

### HYDROLOGIC MONITORING PLAN

COMPANY NAME: BLACK WARRIOR MINERALS, INC.  
MINE NAME: MINE NO. 1, P-3950 COUNTY: JEFFERSON  
NPDES: AL0079707

[\\*A MAP SHOWING ALL MONITORING POINTS MUST ACCOMPANY THIS PLAN](#)

#### **I. Surface Water Monitoring Program: (Discharge Points)**

List each discharge point to be monitored and indicate the type or source of discharge	List parameters to be sampled for each discharge point	List frequency of sampling for each discharge point	Duration of Monitoring
Sediment Basin 041E, 042E, 044E, 046E, 103P, 118E, 119E	pH Iron (Fe) Total Suspended Solids (TSS) **Manganese	Twice monthly	Until joint approval by ASMC and ADEM. In no case sooner than ASMC approval of Phase II Bond release

\*\* Manganese will only be analyzed when required to be in accordance with the NPDES permit. Grab Samples from the primary spillway systems. See attached map for all monitoring site locations.

**Note: If a sample is taken during or within 24 hours after an applicable precipitation event\*, an exemption as allowed by the NPDES permit for Iron (total), Manganese (total) and Total Suspended Solids may be claimed and Settleable Solids, pH and Flow run and reported. The exemption is only applicable if the ADEM “New Source Coal Mine and Associated Discharge Limitations, Conditions and Requirements” are followed.**

**\*An increase in discharge volume caused by an applicable 24-hour precipitation event.**

**A. Reporting and Recording Specifications:**

a) NPDES outfalls:

Reporting as required for NPDES permit to Alabama Department of Environmental Management plus a simultaneous copy to ASMC containing the following:

- 1) Name of Company
- 2) Name of Mine
- 3) ASMC permit number
- 4) NPDES number
- 5) Sampling period covered by report
- 6) List of the discharge points sampled and analysis results

b) Other:

**B. Non-Compliant Discharge Reporting:**

Reporting as required by the NPDES permit to Alabama Department of Environmental Management plus simultaneous copy (indicating ASMC permit number) to ASMC.

## II. Other Surface Water Monitoring.

Bodies of water receiving discharges from the mine:

### **Crooked Creek      U.T. to Crooked Creek**

List Monitoring Points and indicate type or describe location	List Parameters to be sampled	Frequency Minimum Quarterly	Duration of Monitoring	
<b>Site ID</b>	<b>Description</b>	<b>Parameter s Sampled</b>	<b>Minimum Sample Frequency</b>	<b>Duration of Monitoring</b>
DSW-1	Downstream – Crooked Creek	See Table 1	Quarterly	Life of Mine
USW-1	Upstream – Crooked Creek	See Table 1	Quarterly	Life of Mine
USW-1A	Upstream U.T. Crooked Creek	See Table 1	Quarterly	Life of Mine

**TABLE 1 – LIST OF PARAMETERS TO BE SAMPLED**

Parameter	Symbol	Total or Dissolved	Units
Flow Rate	Disch.		CFS
pH	-	-	-
Total Suspended Solids	TSS	Total	mg/l
Iron	Fe	Total	mg/l
Manganese	Mn	Total	mg/l
Aluminum	Al	Dissolved	µg/l
Antimony	Sb	Dissolved	µg/l
*Arsenic	As	Dissolved	µg/l
Beryllium	Be	Dissolved	µg/l
Cadmium	Cd	Dissolved	µg/l
Chromium	Cr	Dissolved	µg/l
Copper	Cu	Dissolved	µg/l
Mercury	Hg	Dissolved	µg/l
Nickel	Ni	Dissolved	µg/l
Selenium	Se	Dissolved	µg/l
Silver	Ag	Dissolved	µg/l
Thallium	Tl	Dissolved	µg/l
Zinc	Zn	Dissolved	µg/l

\* If arsenic is detected, arsenic speciation must be conducted.

**A. Reporting and Recording Specifications:**

- 1) Frequency of Reporting: Quarterly
  
- 2) Contents of Report: Name of company, mine name, ASMC permit number and for all monitoring locations, the dates samples were taken and sample results for each parameter and who collected and analyzed the samples.

**III. Monitoring requirements for removal of sediment ponds and other treatment facilities:**

One sample of inflow collected within 48 hours after commencement of a 24 hour precipitation event. Monitoring data will be submitted to ASMC with application to remove the facility.

Monitoring sites shall be located to sample water entering the facility. (i.e., untreated drainage).

Show proposed locations on the monitoring location map. Parameters to be sampled shall be those required by the NPDES permit.

**IV. A. Monitoring requirements for Phase II bond release:**

List each discharge point to be monitored and indicate the type or source of discharge	List parameters to be sampled for each discharge point	List frequency of sampling for each discharge point	Duration of Monitoring
Sediment Basins: 041E, 042E, 044E, 046E, 103P, 118E, 119E	pH Iron (Fe) Total Suspended Solids (TSS) Manganese	Monthly	No less than monthly for the previous 6 months prior to application for Phase II Bond release.
If no flow to basins during 6 month period:	Same as above.		In pond Sample

Inflow sample will be taken within 48 hours after commencement of a 24 hour precipitation event.

If the basin has not discharged during the 6 month period, an in pond sample will be taken.

**B. Reporting:**

Reports shall be submitted with application for Phase II Bond Release indicating: Sample location number, monitoring period, analysis results, date for each sample, sampling and analytical data and a map showing location of the sample sites.

**V. Groundwater Monitoring**

List Monitoring Points and indicate type or describe location	List Parameters to be sampled	Frequency Minimum Quarterly	Duration of Monitoring
MW-1 MW-2	pH Iron (Fe) Manganese (Mn) Water Level Sulfates Conductivity (SpC)	Quarterly	For Life Of Mine

If any of the wells listed above are destroyed or mined through, it (or they) will be re-drilled at its (their) approximate original location(s) and will be drilled to the approximate same depth as the original well(s). Replacement of the well(s) will be conducted in a manner which will not interrupt the quarterly monitoring of these groundwater sites. The well casing(s) will be installed in such a manner as to prevent surficial contamination. A lithologic log of the re-drilled well(s), along with casing specifications, will be submitted to the Regulatory Authority with the first post-restoration sample.

If, according to the results of the PHC, it is determined that groundwater monitoring may not be necessary, the applicant shall submit with the permit application sufficient documentation, including geologic and hydrologic relations, to enable the Commission to make a decision regarding a waiver of the monitoring of the groundwater.

**A. Reporting and Recording:**

Reports to be filed with ASMC quarterly supplying the following information: Company name, mine name, permit number, and for each monitoring site, the date and sample results for each parameter, including sampling and analytical information for all samples.

**VI. Maintenance of records and Availability for Inspection:**

Reports will be filed with ASMC quarterly, indicating company name, mine name, permit number, date of sample, and analysis results.

**VII.** Describe how the data obtained from performance monitoring may be used to determine the impacts of the operation upon the hydrologic balance. Describe how parameters to be monitored relate to the suitability of the surface and ground water for current and approved post mining land use.

The performance monitoring as described above will provide an excellent gauge for determining most alterations in the hydrologic balance that are caused by this mining operation.

BLACK WARRIOR MINERALS, INC.  
MINE NO. 1, P-3950, R-5  
PART III-D & III-E

Surface water-monitoring site DSW-1 is located downstream (Crooked Creek), USW-1B is located upstream (Crooked Creek), and USW-1A is located upstream (U.T. to Crooked Creek) of any mining to be conducted by BLACK WARRIOR MINERALS, INC. Results of the analysis from the pre-mine analysis of this station can be compared to the post mining results during mining to determine the impact to the receiving stream once mining begins. Monitoring Wells MW-1 and MW-2 will monitor the characteristics of the groundwater within the permit area. This site can be compared to the results of the analysis from baseline sampling to determine the impact to the groundwater and be compared to predictions made in the PHC.

No other parameters are deemed necessary at this time. However, if, during the course of the mining operation, it is determined through the performance monitoring that problems exist, additional parameters may be monitored and the hydrologic monitoring plan will be revised (in consultation with ASMC) to reflect such changes.

**VIII.** Please NOTE: ALL PERFORMANCE MONITORING REPORTS should be submitted in duplicate. For companies with multiple permits, each permit should have a corresponding monitoring report. Sites serving multiple permits should be included in all pertinent monitoring reports.

**IX.** If a waiver is requested for a particular water-bearing stratum, give details. 880-X-8H.06(1)(h)(2)

### **I. Plans For Recording and Reporting Data (779.13)**

Describe how surface and groundwater quantity and quality will be collected, recorded, and reported to the Regulatory Authority according to Section 816.52.

All samples shall be taken according to Standard Methods 1060 and "Collection and Preservation of Samples" or other equally valid approved methods.

Surface water samples shall be taken by the "grab" method.

Flowrate measurement of surface water samples shall be according to ASTM D3858 "Standard Practice for Open Channel Flow Measurement of Water by Velocity - Area Method" or other equally valid approved methods.

The pH of all samples will be measured in the field (within 2 hours). The sample will be stored in ice or near 4<sup>o</sup> C and all other parameters will be analyzed within 24 hours. If samples cannot be analyzed within 24 hours, after the pH has been measured, the pH will be adjusted to 2.0 s.u. or less with Nitric Acid (about 2 mL per liter) which allows samples to be stored up to 6 months at room temperature. Prior to analyzing other parameters, the pH will be re-adjusted to between 4.0 and 5.0 s.u. with 0.1 N Sodium Hydroxide. All other parameters will be adjusted for volume addition. Samples for TSS and sulfates that were not run within 24 hours were refrigerated near 4°C and TSS analyzed within 7 days and sulfates within 28 days. Sample preservation if used was in accordance with Table 1060:I (Summary of Special Sampling or Handling Requirements) from Standard Methods for the Examination of Water and Wastewater 17th Edition 1989 (page 1-37).

Groundwater samples shall be taken by the "grab" method.

The quantity of the water will be determined by comparing the depth to the bottom of the well and the depth to the water.

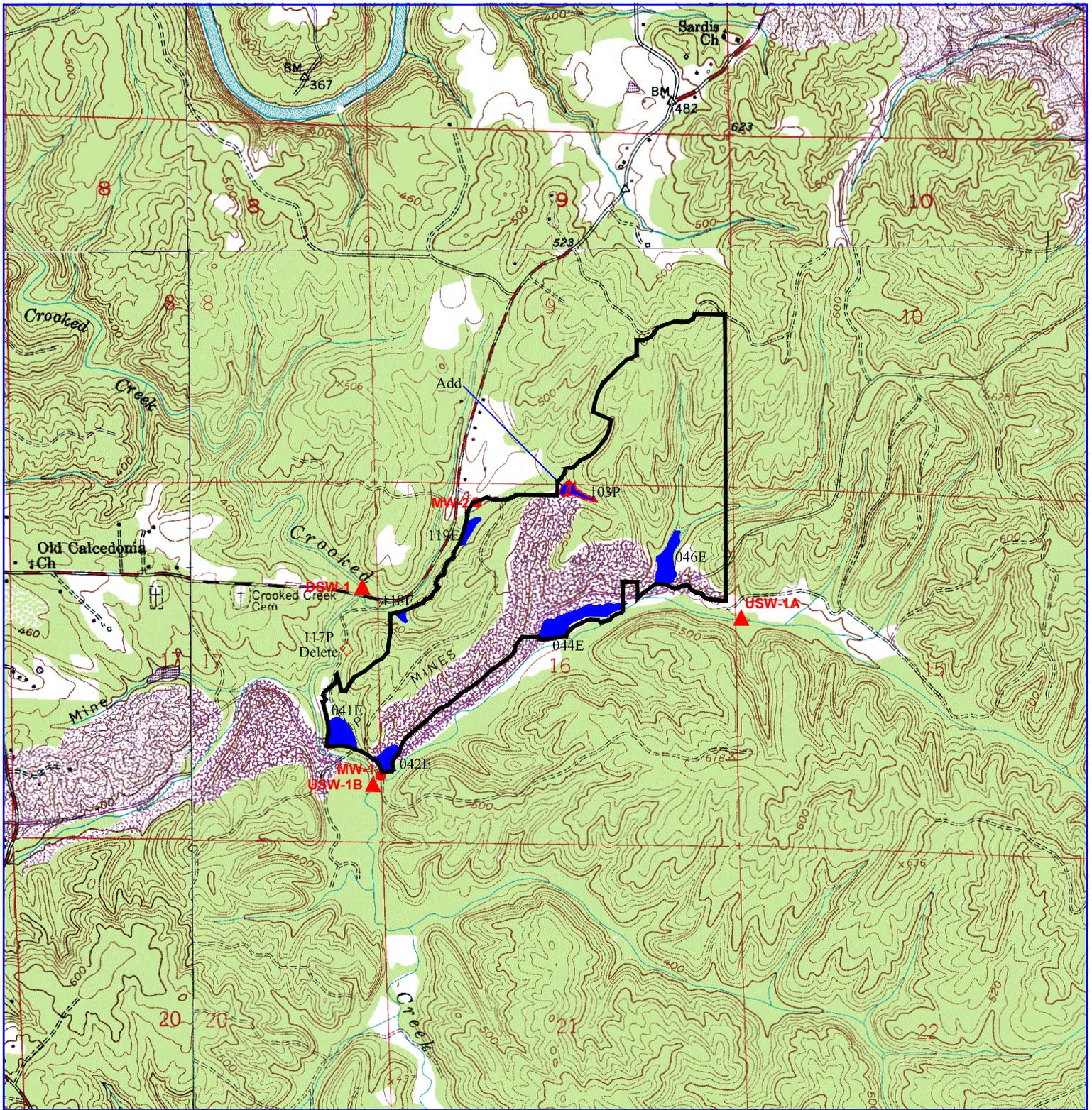
The sampling methods for pH, Fe, Mn and SO<sub>4</sub> are to be sampled in accordance to Hach Water Analysis Handbook. These methods are EPA approved and are adapted from Standard Methods for the Examination of Water and Wastewater.

Sampling will be recorded and reported to the Regulatory Authority as outlined in Part III-D & E of this application.

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PART III-D & III-E

**Monitoring Site Information**

<b>Site ID</b>	<b>Site Type</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Receiving Stream</b>
041E	Basin/Outfall	33° 43' 48"	86° 52' 04"	Crooked Creek
042E	Basin/Outfall	33° 43' 44"	86° 51' 56"	U.T. to Crooked Creek
044E	Basin/Outfall	33° 44' 03"	86° 51' 26"	U.T. to Crooked Creek
046E	Basin/Outfall	33° 44' 11"	86° 51' 08"	U.T. to Crooked Creek
103P	Basin/Outfall	33° 44' 25"	86° 51' 25"	U.T. to Crooked Creek
118E	Basin/Outfall	33° 44' 07"	86° 51' 54"	U.T. to Crooked Creek
119E	Basin/Outfall	33° 44' 18"	86° 51' 43"	U.T. to Crooked Creek
DSW-1 Downstream Crooked Creek	Surface Water Monitoring Site	33° 44' 11"	86° 52' 00"	Not Applicable
USW-1B Upstream Crooked Creek	Surface Water Monitoring Site	33° 43' 42"	86° 51' 58"	Not Applicable
USW-1A Upstream U.T. to Crooked Creek	Surface Water Monitoring Site	33° 44' 06"	86° 50' 54"	Not Applicable
MW-1	Groundwater Monitoring Site	33° 43' 43"	86° 51' 57"	Not Applicable
MW-2	Groundwater Monitoring Site	33° 44' 23"	86° 51' 40"	Not Applicable



BLACK WARRIOR MINERALS, INC. - MINE NO. 1  
 HYDROLOGIC MONITORING MAP  
 NPDES: AL0079707

SECTIONS 9,10, 15, 16, & 17  
 TOWNSHIP 15 SOUTH, RANGE 3 WEST,  
 ALL IN JEFFERSON COUNTY, ALABAMA.  
 BASE MAP: GARDENDALE U.S.G.S. QUAD.

-  **001P** SEDIMENT BASIN
-  **MW1** MONITORING WELL
-  **SW-1** STREAM SITE
-  PROPOSED PERMIT AREA



SCALE 1"=2000'