

HYDROLOGIC MONITORING PLAN

COMPANY NAME: BLACK WARRIOR MINERALS, INC.
MINE NAME: MINE NO. 2, P-39__
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 046, 049, 050, 051, 052, 053, 061, 063, 067, 086, 104, 106, 120, 124, 125	See attached ADEM monitoring requirements	Twice monthly	Until joint approval by ASMC and ADEM. In no case sooner than ASMC approval of Phase II Bond release

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.**

ADEM MONITORING REQUIREMENTS
AL0079707

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

1. Active Mining Limitations and Monitoring Requirements

During the period beginning on the effective date of this Permit and lasting through the expiration date of this Permit, the Permittee is authorized to discharge from each point source identified on Page 1 of this Permit and described more fully in the Permittee's application, if the outfalls have been constructed and certified. Except as provided in Parts I.A.2. and 3., discharges shall be limited and monitored by the Permittee as specified below:

Parameter	Discharge Limitations			Monitoring Requirements	
	Daily Minimum	Monthly Average	Daily Maximum	Sample Type	Measurement Frequency ¹
Specific Conductance 000915	-----	Report µS/cm	Report µS/cm	Grab	2 Month
Sulfate (As S) 00154	-----	Report mg/l.	Report mg/l.	Grab	2 Month
pH 00400	6.0 8.0	-----	8.5 5.0	Grab	2 Month
pH ² 00400	6.0 8.0	-----	10.5 5.0	Grab	2 Month
Solids, Total Suspended 00530	-----	15.0 mg/l.	70.0 mg/l.	Grab	1 Week
Solids, Total Suspended 00530	-----	Report lbs/day	Report lbs/day	Grab	1 Week
Nitrogen, Kjeldahl Total (as N) ³ 00625	-----	Report mg/l.	Report mg/l.	Grab	1 Month
Nitrate Plus Nitrate Total (as N) ³ 00630	-----	Report mg/l.	Report mg/l.	Grab	1 Month
Phosphorus, Total (as P) ⁴ 00665	-----	Report mg/l.	Report mg/l.	Grab	1 Month
Selenium, Total Recoverable ⁵ 00981	-----	5.0 µg/l.	20.0 µg/l.	Grab	1 Month
Iron, Total (As Fe) 01045	-----	3.0 mg/l.	6.0 mg/l.	Grab	2 Month
Manganese, Total (As Mn) ⁶ 01055	-----	2.0 mg/l.	4.0 mg/l.	Grab	2 Month
Flow, In-Canal or Thru Treatment Plant ⁷ 50050	-----	Report MGID	Report MGID	Instantaneous	1 Week
Toxicity, Ceriodaphnia Acute 61425	-----	-----	0 pass(0) fail(1)	Grab	1 Quarter
Toxicity, Ceriodaphnia Chronic ⁸ 61426	-----	-----	0 pass(0) fail(1)	Grab	1 Quarter
Toxicity, Pimephales Acute 61427	-----	-----	0 pass(0) fail(1)	Grab	1 Quarter
Toxicity, Pimephales Chronic ⁹ 61428	-----	-----	0 pass(0) fail(1)	Grab	1 Quarter
Solids, Total Dissolved (TDS) 70290	-----	Report mg/l.	Report mg/l.	Grab	1 Quarter
Flow Rate ¹⁰ 00050	Report cfs	Report cfs	Report cfs	Continuous	1 Day

¹ See Part I.C.2. for further measurement frequency requirements
² See Part IV.D. for pH Exemption Discharge Limitations
³ Monitoring for Total Nitrate Plus Nitrate, Total Kjeldahl Nitrogen, and Total Phosphorus is not required during the months of November through March
⁴ See Part IV.I. for special Selenium Monitoring Exemptions. For the purpose of demonstration of compliance with this parameter, "Total" and "Total Recoverable" shall be considered equivalent
⁵ See Part IV.E. for Manganese Exemption Discharge Limitations
⁶ Flow must be determined at the time of sample collection by direct measurement, calculation, or other method acceptable to the Department
⁷ See Part IV.F. for Effluent Toxicity Limitations and Biomonitoring Requirements for Acute Toxicity
⁸ See Part IV.G. for Effluent Toxicity Limitations and Biomonitoring Requirements for Chronic Toxicity
⁹ See Part IV.H. for Stream Flow Rate Monitoring Requirements

BLACK WARRIOR MINERALS, INC.
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PART III-D AND E

2. Precipitation Exemption Limitations and Monitoring Requirements¹⁰

During the period beginning on the effective date of this Permit and lasting through the expiration date of this Permit, the Permittee is authorized to discharge from each point source identified on Page 1 of this Permit and described more fully in the Permittee's application, if the outfalls have been constructed and certified. During periods of applicable 24-hour precipitation events for which the Permittee claims an exemption of standard mining limits as provided by Part IV.B., such discharge shall be limited and monitored by the Permittee as specified below:

Parameter	Discharge Limitations			Monitoring Requirements	
	Daily Minimum	Monthly Average	Daily Maximum	Sample Type	Measurement Frequency ¹¹
Specific Conductance 00095	-----	Report µS/cm	Report µS/cm	Grab	2/Month
Sulfate (As S) 00154	-----	Report mg/L	Report mg/L	Grab	2/Month
pH 00400	6.0 s.u.	-----	9.0 s.u.	Grab	2/Month
Solids, Total Suspended 00530	-----	Report mg/L	Report mg/L	Grab	1/Week
Solids, Total Suspended 00530	-----	Report lbs/day	Report lbs/day	Grab	1/Week
Selenium, Total Recoverable ¹² 00981	-----	Report mg/L	Report mg/L	Grab	1/Month
Nitrogen, Kjeldahl Total (as N) ¹³ 00625	-----	Report mg/L	Report mg/L	Grab	1/Month
Nitrite Plus Nitrate Total 1 Det. (as N) ¹² 00630	-----	Report mg/L	Report mg/L	Grab	1/Month
Phosphorus, Total (as P) ¹² 00665	-----	Report mg/L	Report mg/L	Grab	1/Month
Solids, Settleable ¹⁴ 00545	-----	-----	0.5 mL/L	Grab	2/Month
Iron, Total (As Fe) ¹⁵ 01045	-----	-----	7.0 mg/L	Grab	2/Month
Flow, In Conduit or Thru Treatment Plant ¹⁶ 50050	-----	Report MGD	Report MGD	Instantaneous	1/Week
Solids, Total Dissolved (TDS) 70296	-----	Report mg/L	Report mg/L	Grab	1/Quarter
Flow Rate 00056	Report cfs	Report cfs	Report cfs	Continuous	1/Day

¹⁰ See Part IV.B. for Precipitation Event Discharge Limitations

¹¹ See Part I.C.2. for further measurement frequency requirements

¹² See Part IV.J. for special Selenium Monitoring Exemptions. For the purpose of demonstration of compliance with this parameter, "Total" and "Total Recoverable" shall be considered equivalent.

¹³ Monitoring for Total Nitrite Plus Nitrate, Total Kjeldahl Nitrogen, and Total Phosphorus is not required during the months of November through March.

¹⁴ The discharge limitation for Settleable Solids is not applicable for precipitation events greater than a 10-year, 24-hour precipitation event.

¹⁵ The discharge limitation for Total Iron (As Fe) is only applicable for precipitation events less than or equal to a 2-year, 24-hour precipitation event.

¹⁶ Flow must be determined at the time of sample collection by direct measurement, calculation, or other method acceptable to the Department.

See Part IV.H. for Stream Flow Rate Monitoring Requirements

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PART III-D AND E

3. Post Mining Limitations and Monitoring Requirements¹⁸

During the period beginning on the effective date of this Permit and lasting through the expiration date of this Permit, the Permittee is authorized to discharge from each point source identified on Page 1 of this Permit and described more fully in the Permittee's application, if the outfalls have been constructed and certified. For those outfalls which the Department has granted written approval pursuant to Part IV.C., such discharge shall be limited and monitored by the Permittee as specified below:

Parameter	Discharge Limitations			Monitoring Requirements	
	Daily Minimum	Monthly Average	Daily Maximum	Sample Type	Measurement Frequency ¹⁹
Specific Conductance 00095	-----	Report µS/cm	Report µS/cm	Grab	1/Month
Sulfate (As S) 00154	-----	Report mg/L	Report mg/L	Grab	1/Month
pH 00400	6.0 s.u.	-----	8.5 s.u.	Grab	1/Month
Solids, Total Suspended 00530	-----	35.0 mg/L	70.0 mg/L	Grab	1/Week
Solids, Total Suspended 00530	-----	Report lbs/day	Report lbs/day	Grab	1/Week
Selenium, Total Recoverable ²⁰ 00981	-----	5.0 µg/L	20.0 µg/L	Grab	1/Month
Nitrogen, Kjeldahl Total (as N) ²¹ 00625	-----	Report mg/L	Report mg/L	Grab	1/Month
Nitrite Plus Nitrate Total 1 Det. (as N) ²¹ 00630	-----	Report mg/L	Report mg/L	Grab	1/Month
Phosphorus, Total (asP) ¹⁹ 00665	-----	Report mg/L	Report mg/L	Grab	1/Month
Solids, Settleable 00545	-----	-----	0.5 mL/L	Grab	1/Month
Flow, In Conduit or Thru Treatment Plant ²² 50050	-----	Report MGD	Report MGD	Instantaneous	1/Week
Solids, Total Dissolved (TDS) 70296	-----	Report mg/L	Report mg/L	Grab	1/Quarter
Flow Rate ²³ 00056	Report cfs	Report cfs	Report cfs	Continuous	1/Day

¹⁸ See Part IV.C. for Post-Mining Discharge Limitations.

¹⁹ See Part IV.C.2. for further measurement frequency requirements.

²⁰ See Part IV.F. for special Selenium Monitoring Exemptions. For the purpose of demonstration of compliance with this parameter, "Total" and "Total Recoverable" shall be considered equivalent.

²¹ Monitoring for Total Nitrite Plus Nitrate, Total Kjeldahl Nitrogen, and Total Phosphorus is not required during the months of November through March.

²² Flow must be determined at the time of sample collection by direct measurement, calculation, or other method acceptable to the Department.

²³ See Part IV.H. for Stream Flow Rate Monitoring Requirements.

I (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:

I (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.

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PART III-D AND E

II. Other Surface Water Monitoring.

Bodies of water receiving discharges from the mine: Savage Creek

Site ID	Description	Parameters Sampled	Minimum Sample Frequency	Duration of Monitoring
DSW-1	Downstream – Crooked Creek	See Table 1	See Table 1	Life of Mine*
USW-1A	Upstream – U.T. to Crooked Creek	See Table 1	See Table 1	Life of Mine*
DSW-2	Downstream – U.T. to Locust Fork	See Table 1	See Table 1	Life of Mine*
DSTC-2	Downstream – Turkey Creek	See Table 1	See Table 1	Life of Mine*
USTC-1	Upstream – Turkey Creek	See Table 1	See Table 1	Life of Mine*
USUTCC-1	Upstream – U.T. to Crooked Creek	See Table 1	See Table 1	Life of Mine*

TABLE 1 – LIST OF PARAMETERS TO BE SAMPLED AND FREQUENCY

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

* The duration of monitoring for the additional metals (Aluminum, Arsenic, Beryllium, Cadmium, Chromium, Copper, Mercury, Nickel, Selenium, Silver, Thallium, Zinc) will be until a phase II bond release or approved monitoring termination by the regulatory authority.

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

Note: Biannual sampling must be either 1st and 3rd quarter or 2nd and 4th quarter.

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: 046, 049, 050, 051, 052, 053, 061, 063, 067, 086, 104, 106, 120, 124, 125	See attached ADEM monitoring requirements	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/OB-4 MW/OB-8	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.

Surface water-monitoring site Station DSW-1 (downstream) on Crooked Creek, Station USW-1A (upstream) on U.T. to Crooked Creek, Station USUTCC-1 (upstream) on U.T. to Crooked Creek, Station DSW-2 (downstream) on U.T. to Locust Fork, Station DSTC-2 (downstream) on Turkey Creek, Station USTC-1 (upstream) on Turkey Creek of any mining to be conducted by Black Warrior Minerals, Inc. at this proposed mine site. 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/OB-4 and MW/OB-8 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.

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". 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. with 0.1N Sodium Hydroxide. 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 (page1-37).

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 SO₄ 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 AND E

Monitoring Site Information

Site ID	Site Type	Latitude	Longitude	Receiving Stream
046	Basin/Outfall	33° 44' 11"	86° 51' 08"	U.T. to Crooked Creek
049	Basin/Outfall	33° 44' 05"	86° 50' 44"	U.T. to Crooked Creek
050	Basin/Outfall	33° 44' 02"	86° 50' 35"	U.T. to Crooked Creek
051	Basin/Outfall	33° 43' 58"	86° 50' 23"	U.T. to Crooked Creek
052	Basin/Outfall	33° 43' 50"	86° 50' 07"	U.T. to Crooked Creek
053	Basin/Outfall	33° 43' 47"	86° 50' 02"	U.T. to Crooked Creek
061	Basin/Outfall	33° 45' 33"	86° 49' 45"	U.T. to Locust Fork
063	Basin/Outfall	33° 45' 05"	86° 49' 49"	U.T. to Locust Fork
067	Basin/Outfall	33° 45' 33"	86° 49' 56"	U.T. to Locust Fork
086	Basin/Outfall	33° 44' 39"	86° 49' 45"	U.T. to Locust Fork
104	Basin/Outfall	33° 44' 29"	86° 51' 24"	U.T. to Crooked Creek
106	Basin/Outfall	33° 44' 34"	86° 51' 26"	U.T. to Crooked Creek
120	Basin/Outfall	33° 44' 45"	86° 51' 26"	U.T. to Crooked Creek
124	Basin/Outfall	33° 44' 56"	86° 51' 09"	U.T. to Crooked Creek
125	Basin/Outfall	33° 45' 01"	86° 51' 02"	U.T. to Locust Fork
DSW-1 Downstream Crooked Creek	Surface Water Monitoring Site	33° 44' 11"	86° 52' 00"	Not Applicable
USW-1A Upstream U.T. to Crooked Creek	Surface Water Monitoring Site	33° 44' 06"	86° 50' 54"	Not Applicable
DSW-2 Downstream U.T. to Locust Fork	Surface Water Monitoring Site	33° 45' 09"	86° 51' 15"	Not Applicable
DSTC-2 Downstream Turkey Creek	Surface Water Monitoring Site	33° 45' 41"	86° 49' 46"	Not Applicable
USTC-1 Upstream Turkey Creek	Surface Water Monitoring Site	33° 44' 33"	86° 48' 51"	Not Applicable
USUTCC-1 Upstream U.T. to Crooked Creek	Surface Water Monitoring Site	33° 43' 45"	86° 50' 00"	Not Applicable
MW/OB-4	Ground Water Monitoring Site	33° 44' 51"	86° 51' 16"	Not Applicable
MW/OB-8	Ground Water Monitoring Site	33° 44' 58"	86° 50' 23"	Not Applicable