921378.OTC
Attn: Sherri Fields

cc:
Paul Henry/alexanderpherry@percengineering.com

Authorized and Released By:

Kathy McKinley

Laboratory Project Manager
Kathy McKinley
(541) 758-0235 ext.23144
February 03, 2015

All analyses performed by CH2M HILL are clearly indicated. Any subcontracted analyses are included as appended reports as received from the subcontracted laboratory. The results included in this report only relate to the samples listed on the following Sample Cross-Reference page. This report shall not be reproduced except in full, without the written approval of the laboratory.

Any unusual difficulties encountered during the analysis of your samples are discussed in the attached case narratives.



Accredited in accordance with NELAP:
Oregon (100022)
Louisiana (05031)

ASL Report #: P1090

Sample Receipt Comments

We certify that the test results meet all NELAP requirements except those listed below:

- CH2M HILL Applied Sciences Laboratory is not accredited by NELAP for the following tests: E200.8M.

Sample Cross-Reference

ASL Sample ID	Client Sample ID	Date/Time Collected	Date Received
P109001	172995 SW-2	01/13/15 09:55	01/20/15
P109002	172998 SW-1	01/13/15 11:30	01/20/15



CASE NARRATIVE METALS ANALYSIS

Lab Name: CH2M HILL ASL

ASL SDG#: P1090

Project: PERC Engineering Co., Inc

Project #: 921378.OTC

With the exceptions noted as flags, footnotes, or detailed in the section below; standard operating procedures were followed in the analysis of the samples and no problems were encountered or anomalies observed.

All laboratory quality control samples were within established control limits, with any exceptions noted below, or in the associated QC summary forms.

Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. For diluted samples, the reporting limits are adjusted for the dilution required.

Calculations are performed before rounding to minimize errors in calculated values.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the section below, or in the sample receipt documentation.

All analyses were performed in accordance with 40 CFR Part 136.

Method(s):

E200.8, IC-ICPMS: E200.2, FLDFLT

E245.1

Analytical Exception(s):

E200.8, IC-ICPMS:

Analysis time for client sample 172995 SW-2:

Arsenic species: 14:07

Total/Dissolved Arsenic: 17:57/18:02

Other ICPMS analytes: 12:08

Analysis time for client sample 172998 SW-1:

Arsenic species: 14:45

Total/Dissolved Arsenic: 18:29/18:35

Other ICPMS analytes: 12:27

E245.1:

Analysis time for client sample 172995 SW-2:

Total Mercury: 08:24

Analysis time for client sample 172998 SW-1:

Total Mercury: 08:26

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information		Lab Information	
Client Sample ID: 172995 SW-2		Lab Sample ID: P109001	
Project Name: PERC Engineering Co., Inc		Date Received: 01/20/15	
Sample Date: 01/13/15		Report Revision No: 0	
Sample Time: 09:55			
Type: Grab			
Matrix: Water			

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Metals									
Aluminum	1	3.17	10.0	56.1		ug/L	E200.8	E200.2	01/26/15
Antimony	1	0.031	0.50	0.052	J	ug/L	E200.8	E200.2	01/26/15
Arsenic (CC)	1	0.030	0.50	0.25	J	ug/L	E200.8	E200.2	01/23/15
Beryllium	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	01/26/15
Cadmium	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	01/26/15
Chromium	1	0.10	1.00	0.20	J	ug/L	E200.8	E200.2	01/26/15
Copper	1	0.50	2.00	0.64	J	ug/L	E200.8	E200.2	01/26/15
Lead	1	0.041	0.50	0.13	J	ug/L	E200.8	E200.2	01/26/15
Mercury	1	0.045	0.10	0.045	U	ug/L	E245.1	METHOD	01/27/15
Nickel	1	0.025	0.50	0.86		ug/L	E200.8	E200.2	01/26/15
Selenium	1	0.069	0.50	0.097	J	ug/L	E200.8	E200.2	01/26/15
Silver	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	01/26/15
Thallium	1	0.025	0.20	0.025	U	ug/L	E200.8	E200.2	01/26/15
Zinc	1	2.50	10.0	5.85	J	ug/L	E200.8	E200.2	01/26/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information				Lab Information			
Client Sample ID: 172995 SW-2				Lab Sample ID: P109001F			
Project Name: PERC Engineering Co., Inc				Date Received: 01/20/15			
Sample Date: 01/13/15				Report Revision No: 0			
Sample Time: 09:55							
Type: Grab							
Matrix: Water							

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Dissolved Metals									
Arsenic (CC)	1	0.030	0.50	0.22	J	ug/L	E200.8	FLDFLT	01/23/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information				Lab Information			
Client Sample ID: 172998 SW-1				Lab Sample ID: P109002			
Project Name: PERC Engineering Co., Inc				Date Received: 01/20/15			
Sample Date: 01/13/15				Report Revision No: 0			
Sample Time: 11:30							
Type: Grab							
Matrix: Water							

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Metals									
Aluminum	1	3.17	10.0	48.2		ug/L	E200.8	E200.2	01/26/15
Antimony	1	0.031	0.50	0.20	J	ug/L	E200.8	E200.2	01/26/15
Arsenic (CC)	1	0.030	0.50	0.24	J	ug/L	E200.8	E200.2	01/23/15
Beryllium	1	0.025	0.50	0.030	J	ug/L	E200.8	E200.2	01/26/15
Cadmium	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	01/26/15
Chromium	1	0.10	1.00	0.24	J	ug/L	E200.8	E200.2	01/26/15
Copper	1	0.50	2.00	0.50	U	ug/L	E200.8	E200.2	01/26/15
Lead	1	0.041	0.50	0.15	J	ug/L	E200.8	E200.2	01/26/15
Mercury	1	0.045	0.10	0.045	U	ug/L	E245.1	METHOD	01/27/15
Nickel	1	0.025	0.50	0.86		ug/L	E200.8	E200.2	01/26/15
Selenium	1	0.069	0.50	0.18	J	ug/L	E200.8	E200.2	01/26/15
Silver	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	01/26/15
Thallium	1	0.025	0.20	0.025	U	ug/L	E200.8	E200.2	01/26/15
Zinc	1	2.50	10.0	5.66	J	ug/L	E200.8	E200.2	01/26/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Client Sample ID: 172998 SW-1	Lab Sample ID: P109002F
Project Name: PERC Engineering Co., Inc	Date Received: 01/20/15
Sample Date: 01/13/15	Report Revision No: 0
Sample Time: 11:30	
Type: Grab	
Matrix: Water	

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Dissolved Metals									
Arsenic (CC)	1	0.030	0.50	0.19	J	ug/L	E200.8	FLDFLT	01/23/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information		Lab Information	
Project Name: PERC Engineering Co., Inc		Method Blank ID: WB1-0123	
Sample Date: N/A		Date Received: N/A	
Sample Time: N/A		Report Revision No: 0	
Type: QC			
Matrix: Water			

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Metals									
Aluminum	1	3.17	10.0	3.17	U	ug/L	E200.8	E200.2	01/26/15
Antimony	1	0.031	0.50	0.031	U	ug/L	E200.8	E200.2	01/26/15
Arsenic (CC)	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	01/23/15
Beryllium	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	01/26/15
Cadmium	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	01/26/15
Chromium	1	0.10	1.00	0.10	U	ug/L	E200.8	E200.2	01/26/15
Copper	1	0.50	2.00	0.50	U	ug/L	E200.8	E200.2	01/26/15
Lead	1	0.041	0.50	0.041	U	ug/L	E200.8	E200.2	01/26/15
Nickel	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	01/26/15
Selenium	1	0.069	0.50	0.069	U	ug/L	E200.8	E200.2	01/26/15
Silver	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	01/26/15
Thallium	1	0.025	0.20	0.025	U	ug/L	E200.8	E200.2	01/26/15
Zinc	1	2.50	10.0	2.50	U	ug/L	E200.8	E200.2	01/26/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information				Lab Information			
Project Name: PERC Engineering Co., Inc				Method Blank ID: WB1-0126			
Sample Date: N/A				Date Received: N/A			
Sample Time: N/A				Report Revision No: 0			
Type: QC							
Matrix: Water							

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Metals									
Mercury	1	0.045	0.10	0.045	U	ug/L	E245.1	METHOD	01/27/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information		Lab Information	
Project Name: PERC Engineering Co., Inc		Method Blank ID: WB10-0123	
Sample Date: N/A		Date Received: N/A	
Sample Time: N/A		Report Revision No: 0	
Type: QC			
Matrix: Water			

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Dissolved Metals									
Arsenic (CC)	1	0.030	0.50	0.030	U	ug/L	E200.8	FLDFLT	01/23/15

U=Not detected at specified detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information				Lab Information			
Project Name: PERC Engineering Co., Inc				Blank Spike ID: BS10W0123			
Type: QC				Report Revision No: 0			
Matrix: Water				Dilution Factor: 1			

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
Metals							
Arsenic (CC)	20.0	19.4	ug/L	97	E200.8	FLDFLT	01/23/15

*=See case narrative

U=Not detected at specified detection limit

E=Estimated value above calibration range

J=Estimated value below reporting limit

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Type: QC Matrix: Water	Blank Spike ID: BS1W0123 Report Revision No: 0 Dilution Factor: 1

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
Metals							
Aluminum	50.0	50.7	ug/L	101	E200.8	E200.2	01/23/15
Antimony	50.0	47.7	ug/L	95	E200.8	E200.2	01/26/15
Arsenic (CC)	50.0	49.6	ug/L	99	E200.8	E200.2	01/26/15
Beryllium	50.0	49.1	ug/L	98	E200.8	E200.2	01/26/15
Cadmium	50.0	50.3	ug/L	101	E200.8	E200.2	01/26/15
Chromium	50.0	50.6	ug/L	101	E200.8	E200.2	01/26/15
Copper	50.0	45.4	ug/L	91	E200.8	E200.2	01/26/15
Lead	50.0	48.8	ug/L	98	E200.8	E200.2	01/26/15
Nickel	50.0	48.9	ug/L	98	E200.8	E200.2	01/26/15
Selenium	50.0	49.7	ug/L	99	E200.8	E200.2	01/26/15
Silver	25.0	23.1	ug/L	92	E200.8	E200.2	01/26/15
Thallium	50.0	50.7	ug/L	101	E200.8	E200.2	01/26/15
Zinc	50.0	53.2	ug/L	106	E200.8	E200.2	01/26/15

*=See case narrative

U=Not detected at specified detection limit

E=Estimated value above calibration range

J=Estimated value below reporting limit

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Type: QC Matrix: Water	Blank Spike ID: BS1W0126 Report Revision No: 0 Dilution Factor: 1

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
Metals							
Mercury	1.00	0.99	ug/L	99	E245.1	METHOD	01/27/15

*=See case narrative

U=Not detected at specified detection limit

E=Estimated value above calibration range

J=Estimated value below reporting limit

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Client Sample ID: 172995 SW-2	Lab Sample ID: P109001
Project Name: PERC Engineering Co., Inc	Date Received: 1/20/2015
Sampling Date: 1/13/2015	Report Revision No.: 0
Sampling Time: 9:55:00 AM	
Type: Grab	
Matrix: Water	

Analyte	MDL	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
<i>Metals</i>							
Arsenic, AsIII	0.13	0.50	0.13	J	ug/L	IC-ICPMS	2/2/2015
Arsenic, AsV	0.15	0.50	0.15	U	ug/L	IC-ICPMS	2/2/2015

U=Not detected at specified detection limits
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: 172998 SW-1	Lab Sample ID: P109002
Project Name: PERC Engineering Co., Inc	Date Received: 1/20/2015
Sampling Date: 1/13/2015	Report Revision No.: 0
Sampling Time: 11:30:00 AM	
Type: Grab	
Matrix: Water	

Analyte	MDL	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
<i>Metals</i>							
Arsenic, AsIII	0.13	0.50	0.17	J	ug/L	IC-ICPMS	2/2/2015
Arsenic, AsV	0.15	0.50	0.15	U	ug/L	IC-ICPMS	2/2/2015

U=Not detected at specified detection limits
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: Method Blank	Lab Sample ID: WB1-0202
Project Name: PERC Engineering Co., Inc	Date Received: NA
Sampling Date: NA	Report Revision No.: 0
Sampling Time: NA	
Type: QC	
Matrix: Water	

Analyte	MDL	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
<i>Metals</i>							
Arsenic, AsIII	0.13	0.50	0.13	U	ug/L	IC-ICPMS	2/2/2015
Arsenic, AsV	0.15	0.50	0.15	U	ug/L	IC-ICPMS	2/2/2015

U=Not detected at specified detection limits
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: Blank Spike
Project Name: PERC Engineering Co., Inc
Type: QC
Matrix: Water

Lab Information

Lab Sample ID: BS1W0202
Date Received: NA
Report Revision No.: 0

Analyte	% Recovery	Analysis Method	Date Analyzed
<i>Metals</i>			
Arsenic, AsIII	112	IC-ICPMS	2/2/2015
Arsenic, AsV	112	IC-ICPMS	2/2/2015

U=Not detected at specified detection limits
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative



SDG ID: P1090

Date Received: 1/20/15

Client/Project: Perc Engr.

Received By: KF

- Were custody seals intact and on the outside of the cooler? Yes No N/A
- Shipping Record: Hand Delivered On File COC
- Radiological Screening for DoD Yes No N/A
- Packing Material: Hand Delivered Ice Blue Ice Box
- Temp OK? (<6C) Therm ID: TH173 Exp. 2/15 1.4 °C Yes No N/A
- Was a Chain of Custody (CoC) Provided? Yes No N/A
- Was the CoC correctly filled out (If No, document below) Yes No N/A
- Did sample labels agree with COC? (If No, document below) Yes No N/A
- Did the CoC list a correct bottle count and the preservative types (No=Correct on CoC) Yes No N/A
- Were the sample containers in good condition (broken or leaking)? Yes No N/A
- Was enough sample volume provided for analysis? (If No, document below) Yes No N/A
- Containers supplied by ASL? Yes No N/A
- Any sample with < 1/2 holding time remaining? If so contact LPM Yes No N/A
- Samples have multi-phase? If yes, document on SRER Yes No N/A
- All water VOCs free of air bubbles? No, document on SRER Yes No N/A
- pH of all samples met criteria on receipt? If "No", preserve and document below. Yes No N/A
- Dissolved/Soluble metals filtered in the field? Yes No N/A
- Dissolved/Soluble metals have sediment in bottom of container? If so document below. Yes No N/A

Preservation Adjustment

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials/Time	24 hour pH check Initials/Time

Did pH of all metals samples preserved upon receipt meet criteria 24 hours after preservation? Yes No

Sample Exception Report (The following exceptions were noted)

Client was notified on: _____ Client contact: _____

Resolution to Exception: