

SURFACE WATER HYDROLOGY (880-X-8E-.06(1))

1. Surface Water Hydrology Description:

The proposed permit area is located in the Warrior River Drainage Basin. All surface water runoff from Beaird Mining & Minerals Co., Inc.'s Cane Creek Mine site drains into Cane Creek and Little Frog Ague which flows into Mulberry Fork, which in turn will flow into the Black Warrior River.

All surface water leaving parts of the permit area which has been disturbed by mining will be routed through one of five (5) sediment basins before being discharged into state waters. All streams in Alabama are considered to be waters of the state. The Alabama Department of Environmental Management designation of streams within the surrounding area are as follows: There are no streams within the permit boundaries. Cane Creek is classified as an Agricultural and Industrial water supply, Little Frog Ague is classified as Fish and Wildlife. The Mulberry Fork's water is used for many purposes along various sections, municipale and industrial water supply, recreational, fish and wildlife as classified by the "Hydrologic Assessment, Eastern Coal Province Area 23, Alabama". The USGS Hydrologic Unit Code and SCS Sub-watershed Number for the area streams is 03160109-150 and 190.

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CANE CREEK MINE, P-3742  
ATTACHMENT II-G

Baseline surface water quality and quantity for this mine site will be characterized by samples taken at stations BMMUS1A, BMMUS1B, MNNUS2 (upstream), and BMMDS1 and BMMDS2 (downstream) of the permit area. BMMDS1 located downstream on Cane Creek drains approximately 35,648 acres or 55.70 square miles. At station BMMDS1 approximately 118 acres or 0.33 percent will be disturbed by this mining operation. BMMDS2 located on Little Frog Ague drains approximately 934.4 acres or 1.46 square miles. At station BMMDS2 approximately 80 acres or 8.56 percent will be disturbed by this mining operation. BMMUS1A located upstream on Cane Creek drains approximately 10,368 acres or 16.20 square miles. BMMUS1B located upstream on Bull Barn Creek drains approximately 2,378 acres or 3.71 square miles. BMMUS2 located upstream on Little Frog Ague drains approximately 224 acres or 0.35 square miles. Stations BMMUS1A, BMMUS1B, and BMMUS2 which are located upstream from the permit area and do not receive any drainage from the mine site and will be used for performance monitoring. For water quantity, drainage area and description of each surface water monitoring station see attached Surface Water Baseline Analysis. For the locations of the surface water monitoring stations refer to the attached Hydro/Geo Map.

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2. Surface Water Bodies

A total of five (5) sediment control structures are proposed for this mining operation. Basin 002P will drain into Bull Barn Creek, basins 007P and 009P will drain into Cane Creek, and basins 010P and 011P will drain into Little Frog Ague. All basins are proposed as temporary basins. For the locations of surface water monitoring stations see the Surface Water Stations Monitoring Map and for the NPDES numbers of sediment basins see attached Hydro/Geo Map in Part II-E.

3. Surface Water Uses:

There is no known use of surface water between the mine site and the receiving streams based on visual inspection and information taken from aerial photos of the permit area. The only known use of surface water in the adjacent area is by fish and Wildlife.

4. Surface Water Quality:

For water quality see attached Surface Water Baseline Analysis.

5. Surface Water Quantity:

For water quantity, drainage area and description of each surface water monitoring station see attached Surface Water Baseline

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Analysis. For the locations of the surface water monitoring stations refer to the attached Hydro/Geo Map.

6. Surface Water Sampling and Analytical Methods:

All surface water samples were taken by the grab method. Flowrate measurements of surface water samples were performed in accordance with ASTM D3858, 10.9.6, p.101 "Standard Practice for Open Channel Flow Measurement of Water by Velocity - Area Method" or other equally valid approved methods. Specific Conductivity and pH of all samples were measured in the field. The samples were poured in a clean plastic container and stored at a temperature near 4°C and all other parameters were analyzed within 24 hours. If samples were not analyzed within 24 hours, after the pH was measured, the pH was adjusted to 2.0 s.u. or less with Nitric Acid (about 2 mL per liter) which allows samples to be stored up to six months at room temperature. Prior to analyzing other parameters, the pH was re-adjusted to between 4.0 and 5.0 s.u. N Sodium Hydroxide. All other parameters were adjusted for volume addition.

7. Precipitation Modeling:

No modeling methods are employed at this time.

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8. Surface Water Monitoring Station Location(s):

For locations of surface water monitoring stations see the attached Surface Water Stations Monitoring Map and Hydro/Geo Map.

9. Surface Water Sampling and Analytical Information:

For Sampling and analytical information see above statement 6, Surface Water Quality Data and Analytical Dates Table.

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BEAIRD MINING & MINERALS CO., INC.  
CANE CREEK MINE  
ATTACHMENT II - E

SURFACE WATER BASELINE ANALYSIS

SAMPLE I.D.: BMMUS1A  
MONITORING SOURCE: CANE CREEK  
DRAINAGE AREA: 16.20 sq. mi.  
LOCATION FROM MINE: UPSTREAM

DATE	pH s.u.	TSS mg/l	FeT mg/l	MnT mg/l	SpC umhos/cm	SO4 mg/l	ACID mg/l	ALK. mg/l	FLOW csm
05-14-93	7.7	2.5	0.55	trace	603		1.2	4.6	142.0
06-11-93	8.0	3.5	2.70	trace	1135				75
07-09-93	8.0	7.5	0.10	trace	860				71.5
07-20-93	8.3	30.5	0.25	0.05	1250				69.4
08-11-93	6.9	8.0	0.20	0.20	932				82.3
08-25-93	7.4	9.0	0.15	0.10	678				70.6
09-23-93	7.1	7.5	0.10	0.10	1050				29.8
10-19-93	7.6	3.5	0.40	trace	753				111.8
02-10-94	7.6	5.5	0.35	0.10	788				104.6
03-04-94	7.4	4.5	0.20	0.10	694				96.4

NOTE: All samples were sampled and analyzed by Environmental Engineering Services, Inc. within the same calendar day.

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ANALYZED BY  
ENVIRONMENTAL ENGINEERING SERVICES, INC.  
12-15-93

BEAIRD MINING & MINERALS CO., INC.  
CANE CREEK MINE  
ATTACHMENT II - E

SURFACE WATER BASELINE ANALYSIS

SAMPLE I.D.: BMMUS1B  
MONITORING SOURCE: BULL BARN CREEK  
DRAINAGE AREA: 3.71 sq/mi.  
LOCATION FROM MINE: UPSTREAM

DATE	pH s.u.	TSS mg/l	FeT mg/l	MnT mg/l	SpC umhos/cm	SO4 mg/l	ACID mg/l	ALK. mg/l	FLOW csm
05-14-93	7.8	3.5	0.55	trace	1670		0.8	3.6	195.8
06-11-93	7.8	4.5	0.10	trace	3000				187.5
07-09-93	7.8	4.5	0.10	trace	2800				154.7
07-20-93	7.8	6.5	0.05	trace	3300				151.2
08-11-93	7.2	11.0	0.15	0.30	1478				124.6
08-25-93	7.6	4.0	0.30	0.20	1042				99.1
09-23-93	7.3	6.0	0.20	0.20	2900				60.0
10-19-93	7.7	7.5	0.10	0.10	1720				142.6
02-10-94	7.9	4.0	0.20	0.10	1124				179.3
03-04-94	7.2	6.0	trace	0.20	811				168.2

NOTE: All samples were sampled and analyzed by Environmental Engineering Services, Inc. within the same calendar day.

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SURFACE WATER BASELINE ANALYSIS

SAMPLE I.D.: BMMUS2  
MONITORING SOURCE: LITTLE FROG AGUE  
DRAINAGE AREA: 0.35 sq.mi  
LOCATION FROM MINE: UPSTREAM

DATE	pH s.u.	TSS mg/l	FeT mg/l	MnT mg/l	SpC umhos/cm	SO4 mg/l	ACID mg/l	ALK. mg/l	FLOW csm
05-14-93	7.2	9.5	2.00	1.50	478		0.4	2.1	N.F.
06-11-93	7.4	1.0	1.10	0.54	530				N.F.
07-09-93	6.8	41.5	0.40	trace	725				N.F.
07-20-93	7.3	190	1.80	1.00	752				N.F.
08-11-93	7.1	32.5	0.70	0.40	1141				N.F.
08-25-93	7.1	21.5	0.85	0.40	1418				N.F.
09-23-93	7.4	94.5	0.70	0.60	761				N.F.
10-19-93	7.3	11.5	1.15	0.25	626				N.F.
02-10-94	7.4	13.5	0.60	0.30	1478				N.F.
03-04-94	7.6	14.5	0.55	0.60	1021				N.F.

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SURFACE WATER BASELINE ANALYSIS

SAMPLE I.D.: BMMDS1  
MONITORING SOURCE: CANE CREEK  
DRAINAGE AREA: 55.70 SQ.MI.  
LOCATION FROM MINE: DOWNSTREAM

DATE	pH s.u.	TSS mg/l	FeT mg/l	MnT mg/l	SpC umhos/cm	SO4 mg/l	ACID mg/l	ALK. mg/l	FLOW csm
05-14-93	7.7	11.5	0.70	trace	620		0.8	3.2	1860.0
06-11-93	7.8	6.5	0.15	0.10	1208				525.5
07-09-93	7.2	24.5	trace	0.05	1000				1180.3
07-20-93	8.1	27.5	0.10	0.02	665				1169.1
08-11-93	7.4	3.0	0.25	0.10	1280				1231.6
08-25-93	7.8	4.5	0.20	0.20	972				894.6
09-23-93	7.7	4.5	0.10	0.10	684				2269.9
10-19-93	7.6	16.0	0.60	0.20	774				1482.6
02-10-94	7.0	9.0	0.25	trace	1242				1528.4
03-04-94	7.1	8.0	trace	0.10	942				1432.2

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BEAIRD MINING & MINERALS CO., INC.  
 CANE CREEK MINE  
 ATTACHMENT II - E

SURFACE WATER BASELINE ANALYSIS

SAMPLE I.D.: BMMDS2  
 MONITORING SOURCE: LITTLE FROG AUGER  
 DRAINAGE AREA: 1.46 SQ.MI.  
 LOCATION FROM MINE: DOWNSTREAM

DATE	pH s.u.	TSS mg/l	FeT mg/l	MnT mg/l	SpC umhos/cm	SO4 mg/l	ACID mg/l	ALK. mg/l	FLOW csm
05-14-93	8.2	1.5	0.30	trace	314		0.6	2.7	39.6
06-11-93	8.1	0.5	1.60	0.10	470				16.8
07-09-93	8.2	21.0	0.20	trace	631				65.2
07-20-93	8.1	4.5	0.10	0.02	665				64.5
08-11-93	6.8	5.5	0.40	0.20	694				42.8
08-25-93	8.1	6.0	0.35	0.10	1681				38.2
09-23-93	7.2	1.5	0.05	trace	502				11.3
10-19-93	7.8	2.0	0.35	trace	468				27.4
02-10-94	8.1	12.0	0.15	trace	1680				72.3
03-04-94	7.9	3.5	0.10	0.10	1438				46.2

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