

STATE OF MISSOURI  
DEPARTMENT OF NATURAL RESOURCES  
MISSOURI CLEAN WATER COMMISSION



## MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92<sup>nd</sup> Congress) as amended.

Permit No.: MO-0000574

Owner:  
Address: PRR Mining Inc.  
8800 Page Avenue, St. Louis, MO 63114

Continuing Authority:  
Address: Thayer Land Development Company, LLC  
8800 Page Avenue, St. Louis, MO 63114

Facility Name:  
Facility Address: Pea Ridge Resources  
11199 State Hwy EE, Sullivan, MO 63080

Legal Description:  
UTM Coordinates: See page two (2)  
See page two (2)

Receiving Stream:  
First Classified Stream and ID:  
USGS Basin & Sub-watershed No.: See page two (2)  
See page two (2)  
See page two (2)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

### FACILITY DESCRIPTION

See page two (2)

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

March 1, 2012                      January 9, 2013  
Effective Date                      Modification Date

  
Sara Parker Pauley, Director, Department of Natural Resources

February 28, 2017  
Expiration Date

  
John Madros, Director, Water Protection Program

**FACILITY DESCRIPTION (continued)**

**Outfall #001 - Industrial (Iron-Ore Mine) - SIC #1011 - No Certified Operator Required**

Stormwater, Processed Wastewater, and Mine Dewater

Wings Enterprises Iron-ore mine (known as Pea Ridge)

Magnetic separation of iron ore from tailings material into a concentrate. Process wastewater and storm water is treated via sediment detention basins.

Design flow is 10.8 MGD.

Legal Description:	SW ¼, SW ¼, Sec. 3, T39N, R1W, Washington County
UTM Coordinates:	X= 672991 Y= 4222132
Receiving Stream:	Mary's Creek (P)
First Classified Stream and ID:	Mary's Creek (P) (03661)
USGS Basin & Sub-watershed No.:	(07140102- 0602)

Outfall #002 - Domestic Wastewater SIC # 4952 - Eliminated  
Single Cell Lagoon

**Outfall #003 Industrial (Iron-Ore Mine) - SIC #1011**

Mine Dewater

Design flow is 4.7 MGD.

Legal Description:	SE ¼, SE ¼, Sec. 35, T40N, R2W, Crawford County
UTM Coordinates:	X=665643 Y= 4422451
Receiving Stream:	Meramec River (P)
First Classified Stream and ID:	Meramec River (P) (01846)
USGS Basin & Sub-watershed No.:	(07140102- 0703)

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

PAGE NUMBER 3 of 12

PERMIT NUMBER MO-0000574

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations, shall become effective upon issuance of the 2012 permit modification, and remain in effect for one (1) years and 364 days. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #001</u>						
Flow	MGD	*		*	once/day	24 hr. total
Total Suspended Solids	mg/L	30		20	once/week	grab
pH – Units	SU	****		****	once/week	grab
Oil & Grease	mg/L	15		10	once/week	grab
Fluoride	mg/L	6.5		3.5	once/week	grab
Chloride + Sulfate	mg/L	1000		*	once/week	grab
Total Hardness	mg/L	*		*	once/week	grab
Iron, Total Recoverable	µg/L	1806		800	once/week	grab
Cobalt, Total Recoverable	mg/L	*		*	once/week	grab
Arsenic, Total Recoverable	µg/L	36.8		16.4	once/week	grab
Beryllium, Total Recoverable	µg/L	*		*	once/week	grab
Cadmium, Total Recoverable	µg/L	0.5		0.4	once/week	grab
Chromium (III), Total Recoverable	µg/L	211		105	once/week	grab
Chromium (VI), Total Dissolved	µg/L	16		8	once/week	grab
Copper, Total Recoverable	µg/L	20.6		9.5	once/week	grab
Lead, Total Recoverable	µg/L	10.3		4.7	once/week	grab
Mercury, Total Recoverable	µg/L	*		*	once/week	grab
Nickel, Total Recoverable	µg/L	*		*	once/week	grab
Selenium, Total Recoverable	µg/L	*		*	once/week	grab
Silver, Total Recoverable	µg/L	*		*	once/week	grab
Thallium, Total Recoverable	µg/L	*		*	once/week	grab
Zinc, Total Recoverable	µg/L	*		*	once/week	grab
COD	mg/L	*		*	once/week	grab
Aluminum, Total Recoverable	µg/L	*		*	once/week	grab

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE July 28, 2012. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

<b>A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)</b>				PAGE NUMBER 4 of 12		
				PERMIT NUMBER MO-0000574		
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Whole Effluent Toxicity (WET) test	% Survival	See Special Condition #10			twice/year	24 hr. composite
MONITORING REPORTS SHALL BE SUBMITTED <u>SEMI-ANNUALLY</u> ; THE FIRST REPORT IS DUE <u>July 28, 2012</u> .						
<b>B. STANDARD CONDITIONS</b>						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Parts I &amp; III</u> STANDARD CONDITIONS DATED <u>October 1, 1980 and August 15, 1994</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.						

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

PAGE NUMBER 5 of 12

PERMIT NUMBER MO-0000574

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations, shall become effective upon the date of the 2012 permit modification and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #001</u>						
Flow	MGD	*		*	once/day	24 hr. total
Total Suspended Solids	mg/L	30		20	once/month	grab
pH – Units	SU	****		****	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
Fluoride	mg/L	6.6		3.3	once/month	grab
Chloride	mg/L	377.5		188.2	once/month	grab
Sulfate	mg/L	499.2		248.8	once/month	grab
Total Hardness	mg/L	*		*	once/month	grab
Iron, Total Recoverable	mg/L	1.6		0.8	once/month	grab
Cobalt, Total Recoverable	mg/L	1.6		0.8	once/month	grab
Arsenic, Total Recoverable	µg/L	32.8		16.4	once/month	grab
Beryllium, Total Recoverable	µg/L	8.2		4.1	once/month	grab
Cadmium, Total Recoverable	µg/L	0.6		0.3	once/month	grab
Chromium (III), Total Recoverable	µg/L	187.9		93.6	once/month	grab
Chromium (VI), Total Dissolved	µg/L	16.4		8.2	once/month	grab
Copper, Total Recoverable	µg/L	23.1		11.5	once/month	grab
Lead, Total Recoverable	µg/L	7.3		3.6	once/month	grab
Mercury, Total Recoverable	µg/L	0.8		0.4	once/month	grab
Nickel, Total Recoverable	µg/L	133.8		66.7	once/month	grab
Selenium, Total Recoverable	µg/L	8.2		4.1	once/month	grab
Silver, Total Recoverable	µg/L	8.0		4.0	once/month	grab
Thallium, Total Recoverable	µg/L	10.3		5.2	once/month	grab
Zinc, Total recoverable	µg/L	183.8		91.6	once/month	grab
COD	mg/L	*		*	once/month	grab
Aluminum, Total Recoverable	µg/L	748.8		373.2	once/month	grab

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE January 28, 2014. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

<b>A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)</b>				PAGE NUMBER 6 of 12		
				PERMIT NUMBER MO-0000574		
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall 001 Whole Effluent Toxicity (WET) test	% Survival	See Special Condition #10			twice/year	24 hr. composite
MONITORING REPORTS SHALL BE SUBMITTED <u>SEMI-ANNUALLY</u> ; THE FIRST REPORT IS DUE <u>July 28, 2012</u> .						
<b>B. STANDARD CONDITIONS</b>						
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**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

PAGE NUMBER 7 of 12

PERMIT NUMBER MO-0000574

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance of the 2012 permit modification and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #003</u>						
Flow	MGD	*		*	once/day	24 hr. total
Total Suspended Solids	mg/L	30		20	once/week	grab
pH – Units	SU	****		****	once/week	grab
Oil & Grease	mg/L	15		10	once/week	grab
Fluoride	mg/L	46.8		23.3	once/week	grab
Chloride	mg/L	4876.7		2430.5	once/week	grab
Sulfate	mg/L	805.3		401.3	once/week	grab
Total Hardness	mg/L	*		*	once/week	grab
Iron, Total Recoverable	mg/L	2.0		1.0	once/week	grab
Cobalt, Total Recoverable	mg/L	11.7		5.8	once/week	grab
Arsenic, Total Recoverable	µg/L	233.8		116.5	once/week	grab
Beryllium, Total Recoverable	µg/L	58.5		29.1	once/week	grab
Cadmium, Total Recoverable	µg/L	3.7		1.9	once/week	grab
Chromium (III), Total Recoverable	µg/L	1161.6		578.9	once/week	grab
Chromium (VI), Total Dissolved	µg/L	116.9		58.3	once/week	grab
Copper, Total Recoverable	µg/L	11.7		5.8	once/week	grab
Lead, Total Recoverable	µg/L	43.3		21.6	once/week	grab
Mercury, Total Recoverable	µg/L	5.8		2.9	once/week	grab
Nickel, Total Recoverable	µg/L	823.3		410.3	once/week	grab
Selenium, Total Recoverable	µg/L	58.8		29.1	once/week	grab
Silver, Total Recoverable	µg/L	9.6		4.8	once/week	grab
Thallium, Total Recoverable	µg/L	73.7		36.7	once/week	grab
Zinc, Total recoverable	µg/L	256.1		127.6	once/week	grab
COD	mg/L	*		*	once/week	grab
Aluminum, Total Recoverable	µg/L	1207.9		602	once/week	grab

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE January 28, 2014. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

<b>A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)</b>				PAGE NUMBER 8 of 12		
				PERMIT NUMBER MO-0000574		
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall 003 Whole Effluent Toxicity (WET) test	% Survival	See Special Condition #10			twice/year	24 hr. composite
MONITORING REPORTS SHALL BE SUBMITTED <u>SEMI-ANNUALLY</u> ; THE FIRST REPORT IS DUE <u>July 28, 2012</u> .						
<b>B. STANDARD CONDITIONS</b>						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Parts I &amp; III</u> STANDARD CONDITIONS DATED <u>October 1, 1980 and August 15, 1994</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

- \* Monitoring requirement only.
- \*\* A 24-hour composite sample is composed of 48 aliquots (subsamples) collected at 30 minute intervals by an automatic sampling device.
- \*\*\* Sample once per quarter in the months of March, June, September, and December. See table below for quarterly sampling.

Sample discharge at least once for the months of:	Report is due:
January, February, March (1st Quarter)	April 28
April, May, June (2nd Quarter)	July 28
July, August, September (3rd Quarter)	October 28
October, November, December (4th Quarter)	January 28

\*\*\*\* pH is measured in pH units and is not to be averaged. The pH is limited to the range of 6.5-9.0 pH units.

C. SPECIAL CONDITIONS

1. This permit may be reopened and modified, or alternatively revoked and reissued, to:
  - (a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
    - (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
    - (2) controls any pollutant not limited in the permit.
  - (b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.
  - (c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

2. All outfalls must be clearly marked in the field.
3. Permittee will cease discharge by connection to a facility with an area-wide management plan per 10 CSR 20-6.010(3)(B) within 90 days of notice of its availability.

C. SPECIAL CONDITIONS (continued)

4. Water Quality Standards

- (a) Discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.
- (b) General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
  - (1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
  - (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
  - (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
  - (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
  - (5) There shall be no significant human health hazard from incidental contact with the water;
  - (6) There shall be no acute toxicity to livestock or wildlife watering;
  - (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
  - (8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

5. Changes in Discharges of Toxic Substances

The permittee shall notify the Director as soon as it knows or has reason to believe:

- (a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
  - (1) One hundred micrograms per liter (100 µg/L);
  - (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
  - (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;
  - (4) The level established in Part A of the permit by the Director.
- (b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant, which was not reported in the permit application.

6. Report as no-discharge when a discharge does not occur during the report period.

7. The discharge of any pollutant not documented in the application for this permit is prohibited. This includes any chemical, biological material, radiological material, or any other material that may effect the ability of the receiving stream to fully support it's beneficial and designated uses.

8. There shall be no discharge of a solid waste to waters of the state.

9. It is a violation of the Missouri Clean Water Law to fail to pay fees associated with this permit (644.055 RSMo).

10. Bypasses are not authorized at this facility and are subject to 40 CFR 122.41(m). If a bypass occurs, the permittee shall report in accordance to 40 CFR 122.41(m)(3)(i), and with Standard Condition Part I, Section B, subsection 2.b. Bypasses are to be reported to the Southeast Regional Office.

11. An Operation and Maintenance (O & M) manual shall be maintained by the permittee and made available to the operator. The O & M manual shall include key operating procedures and a brief summary of the operation of the facility.

12. The permittee shall comply with any applicable requirements listed in 10 CSR 20-9, unless the facility has received written notification that the Department has approved a modification to the requirements. The monitoring frequencies contained in this permit shall not be construed by the permittee as a modification of the monitoring frequencies listed in 10 CSR 20-9. If a modification of the monitoring frequencies listed in 10 CSR 20-9 is needed, the permittee shall submit a written request to the department for review and, if deemed necessary, approval.

C. SPECIAL CONDITIONS (continued)

13. The permittee shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must be kept on-site. The SWPPP must be reviewed and updated, if needed, every year or as site conditions change. The permittee shall select, install, use, operate, and maintain the Best Management Practices prescribed in the SWPPP in accordance with the concepts and methods described in the following document:  
Developing Your Stormwater Pollution Prevention Plan, A Guide for Industrial Operators, (Document number EPA 833-B-09-002) published by the United States Environmental Protection Agency (USEPA) in February 2009.  
The SWPPP must include the following:
- (a) A listing of specific Best Management Practices (BMPs) and a narrative explaining how BMPs will be implemented to control and minimize the amount of potential contaminants that may enter storm water. Minimum BMPs are listed in SPECIAL CONDITIONS #14 below.
  - (b) The SWPPP must include a schedule for once per month site inspections and brief written reports. These reports must be kept on file with the SWPPP at the facility. The inspections must include observation and evaluation of BMP effectiveness, noting any deficiencies. Deficiencies must be documented within 24 hours of discovery. Corrective action to address deficiencies must be documented within fourteen (14) days and shall be included with the written report. Any corrective measure that necessitates major construction may also need a construction permit. Inspection reports must be kept on site with the SWPPP and maintained for a period of five (5) years. These must be made available to DNR personnel upon request.
  - (c) A provision for designating an individual to be responsible for environmental matters.
  - (d) A provision for providing training to all personnel involved in material handling and storage, and housekeeping of maintenance and cleaning areas. Proof of training shall be submitted on request of DNR.
14. Permittee shall adhere to the following minimum Best Management Practices:
- (a) Prevent the spillage or loss of fluids, oil, grease, fuel, etc. from vehicle maintenance, equipment cleaning, or warehouse activities and thereby prevent the contamination of storm water from these substances.
  - (b) Provide collection facilities and arrange for proper disposal of waste products including but not limited to petroleum waste products, and solvents.
  - (c) Store all paint, solvents, petroleum products and petroleum waste products (except fuels), and storage containers (such as drums, cans, or cartons) so that these materials are not exposed to storm water or provide other prescribed BMP's such as plastic lids and/or portable spill pans to prevent the commingling of storm water with container contents. Commingled water may not be discharged under this permit. Provide spill prevention control, and/or management sufficient to prevent any spills of these pollutants from entering waters of the state. Any containment system used to implement this requirement shall be constructed of materials compatible with the substances contained and shall also prevent the contamination of groundwater.
  - (d) Provide good housekeeping practices on the site to keep trash from entry into waters of the state.
  - (e) Provide sediment and erosion control sufficient to prevent or control sediment loss off of the property. This could include the use of straw bales, silt fences, or sediment basins, if needed, to comply with effluent limits.
  - (f) Provide good housekeeping or any other best management practice to reduce the *E. coli* in the storm water discharge leaving the site.
  - (g) Try to prevent storm water from coming into contact with polluting materials. This is generally more effective, and less costly, than trying to remove pollutants from stormwater
  - (h) You must divert, infiltrate, reuse, contain, or otherwise reduce stormwater runoff, to minimize pollutants in your discharges.

C. SPECIAL CONDITIONS (continued)

15. Whole Effluent Toxicity (WET) Test shall be conducted as follows:

SUMMARY OF ACUTE WET TESTING FOR THIS PERMIT				
OUTFALL	AEC	FREQUENCY	SAMPLE TYPE	MONTH
001	100%	Twice/Year	24 hr. composite**	Any

Dilution Series							
AEC% = 100	100% effluent	50% effluent	25% effluent	12.5% effluent	6.25% effluent	(Control) 100% upstream, if available	(Control) 100% Lab Water, also called synthetic water

SUMMARY OF ACUTE WET TESTING FOR THIS PERMIT				
OUTFALL	AEC	FREQUENCY	SAMPLE TYPE	MONTH
003	62%	Twice/Year	24 hr. composite**	Any

Dilution Series							
AEC% = 62	100% effluent	50% effluent	25% effluent	12.5% effluent	6.25% effluent	(Control) 100% upstream, if available	(Control) 100% Lab Water, also called synthetic water

(a) Test Schedule and Follow-Up Requirements

- (1) Perform a MULTIPLE-dilution acute WET test in the months and at the frequency specified above. For tests which are successfully passed, submit test results using the Department's WET test report form #MO-780-1899 along with complete copies of the test reports as received from the laboratory, including copies of chain-of-custody forms within 30 calendar days of availability to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102. If the effluent passes the test, do not repeat the test until the next test period.
  - (a) Chemical and physical analysis of the upstream control and effluent sample shall occur immediately upon being received by the laboratory, prior to any manipulation of the effluent sample beyond preservation methods consistent with federal guidelines for WET testing that are required to stabilize the sample during shipping.
  - (b) Any and all chemical or physical analysis of the effluent sample performed in conjunction with the WET test shall be performed at the 100% Effluent concentration in addition to analysis performed upon any other effluent concentration.
  - (c) All chemical analyses included in the Missouri Department of Natural Resources WET test report form #MO-780-1899 shall be performed and results shall be recorded in the appropriate field of the report form.
- (2) The WET test will be considered a failure if mortality observed in effluent concentrations equal to or less than the AEC is significantly different (at the 95% confidence level;  $p = 0.05$ ) than that observed in the upstream receiving-water control sample. Where upstream receiving water is not available, synthetic laboratory control water may be used.
- (3) All failing test results along with complete copies of the test reports as received from the laboratory, INCLUDING THOSE TESTS CONDUCTED UNDER CONDITION (3) BELOW, shall be reported to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the availability of the results.
- (4) If the effluent fails the test for BOTH test species, a multiple dilution test shall be performed for BOTH test species within 30 calendar days and biweekly thereafter (for storm water, tests shall be performed on the next and subsequent storm water discharges as they occur, but not less than 7 days apart) until one of the following conditions are met: Note: Written request regarding single species multiple dilution accelerated testing will be address by THE WATER PROTECTION PROGRAM on a case by case basis.
  - (i) THREE CONSECUTIVE MULTIPLE-DILUTION TESTS PASS. No further tests need to be performed until next regularly scheduled test period.
  - (ii) A TOTAL OF THREE MULTIPLE-DILUTION TESTS FAIL.
- (5) Follow-up tests do not negate an initial failed test.
- (6) The permittee shall submit a summary of all test results for the test series along with complete copies of the test reports as received from the laboratory to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the third failed test.

C. SPECIAL CONDITIONS (continued)

- (7) Additionally, the following shall apply upon failure of the third follow up MULTIPLE DILUTION test The permittee should contact THE WATER PROTECTION PROGRAM within 14 calendar days from availability of the test results to ascertain as to whether a TIE or TRE is appropriate. If the permittee does not contact THE WATER PROTECTION PROGRAM upon the third follow up test failure, a toxicity identification evaluation (TIE) or toxicity reduction evaluation (TRE) is automatically triggered. The permittee shall submit a plan for conducting a TIE or TRE to the WATER PROTECTION PROGRAM within 60 calendar days of the date of the automatic trigger or DNR's direction to perform either a TIE or TRE. This plan must be approved by DNR before the TIE or TRE is begun. A schedule for completing the TIE or TRE shall be established in the plan approval.
  - (8) Upon DNR's approval, the TIE/TRE schedule may be modified if toxicity is intermittent during the TIE/TRE investigations. A revised WET test schedule may be established by DNR for this period.
  - (9) If a previously completed TIE has clearly identified the cause of toxicity, additional TIEs will not be required as long as effluent characteristics remain essentially unchanged and the permittee is proceeding according to a DNR approved schedule to complete a TRE and reduce toxicity. Regularly scheduled WET testing as required in the permit, without the follow-up requirements, will be required during this period.
  - (10) When WET test sampling is required to run over one DMR period, each DMR report shall contain a copy of the Department's WET test report form that was generated during the reporting period.
  - (11) Submit a concise summary in tabular format of all WET test results with the annual report.
- (b) Test Conditions
- (1) Test Type: Acute Static non-renewal
  - (2) All tests, including repeat tests for previous failures, shall include both test species listed below unless approved by the department on a case by case basis.
  - (3) Test species: Ceriodaphnia dubia and Pimephales promelas (fathead minnow). Organisms used in WET testing shall come from cultures reared for the purpose of conducting toxicity tests and cultured in a manner consistent with the most current USEPA guidelines. All test animals shall be cultured as described in the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms.
  - (4) Test period: 48 hours at the "Allowable Effluent Concentration" (AEC) specified above.
  - (5) Upstream receiving stream water shall be used as dilution water. If upstream water is unavailable or if mortality in the upstream water exceeds 10%, "reconstituted" water will be used as dilution water. Procedures for generating reconstituted water will be supplied by the MDNR upon request.
  - (6) Tests will be run with 100% receiving-stream water (if available), collected upstream of the outfall at a point beyond any influence of the effluent, and reconstituted water.
  - (7) If reconstituted-water control mortality for a test species exceeds 10%, the entire test will be rerun.
  - (8) If upstream control mortality exceeds 10%, the entire test will be rerun using reconstituted water as the dilutant.
  - (9) Whole-effluent-toxicity test shall be consistent with the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms

D. SCHEDULE OF COMPLIANCE

1. Within one year of issuance of the 2012 permit modification, the permittee shall submit a report detailing progress made in attaining compliance with the final effluent limits.
2. Within two years of issuance of the 2012 permit modification, the permittee shall attain compliance with the final effluent limits.
3. If the permittee fails to meet any of the interim dates above, the permittee shall notify the Department in writing of the reason for non compliance no later than 14 days following each interim date.

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**Missouri Department of Natural Resources**  
**FACT SHEET**  
**FOR THE PURPOSE OF RENEWAL**  
**OF**  
**MO-0000574**  
**PEA RIDGE RESOURCES IRON ORE MINE**

The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollution Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of storm water from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)2.] a Factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

A Factsheet is not an enforceable part of an operating permit. This Factsheet is for an Industrial Facility .

**Part I – Facility Information**

Facility Type: INDUSTRIAL  
Facility SIC Code(s): 1011 – Iron Ore

**Facility Description:**

Since the issuance of the previous permit, the facility has undergone an extensive remediation project to rehabilitate the settling structure for which outfall # 001 discharges. This included the removal of tailings from the basins, grading, and shaping. One of the goals of the remediation was to isolate Mary's Creek from the processed and storm water which discharges from the facility. Processed and storm water is collected and moves through the rehabbed settling basins and discharges to Mary's Creek. Additionally during the remediation project the wastewater lagoon and outfall # 002 were decommissioned. Current mining activities at the facility consist of processing tailings from the site to obtain minerals present. No underground mining is taking place at the facility at this time.

Have any changes occurred at this facility or in the receiving water body that effects effluent limit derivation?  - Yes;

**2012 Permit Modification**

Pea Ridge Resources is working to dewater the mine prior to startup of operations. The preferred alternative is to pump water through the existing magnetite process, pump to Mary's Creek, pump to Meramec River, treat with a water treatment plant (reverse osmosis process), and to use the existing treatment plant. This is a short term, 15 month process. After the mine is dewatered, the facility will cease pumping to the Meramec River. The design flow of Outfall 001 to Mary's Creek is 10.8 MGD and the design flow of Outfall 003 to the Meramec River is 4.71 MGD. This activity thus requires the permit to be modified as follows:

- The name of the facility, owner and continuing authority has been changed.
- Outfall 003 has been added to the permit to facilitate future dewatering discharges.
- The design flow of outfall 001 has been increased due to future dewatering activities
- Interim and Final limitations and monitoring frequencies for outfall 001 have been changed to reflect the increased design flow.
- COD and Aluminum limitations and monitoring requirements have been established for outfall 001.
- Outfall 003 interim and final limitations and monitoring frequencies have been established.

Application Date: 07/09/2011

Expiration Date: 12/7/2011

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Last Inspection: January 7, 2009 In Compliance ; Non-Compliance

**OUTFALL(S) TABLE:**

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	16.71	Settling Basins	Industrial	0.0
002	Eliminated, Wastewater Lagoon Decommissioned and Closed			
003	7.3	Secondary	Mine Water	0.0

**Outfall #001 Storm and Processed Wastewater**

Legal Description: SW ¼, SW ¼, Sec. 3, T39N, R1W, Washington County  
 UTM Coordinates: X= 672991 Y= 4222132  
 Receiving Stream: Mary’s Creek (C)  
 First Classified Stream and ID: Mary’s Creek (C) (03661)  
 USGS Basin & Sub-watershed No.: (07140102- 0602)

**Outfall #002**

Domestic Wastewater SIC # 4952 - Eliminated  
 Single Cell Lagoon

**Outfall #003 Industrial (Iron-Ore Mine) - SIC #1011**

**Mine Dewater**

Design flow is 4.7 MGD.

Legal Description: SE ¼, SE ¼, Sec. 35, T40N, R2W, Crawford County  
 UTM Coordinates: X=665643 Y= 44224451  
 Receiving Stream: Meramec River (P)  
 First Classified Stream and ID: Meramec River (P) (01846)  
 USGS Basin & Sub-watershed No.: (07140102- 0703)

**Receiving Water Body’s Water Quality & Facility Performance History:**

Prior to the rehabilitation of the settling basins at the facility Mary’s Creek basically flowed directly through the settling structures. These structures were filled with mine tailings during this time. Mary’s Creek has been restored to what is believed to be its original streambed and the tailings have been removed from the settling basins. These basins have been graded and shaped and isolated via a levee from Mary’s Creek. Storm and processed water flows from the facility to the settling basins. The basins then discharge to Mary’s Creek. Treatment conducted at the facility consists of settling and phytoremediation.

**2012 Antidegradation Review**

Water quality data from Mary’s Creek, the Meramec River at Sullivan and the existing water of the mine was used to evaluate options and alternatives. The pollutants of concern are for the most part minimally degrading; however a few are significantly degrading. See Appendix C of the Antidegradation Review which is Appendix B of this fact sheet for mine data. A copy of existing water quality for Meramec River is available upon request.

## **Part II – Operator Certification Requirements**

As per [10 CSR 20-6.010(8) Terms and Conditions of a Permit], permittees shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions and regulations. Operators or supervisors of operations at regulated wastewater treatment facilities shall be certified in accordance with [10 CSR 20-9.020(2)] and any other applicable state law or regulation. As per [10 CSR 20-9.010(2)(A)], requirements for operation by certified personnel shall apply to all wastewater treatment systems, if applicable, as listed below:

Not Applicable ; This facility is not required to have a certified operator.

## **Part III – Receiving Stream Information**

### **APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:**

As per Missouri's Effluent Regulations [10 CSR 20-7.015], the waters of the state are divided into the below listed seven (7) categories. Each category lists effluent limitations for specific parameters, which are presented in each outfall's Effluent Limitation Table and further discussed in the Derivation & Discussion of Limits section.

- Missouri or Mississippi River [10 CSR 20-7.015(2)]:   
 Lake or Reservoir [10 CSR 20-7.015(3)]:   
 Losing [10 CSR 20-7.015(4)]:   
 Metropolitan No-Discharge [10 CSR 20-7.015(5)]:   
 Special Stream [10 CSR 20-7.015(6)]:   
 Subsurface Water [10 CSR 20-7.015(7)]:   
 All Other Waters [10 CSR 20-7.015(8)]:

10 CSR 20-7.031 Missouri Water Quality Standards, the Department defines the Clean Water Commission water quality objectives in terms of "water uses to be maintained and the criteria to protect those uses." The receiving stream and/or 1<sup>st</sup> classified receiving stream's beneficial water uses to be maintained are located in the Receiving Stream Table located below in accordance with [10 CSR 20-7.031(3)].

### **RECEIVING STREAM(S) TABLE:**

WATERBODY NAME	CLASS	WBID	DESIGNATED USES*	8-DIGIT HUC	EDU**
Mary's Creek	C	03661	AQL, LWW, WBC_B	07140102	Ozark/Meramec
Meramec River	P	01846	AQL, CLF, IND, IRR, SCR, WBC(A)	07140102	Ozark/Meramec

\* - Irrigation (IRR), Livestock & Wildlife Watering (LWW), Protection of Warm Water Aquatic Life and Human Health-Fish Consumption (AQL), Cool Water Fishery (CLF), Cold Water Fishery (CDF), Whole Body Contact Recreation (WBC), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Industrial (IND), Groundwater (GRW).

\*\* - Ecological Drainage Unit

### **RECEIVING STREAM(S) LOW-FLOW VALUES TABLE:**

RECEIVING STREAM (U, C, P)	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
Mary's Creek (P)		0.1	
Meramec River (P)		179	

### **MIXING CONSIDERATIONS TABLE: MARY'S CREEK**

MIXING ZONE (CFS) [10 CSR 20-7.031(4)(A)4.B.(II)(a)]		ZONE OF INITIAL DILUTION (CFS) [10 CSR 20-7.031(4)(A)4.B.(II)(b)]	
7Q10	30Q10	1Q10	7Q10
0.025	.025	0.0025	0.0025

**MIXING CONSIDERATIONS TABLE: MERAMEC RIVER**

MIXING ZONE (CFS) [10 CSR 20-7.031(4)(A)4.B.(III)(a)]	ZONE OF INITIAL DILUTION (CFS) [10 CSR 20-7.031(4)(A)4.B.(III)(B)]
7Q10	7Q10
44.75	4.475

**RECEIVING STREAM MONITORING REQUIREMENTS:**

No receiving water monitoring requirements recommended at this time.

**Part IV – Rationale and Derivation of Effluent Limitations & Permit Conditions**

**ALTERNATIVE EVALUATIONS FOR NEW FACILITIES:**

As per [10 CSR 20-7.015(4)(A)], discharges to losing streams shall be permitted only after other alternatives including land application, discharges to a gaining stream and connection to a regional wastewater treatment facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

Not Applicable ; The facility does not discharge to a Losing Stream as defined by [10 CSR 20-2.010(36)] & [10 CSR 20-7.031(1)(N)], or is an existing facility.

**ANTI-BACKSLIDING:**

A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(c); 40 CFR Part 122.44(I)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

- Limitations in this operating permit for the reissuance of this permit conform to the anti-backsliding provisions of Section 402(o) of the Clean Water Act, and 40 CFR Part 122.44.

**ANTIDegradation:**

In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(2)], the Department is to document by means of Antidegradation Review that the use of a water body's available assimilative capacity is justified. Degradation is justified by documenting the socio-economic importance of a discharging activity after determining the necessity of the discharge.

- See Appendix B for the 2012 Antidegradation Review.

**AREA-WIDE WASTE TREATMENT MANAGEMENT & CONTINUING AUTHORITY:**

As per [10 CSR 20-6.010(3)(B)], ...An applicant may utilize a lower preference continuing authority by submitting, as part of the application, a statement waiving preferential status from each existing higher preference authority, providing the waiver does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or any other regional sewage service and treatment plan approved for higher preference authority by the Department.

**BIOSOLIDS & SEWAGE SLUDGE:**

Biosolids are solid materials resulting from domestic wastewater treatment that meet federal and state criteria for beneficial uses (i.e. fertilizer). Sewage sludge is solids, semi-solids, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works. Additional information regarding biosolids and sludge is located at the following web address: <http://dnr.mo.gov/env/wpp/pub/index.html>, items WQ422 through WQ449.

Not applicable; This condition is not applicable to the permittee for this facility.

**COMPLIANCE AND ENFORCEMENT:**

Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance.

Not Applicable ; The permittee/facility is not currently under Water Protection Program enforcement action.

**REASONABLE POTENTIAL ANALYSIS (RPA):**

Federal regulation [40 CFR Part 122.44(d)(1)(i)] requires effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above narrative or numeric water quality standard.

In accordance with [40 CFR Part 122.44(d)(iii)] if the permit writer determines that any give pollutant has the reasonable potential to cause, or contribute to an in-stream excursion above the WQS, the permit must contain effluent limits for that pollutant.

Not Applicable ;

**SCHEDULE OF COMPLIANCE (SOC):**

A schedule of remedial measures included in a permit, including an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit.

Applicable ; The time given for effluent limitations of this permit listed under Interim Effluent Limitation and Final Effluent Limitations were established in accordance with [10 CSR 20-7.031(10)].

**STORM WATER POLLUTION PREVENTION PLAN (SWPPP):**

In accordance with 40 CFR 122.44(k) *Best Management Practices (BMPs)* to control or abate the discharge of pollutants when: (1) Authorized under section 304(e) of the Clean Water Act (CWA) for the control of toxic pollutants and hazardous substances from ancillary industrial activities; (2) Authorized under section 402(p) of the CWA for the control of storm water discharges; (3) Numeric effluent limitations are infeasible; or (4) the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.

In accordance with the EPA's *Developing Your Stormwater Pollution Prevention Plan, A Guide for Industrial Operators*, (Document number EPA 833-B-09-002) [published by the United States Environmental Protection Agency (USEPA) in February 2009], BMPs are measures or practices used to reduce the amount of pollution entering (regarding this operating permit) waters of the state. BMPs may take the form of a process, activity, or physical structure.

Additionally in accordance with the Storm Water Management, a SWPPP is a series of steps and activities to (1) identify sources of pollution or contamination, and (2) select and carry out actions which prevent or control the pollution of storm water discharges.

Applicable ; A SWPPP shall be developed and implemented for each site and shall incorporate required practices identified by the Department with jurisdiction, incorporate erosion control practices specific to site conditions, and provide for maintenance and adherence to the plan.

**VARIANCE:**

As per the Missouri Clean Water Law § 644.061.4, variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141.

Not Applicable ; This operating permit is not drafted under premises of a petition for variance.

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**WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:**

As per [10 CSR 20-2.010(78)], the amount of pollutant each discharger is allowed by the Department to release into a given stream after the Department has determined total amount of pollutant that may be discharged into that stream without endangering its water quality.

Applicable ; Wasteload allocations were calculated where applicable using water quality criteria or water quality model results and the dilution equation below:

$$C = \frac{(Cs \times Qs) + (Ce \times Qe)}{(Qe + Qs)} \quad (\text{EPA/505/2-90-001, Section 4.5.5})$$

Where C = downstream concentration  
Cs = upstream concentration  
Qs = upstream flow  
Ce = effluent concentration  
Qe = effluent flow

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow at the edge of the mixing zone (MZ). Acute wasteload allocations were determined using applicable water quality criteria (CMC: criteria maximum concentration) and stream volume of flow at the edge of the zone of initial dilution (ZID).

Water quality based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

Number of Samples "n":

Additionally, in accordance with the TSD for water quality-based permitting, effluent quality is determined by the underlying distribution of daily values, which is determined by the Long Term Average (LTA) associated with a particular Wasteload Allocation (WLA) and by the Coefficient of Variation (CV) of the effluent concentrations. Increasing or decreasing the monitoring frequency does not affect this underlying distribution or treatment performance, which should be, at a minimum, be targeted to comply with the values dictated by the WLA. Therefore, it is recommended that the actual planned frequency of monitoring normally be used to determine the value of "n" for calculating the AML. However, in situations where monitoring frequency is once per month or less, a higher value for "n" must be assumed for AML derivation purposes. Thus, the statistical procedure being employed using an assumed number of samples is "n = 4" at a minimum. For Total Ammonia as Nitrogen, "n = 30" is used.

**WLA MODELING:**

There are two general types of effluent limitations, technology-based effluent limits (TBELs) and water quality based effluent limits (WQBELs). If TBELs do not provide adequate protection for the receiving waters, then WQBEL must be used.

Not Applicable ; A WLA study was either not submitted or determined not applicable by Department staff.

**WATER QUALITY STANDARDS:**

Per [10 CSR 20-7.031(3)], General Criteria shall be applicable to all waters of the state at all times including mixing zones. Additionally, [40 CFR 122.44(d)(1)] directs the Department to establish in each NPDES permit to include conditions to achieve water quality established under Section 303 of the Clean Water Act, including State narrative criteria for water quality.

**WHOLE EFFLUENT TOXICITY (WET) TEST:**

A WET test is a quantifiable method of determining if a discharge from a facility may be causing toxicity to aquatic life by itself, in combination with or through synergistic responses when mixed with receiving stream water.

Applicable ;

Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures that the provisions in the 10 CSR 20-6.010(8)(A)7. and the Water Quality Standards 10 CSR 20-7.031(3)(D),(F),(G),(I)2.A & B are being met. Under [10 CSR 20-6.010(8)(A)4], the Department may require other terms and conditions that it deems necessary to assure compliance with the Clean Water Act and related regulations of the Missouri Clean Water Commission. In addition the following MCWL apply: §§644.051.3 requires the Department to set permit conditions that comply with the MCWL and CWA; 644.051.4 specifically references toxicity as an item we must consider in writing permits (along with water quality-based effluent limits, pretreatment, etc...); and 644.051.5 is the basic authority to require testing conditions. WET test will be required by all facilities meeting the following criteria:

- Facility is a designated Major.
- Facility continuously or routinely exceeds its design flow.
- Facility (industrial) that alters its production process throughout the year.
- Facility handles large quantities of toxic substances, or substances that are toxic in large amounts.
- Facility has Water Quality-based Effluent Limitations for toxic substances (other than NH<sub>3</sub>)
- Facility is a municipality or domestic discharger with a Design Flow  $\geq$  22,500 gpd.
- Other – please justify.

**40 CFR 122.41(M) - BYPASSES:**

The federal Clean Water Act (CWA), Section 402 prohibits wastewater dischargers from “bypassing” untreated or partially treated sewage (wastewater) beyond the headworks. A bypass, which includes blending, is defined as an intentional diversion of waste streams from any portion of a treatment facility, [40 CFR 122.41(m)(1)(i)]. Additionally, Missouri regulation 10 CSR 20-2.010(11) defines a bypass as the diversion of wastewater from any portion of wastewater treatment facility or sewer system to waters of the state. Only under exceptional and specified limitations do the federal regulations allow for a facility to bypass some or all of the flow from its treatment process. Bypasses are prohibited by the CWA unless a permittee can meet all of the criteria listed in 40 CFR 122.41(m)(4)(i)(A), (B), & (C). Any bypasses from this facility are subject to the reporting required in 40 CFR 122.41(l)(6) and per Missouri’s Standard Conditions I, Section B, part 2.b. Additionally, Anticipated Bypasses include bypasses from peak flow basins or similar devices designed for peak wet weather flows.

- Not Applicable, this facility does not bypass.

**303(d) LIST & TOTAL MAXIMUM DAILY LOAD (TMDL):**

Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) list helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs.

A TMDL is a calculation of the maximum amount of a given pollutant that a body of water can absorb before its water quality is affected. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan will be developed that shall include the TMDL calculation

Not Applicable ;

This facility does not discharge to a 303(d) listed stream.

**Part V – Effluent Limits Determination**

**Outfall #001 – Main Facility Outfall**

Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

**EFFLUENT LIMITATIONS TABLE:**

Outfall # 001

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS	
FLOW	GPD	1	*		*	No	*	
TSS	MG/L	1	30		20	No	30/20	
PH	SU	1	6.5-9.0		6.5-9.0	No	6.5-9.0	
OIL & GREASE (MG/L)	MG/L	1	15		10	No	15/10	
FLUORIDE	MG/L	2	6.6		3.3	YES	6.5/3.3	
CHLORIDE	MG/L	2	377.5		188.2	YES	1000/*	
SULFATE	MG/L	2	499.2		248.8	YES	****	
CYANIDE, AMENABLE TO CHLORINATION	µg/L	2	N/A		N/A	YES	*/*	
HARDNESS, TOTAL	MG/L	2	*		*	No	*/*	
ALUMINUM	µg/L	2/3	N/A		N/A	YES	749.2/373.4	
IRON, TOTAL RECOVERABLE	mg/L	2/3	1.6		0.8	YES	1600/800 µg/L	
COBALT, TOTAL RECOVERABLE	mg/L	2/3	1.6		0.8	No	1.6/0.8	
ARSENIC, TOTAL RECOVERABLE	µg/L	2/3	32.8		16.4	YES	33/16.4	
BERYLLIUM, TOTAL RECOVERABLE	µg/L	2/3	8.2		4.1	YES	8.1/4.0	
CADMIUM, TOTAL RECOVERABLE	µg/L	2/3	0.6		0.3	YES	0.5/0.3	
CHROMIUM (III), TOTAL RECOVERABLE	µg/L	2/3	187.9		93.6	YES	211/105	
CHROMIUM (VI), DISSOLVED	µg/L	2/3	16.4		8.2	YES	16/8	
COPPER, TOTAL RECOVERABLE	µg/L	2/3	23.1		11.5	YES	19/9.5	
LEAD, TOTAL RECOVERABLE	µg/L	2/3	7.3		6.3	YES	9.3/4.7	
MERCURY, TOTAL RECOVERABLE	µg/L	2/3	0.8		0.4	YES	0.9/0.5	
NICKEL, TOTAL RECOVERABLE	µg/L	2/3	133.8		66.7	YES	128.7/64.2	
SELENIUM, TOTAL RECOVERABLE	µg/L	2/3	8.2		4.1	YES	8.1/4.0	
SILVER, TOTAL RECOVERABLE	µg/L	2/3	8.0		4.0	YES	8.7/4.3	
THALLIUM, TOTAL RECOVERABLE	µg/L	2/3	10.3		5.2	YES	10.3/5.1	
ZINC, TOTAL RECOVERABLE	µg/L	2/3	183.8		91.6	YES	180/90	
COD	mg/L	9	*		*	YES	****	
ALUMINUM, TOTAL RECOVERABLE	µg/L	2	748.8		373.2	YES	****	
WHOLE EFFLUENT TOXICITY (WET) TEST	% Survival	11	Please see WET Test in the Derivation and Discussion Section below.					

\* - Monitoring requirement only.

\*\* - For DO the Daily Maximum is a Daily Minimum and the Monthly Average is a Monthly Average Minimum.

\*\*\* - # of colonies/100mL; the Monthly Average for *E. coli* is a geometric mean.

\*\*\*\* - Parameter not previously established in previous state operating permit.

**Basis for Limitations Codes:**

- |  |                                    |
|--|------------------------------------|
| 1. State or Federal Regulation/Law       | 7. Antidegradation Policy          |
| 2. Water Quality Standard (includes RPA) | 8. Water Quality Model             |
| 3. Water Quality Based Effluent Limits   | 9. Best Professional Judgment      |
| 4. Lagoon Policy                         | 10. TMDL or Permit in lieu of TMDL |
| 5. Ammonia Policy                        | 11. WET Test Policy                |
| 6. Antidegradation Review                |                                    |

**OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:**

**Technology-based Effluent Limitations (TBELs) vs. Water Quality Based Effluent Limitations (WQBEL)**

40 CFR Part 440.14 establishes Effluent Limit Guidelines (i.e. TBELs); however, when available TBELs are to be compared to WQBEL. There are three (3) pollutants that fall under both TBELs and WQBEL for this specific industry (TSS, pH, and Iron).

Pollutant	TBELs		WQBEL	
	MDL	AML	MDL	AML
TSS	<b>30 mg/L</b>	<b>20 mg/L</b>	N/A	N/A
pH	6.0 – 9.0 S.U.	6.0 – 9.0 S.U.	<b>6.5 – 9.0 S.U.</b>	<b>6.5 – 9.0 S.U.</b>
Iron, Total Recoverable	2000 µg/L	1000 µg/L	<b>1806 µg/L</b>	<b>607 µg/L</b>

**BOLD DENOTES THE MORE PROTECTIVE AND THEREFORE – APPLICABLE.**

- **Flow.** In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the department, which may require the submittal of an operating permit modification.
- **Total Suspended Solids (TSS).** Effluent limitations have been retained from previous state operating permit. Due to the fact that this is re-opening of the mining activity at this mine, New Source Performance Standards are applicable. Per 40 CFR Part 440.14(a) 30 mg/L as a Daily Maximum and 20 mg/L as a Monthly Average. However, the effluent limitations have not been modified.
- **Chemical Oxygen Demand:** Monitoring only.
- **pH.** Effluent limitation range of 6.5 to 9.0 Standard pH Units per 10 CSR 20-7.031(4)(E) are more protective as compared to the effluent range per 40 CFR Part 440.14(a) of 6.0 – 9.0. Therefore, the effluent limitation range shall be 6.5 – 9.0 Standard pH Units.
- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.
- **Calculations for other parameters:**

Design Flow (gpm)	7500
Design Flow (cfs)	16.71
Marys Creek 7Q10 (cfs)	0.1
Chronic Flow (cfs)	0.025
Acute Flow (cfs)	0.0025
LTA <sub>A</sub>	0.321
LTA <sub>C</sub>	0.527
MDL	3.11
AML	1.55
Hardness (mg/L)	170

		Chronic Criteria	Acute Criteria	WLA <sub>C</sub>	WLA <sub>A</sub>	LTA <sub>C</sub>	LTA <sub>A</sub>	Max Daily Limit	Avg. Monthly Limit
Fluoride	mg/L	4	N/A	4.01	N/A	2.11	N/A	6.57	3.28
Chloride	mg/L	230	860.00	230.34	860.13	121.39	276.10	377.53	188.20
Sulfate	mg/L	500	500.00	500.75	500.07	263.89	160.52	499.23	248.81
Iron	mg/L	1	N/A	1.00	N/A	0.53	N/A	1.64	0.82
Aluminum	μg/L	N/A	750.00	N/A	750.11	N/A	240.79	748.84	373.22
Arsenic	μg/L	20	N/A	20.03	N/A	10.56	N/A	32.83	16.36
Beryllium	μg/L	5	N/A	5.01	N/A	2.64	N/A	8.21	4.09
Cadmium	μg/L	0.36	7.97	0.36	7.97	0.19	2.56	0.59	0.29
Chromium (III)	μg/L	114.47	879.96	114.64	880.09	60.42	282.51	187.89	93.64
Chromium (VI)	μg/L	10	15.00	10.01	15.00	5.28	4.82	16.41	8.18
Cobalt	mg/L	1	N/A	1.00	N/A	0.53	N/A	1.64	0.82
Copper	μg/L	14.09	22.15	14.11	22.15	7.44	7.11	23.13	11.53
Lead	μg/L	4.46	14.45	4.47	14.45	2.35	4.64	7.32	3.65
Mercury	μg/L	0.5	2.40	0.50	2.40	0.26	0.77	0.82	0.41
Nickel	μg/L	81.52	734.02	81.64	734.13	43.03	235.66	133.81	66.69
Selenium	μg/L	5	N/A	5.01	N/A	2.64	N/A	8.21	4.09
Silver	μg/L	N/A	8.03	N/A	8.03	N/A	2.58	8.02	3.99
Thallium	μg/L	6.3	N/A	6.31	N/A	3.33	N/A	10.34	5.15
Zinc	μg/L	184.08	184.08	184.36	184.11	97.16	59.10	183.80	91.60

Hardness Dependent Metals:

Effluent limitations for total recoverable metals were developed using methods and procedures outlined in EPA/505/2-90-001 and “The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion” (EPA 823-B-96-007). General warm-water fishery criteria apply and water hardness = 162 mg/L. Hardness was determined from data submitted with the Antidegradation Report and the 25<sup>th</sup> percentile of the Mary’s Creek was 170.0 mg/L

Due to the absence of contemporaneous effluent and instream data for total recoverable metals, dissolved metals, hardness, and total suspended solids with which to calculate metals translators, partitioning between the dissolved and adsorbed phases was assumed to be minimal (Section 5.7.3, EPA/505/2-90-001). Freshwater criteria conversion factors for dissolved metals were used as the metals translator as recommended in guidance (Section 1.3, 1.5.3, and Table 1, EPA 823-B-96-007). If concurrent site-specific data for total recoverable metals, dissolved metals, hardness, and total suspended solids are provided to the department, partitioning evaluations may be considered and site-specific translators developed.

- **Iron, Total Recoverable:** Due to the fact that this is re-opening of the mining activity at this mine, New Source Performance Standards are applicable. Per 40 CFR Part 440.14(a) 2.0 mg/L as a Daily Maximum and 1.0 mg/L as a Monthly Average. The water quality based effluent limits for discharge to Mary’s Creek is more protective than the new source standards.

- **Total Hardness as CaCO<sub>3</sub>**: Monitoring requirement only is being established due to the fact that several of the Metal pollutants' toxicity is affected by the level of Total Hardness.
- **WET Test**. WET Testing schedules and intervals are established in accordance with the Department's Permit Manual; Section 5.2 *Effluent Limits / WET Testing for Compliance Bio-monitoring*. It is recommended that WET testing be conducted during the period of lowest stream flow.
  - Acute
  - No less than ONCE/YEAR:**
    - Facility is designated as a Major facility or has a design flow  $\geq 1.0$  MGD.
    - Facility continuously or routinely exceeds their design flow.
    - Facility exceeds its design population equivalent (PE) for BOD<sub>5</sub> whether or not its design flow is being exceeded.
    - Facility has Water Quality-based effluent limitations for toxic substances (other than NH<sub>3</sub>).

Allowable Effluent Concentration (AEC) calculations determine if the facility is to conduct single dilution or multiple dilution WET testing. Facilities that discharge to unclassified or Class C receiving streams, the AEC% is 100%. Facilities with less than 100% for an AEC% will have multiple dilution WET testing. Facilities that discharge to Lakes and have Acute WET testing, the AEC% is 100% due to [10 CSR 20-7.031(4)(A)4.B.(IV)(b)] ZID not allowed for Lakes.

$$\text{Acute AEC\%} = ((\text{design flow}_{\text{cfs}} + \text{ZID}_{7\text{Q}10}) / \text{design flow}_{\text{cfs}})^{-1} \times 100$$
$$\text{Acute AEC\%} = ((16.71 + 0.0025) / 16.71)^{-1} \times 100 = 100\%$$

- **Minimum Sampling and Reporting Frequency Requirements**. Sampling and reporting frequency requirements have been retained from previous state operating permit.

**Outfall #003**

Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
FLOW	GPD	1	*		*	NO	*
TSS	MG/L	1	30		20	NO	30/20
PH	SU	1	6.5-9.0		6.5-9.0	NO	6.5-9.0
OIL & GREASE (MG/L)	MG/L	1	15		10	NO	15/10
FLUORIDE	MG/L	2	46.8		23.3	YES	6.5/3.3
CHLORIDE	MG/L	2	4876.7		2430.5	YES	1000/*
SULFATE	MG/L	2	805.3		401.3	YES	****
HARDNESS, TOTAL	MG/L	2	*		*	NO	*/*
ALUMINUM	µg/L	2/3	1207.9		602	YES	749.2/373.4
IRON, TOTAL RECOVERABLE	mg/L	2/3	2.0		1.0	YES	1600/800 UG/L
COBALT, TOTAL RECOVERABLE	mg/L	2/3	11.7		5.8	NO	1.6/0.8
ARSENIC, TOTAL RECOVERABLE	µg/L	2/3	233.8		116.5	YES	33/16.4
BERYLLIUM, TOTAL RECOVERABLE	µg/L	2/3	58.5		29.1	YES	8.1/4.0
CADMIUM, TOTAL RECOVERABLE	µg/L	2/3	3.7		1.9	YES	0.5/0.3
CHROMIUM (III), TOTAL RECOVERABLE	µg/L	2/3	1161.6		578.9	YES	211/105
CHROMIUM (VI), DISSOLVED	µg/L	2/3	116.9		58.3	YES	16/8
COPPER, TOTAL RECOVERABLE	µg/L	2/3	11.7		5.8	YES	19/9.5
LEAD, TOTAL RECOVERABLE	µg/L	2/3	43.3		21.6	YES	9.3/4.7
MERCURY, TOTAL RECOVERABLE	µg/L	2/3	5.8		2.9	YES	0.9/0.5
NICKEL, TOTAL RECOVERABLE	µg/L	2/3	823.3		410.3	YES	128.7/64.2
SELENIUM, TOTAL RECOVERABLE	µg/L	2/3	58.5		29.1	YES	8.1/4.0
SILVER, TOTAL RECOVERABLE	µg/L	2/3	9.6		4.8	YES	8.7/4.3
THALLIUM, TOTAL RECOVERABLE	µg/L	2/3	73.7		36.7	YES	10.3/5.1
ZINC, TOTAL RECOVERABLE	µg/L	2/3	256.1		127.6	YES	180/90
COD	mg/L	9	*		*	YES	****
ALUMINUM, TOTAL RECOVERABLE	µg/L	2	1207.9		602	YES	****
WHOLE EFFLUENT TOXICITY (WET) TEST	% Survival	11	Please see WET Test in the Derivation and Discussion Section below.				

\* - Monitoring requirement only.

\*\* - For DO the Daily Maximum is a Daily Minimum and the Monthly Average is a Monthly Average Minimum.

\*\*\* - # of colonies/100mL; the Monthly Average for *E. coli* is a geometric mean.

\*\*\*\* - Parameter not previously established in previous state operating permit.

**Basis for Limitations Codes:**

- |  |                                    |
|--|------------------------------------|
| 1. State or Federal Regulation/Law       | 7. Antidegradation Policy          |
| 2. Water Quality Standard (includes RPA) | 8. Water Quality Model             |
| 3. Water Quality Based Effluent Limits   | 9. Best Professional Judgment      |
| 4. Lagoon Policy                         | 10. TMDL or Permit in lieu of TMDL |
| 5. Ammonia Policy                        | 11. WET Test Policy                |
| 6. Antidegradation Review                |                                    |

**OUTFALL #003 – DERIVATION AND DISCUSSION OF LIMITS:**

- **Flow.** In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the department, which may require the submittal of an operating permit modification.
- **Chemical Oxygen Demand:** Monitoring only. The discharge contains parameters that can exert a high demand on available oxygen, thus sampling is required.
- **Total Suspended Solids:** Effluent limitations have been retained from previous state operating permit. Due to the fact that this is re-opening of the mining activity at this mine, New Source Performance Standards are applicable. Per 40 CFR Part 440.14(a) 30 mg/L as a Daily Maximum and 20 mg/L as a Monthly Average. However, the effluent limitations have not been modified.
- **Total Hardness as CaCO<sub>3</sub>:** Monitoring requirement only is being established due to the fact that several of the Metal pollutants' toxicity is affected by the level of Total Hardness.
- **pH.** pH shall be maintained in the range from 6.5 to nine (6.5– 9.0) standard units [10 CSR 20-7.015 (8)(A)2.].
- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.
- **Iron, Total Recoverable:** Due to the fact that this is re-opening of the mining activity at this mine, New Source Performance Standards are applicable. Per 40 CFR Part 440.14(a) 2.0 mg/L as a Daily Maximum and 1.0 mg/L as a Monthly Average. The facility calculated water quality based effluent limits and minimally degrading effluent limits, however the technology based effluent limits are more protective.
- **Calculations for other parameters:**

<b>Design Flow (gpm)</b>	3275
<b>Design Flow (cfs)</b>	7.2967
<b>Meramec 7Q10 (cfs)</b>	179
<b>Chronic Flow (cfs)</b>	44.75
<b>Acute Flow (cfs)</b>	4.475
<b>LTA<sub>A</sub></b>	0.321
<b>LTA<sub>C</sub></b>	0.527
<b>MDL</b>	3.11
<b>AML</b>	1.55
<b>Hardness (mg/L)</b>	143

Parameter	Units	Chronic Criteria	Acute Criteria	WLA <sub>C</sub>	WLA <sub>A</sub>	LTA <sub>C</sub>	LTA <sub>A</sub>	MDL	AML
Fluoride	mg/L	4	N/A	28.5	N/A	15.0	N/A	46.8	23.3
Chloride	mg/L	417.15	674.97	2975.5	1088.9	1568.1	349.5	4876.7	2430.5
Sulfate	mg/L	500	500	3566.5	806.6	1879.5	258.9	805.3	401.3
Iron	mg/L	1	N/A	7.1	N/A	3.8	N/A	11.7	5.8
Aluminum	µg/L	N/A	750	N/A	1210	N/A	388.4	1207.9	602
Arsenic	µg/L	20	N/A	142.7	N/A	75.2	N/A	233.8	116.5
Beryllium	µg/L	5	N/A	35.7	N/A	18.8	N/A	58.5	29.1
Cadmium	µg/L	0.32	6.74	2.3	10.9	1.2	3.5	3.7	1.9
Chromium (III)	µg/L	99.36	763.74	708.7	1232.1	373.5	395.5	1161.6	578.9
Chromium (VI)	µg/L	10	15.	71.3	24.2	37.65	7.8	116.9	58.3
Cobalt	µg/L	1	N/A	7.1	N/A	3.8	N/A	11.7	5.8
Copper	µg/L	12.16	18.82	86.7	30.4	45.7	9.7	142.2	70.9
Lead	µg/L	3.7	95.07	26.4	153.4	13.9	49.2	43.3	21.6
Mercury	µg/L	0.5	2.4	3.6	3.9	1.9	1.2	5.8	2.9
Nickel	µg/L	70.42	634.10	502.3	1023	264.7	328.4	823.3	410.3
Selenium	µg/L	5	N/A	35.7	N/A	18.8	N/A	58.5	29.1
Silver	µg/L	N/A	5.960	N/A	9.6	N/A	3.1	9.6	4.8
Thallium	µg/L	6.3	N/A	44.9	N/A	23.7	N/A	73.7	36.7
Zinc	µg/L	158.99	158.99	1134.1	256.5	597.7	82.3	256.1	127.6

Hardness Dependent Metals:

Effluent limitations for total recoverable metals were developed using methods and procedures outlined in EPA/505/2-90-001 and “The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion” (EPA 823-B-96-007). General warm-water fishery criteria apply and water hardness = 162 mg/L. Hardness was determined from data submitted with the Antidegradation Report and the 25<sup>th</sup> percentile of the Meramec River was 143.0 mg/L

Due to the absence of contemporaneous effluent and instream data for total recoverable metals, dissolved metals, hardness, and total suspended solids with which to calculate metals translators, partitioning between the dissolved and adsorbed phases was assumed to be minimal (Section 5.7.3, EPA/505/2-90-001). Freshwater criteria conversion factors for dissolved metals were used as the metals translator as recommended in guidance (Section 1.3, 1.5.3, and Table 1, EPA 823-B-96-007). If concurrent site-specific data for total recoverable metals, dissolved metals, hardness, and total suspended solids are provided to the department, partitioning evaluations may be considered and site-specific translators developed.

- **WET Test.** WET Testing schedules and intervals are established in accordance with the Department's Permit Manual; Section 5.2 *Effluent Limits / WET Testing for Compliance Bio-monitoring*. It is recommended that WET testing be conducted during the period of lowest stream flow.
  - Acute
  - No less than ONCE/YEAR:**
    - Facility is designated as a Major facility or has a design flow  $\geq 1.0$  MGD.
    - Facility has Water Quality-based effluent limitations for toxic substances (other than  $\text{NH}_3$ ).

Allowable Effluent Concentration (AEC) calculations determine if the facility is to conduct single dilution or multiple dilution WET testing. Facilities that discharge to unclassified or Class C receiving streams, the AEC% is 100%. Facilities with less than 100% for an AEC% will have multiple dilution WET testing. Facilities that discharge to Lakes and have Acute WET testing, the AEC% is 100% due to [10 CSR 20-7.031(4)(A)4.B.(IV)(b)] ZID not allowed for Lakes.

$$\text{Acute AEC\%} = ((\text{design flow}_{\text{cfs}} + \text{ZID}_{7\text{Q}10}) / \text{design flow}_{\text{cfs}})^{-1}] \times 100$$
$$\text{Acute AEC\%} = ((7.3 + 4.475) / 7.3)^{-1}] \times 100 = 62\%$$

- **Minimum Sampling and Reporting Frequency Requirements.** Sampling and reporting frequency requirements have been retained from previous state operating permit.

## **Part VI – Administrative Requirements**

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

### **PUBLIC NOTICE:**

The Department shall give public notice that a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in and water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing.

The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit.

For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

- The Public Notice period for this operating permit is tentatively schedule to begin in October 2012.

**DATE OF FACT SHEET:** NOVEMBER 7, 2011

**DATE OF FACT SHEET MODIFICATION:** SEPTEMBER 27, 2012

### **COMPLETED BY:**

**CHRIS WIEBERG, ENVIRONMENTAL SPECIALIST**  
**NPDES PERMITS UNIT**  
**PERMITTING AND ENGINEERING SECTION**  
**WATER PROTECTION PROGRAM**  
**(573) 526-5781**  
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**APPENDIX # A – RPA RESULTS: NONE AT THIS TIME**  
**Appendix #B- Antidegradation Review:**

# **Water Quality and Antidegradation Review**

*For the Protection of Water Quality and Determination of Effluent Limits for  
Discharges to Mary's Creek and the Meramec River*

*by*

***PEA RIDGE RESOURCES***



September 2012, revised November 2012

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## Table of Contents

1.	FACILITY INFORMATION .....	19
2.	WATER QUALITY INFORMATION .....	19
2.1.	WATER QUALITY HISTORY: .....	19
3.	RECEIVING WATERBODY INFORMATION .....	19
4.	GENERAL COMMENTS .....	20
5.	ANTIDegradation REVIEW INFORMATION .....	20
5.1.	TIER DETERMINATION .....	20
	TABLE 1: OUTFALL 001, MARY’S CREEK TIER DETERMINATION .....	21
	TABLE 2: OUTFALL 003, MERAMEC RIVER TIER DETERMINATION .....	22
5.2.	EXISTING WATER QUALITY .....	22
5.3.	DEMONSTRATION OF NECESSITY AND SOCIAL AND ECONOMIC IMPORTANCE .....	22
5.3.1.	REGIONALIZATION ALTERATIVE .....	24
6.	GENERAL ASSUMPTIONS OF THE WATER QUALITY AND ANTIDegradation REVIEW .....	24
7.	MIXING CONSIDERATIONS .....	25
8.	PERMIT LIMITS AND MONITORING INFORMATION .....	25
9.	RECEIVING WATER MONITORING REQUIREMENTS .....	25
10.	DERIVATION AND DISCUSSION OF LIMITS .....	25
10.1.	OUTFALL #001 – MARY’S CREEK OUTFALL LIMIT DERIVATION .....	27
	TABLE 3: OUTFALL 001 EFFLUENT LIMITS .....	27
10.2.	OUTFALL #003 – MERAMEC RIVER OUTFALL LIMIT DERIVATION .....	30
	TABLE 4: OUTFALL 003 EFFLUENT LIMITS .....	30
11.	ANTIDegradation REVIEW PRELIMINARY DETERMINATION .....	32
	APPENDIX A: MAP OF DISCHARGE LOCATION .....	33
	APPENDIX B: MINE WATER SAMPLING AT VARIOUS DEPTHS .....	34
	APPENDIX C: ANTIDegradation REVIEW SUMMARY ATTACHMENTS .....	1

## 1. FACILITY INFORMATION

FACILITY NAME: Pea Ridge Resources NPDES #: MO-000547

FACILITY TYPE/DESCRIPTION: Pea Ridge Resources is working to dewater the mine prior to startup of operations. The preferred alternative is to pump water through the existing magnetite process, pump to Mary's Creek, pump to Meramec River, treat with a water treatment plant (reverse osmosis process), and to use the existing treatment plant. This is a short term, 15 month process. After the mine is dewatered, the facility will cease pumping to the Meramec River. The design flow of Outfall 001 to Mary's Creek is 10.8 MGD and the design flow of Outfall 003 to the Meramec River is 4.71 MGD.

Outfall 001:

COUNTY: Washington UTM COORDINATES: x= 672991; y = 4222132  
 12- DIGIT HUC: 07140102- 0602 LEGAL DESCRIPTION: SW ¼, SW ¼, Sec. 3, T39N, R1W  
 EDU\*: Ozark/Meramec ECOREGION: Ozark/Highlands /Oak Woodland/Forest Hills

\* - Ecological Drainage Unit

Outfall 003:

COUNTY: Crawford UTM COORDINATES: x= 665643; y= 44224451  
 12- DIGIT HUC: 07140102-0703 LEGAL DESCRIPTION: SE ¼, SE ¼, Sec. 35, T40N, R02W  
 EDU\*: Ozark/Meramec ECOREGION: Ozark/Highlands /Oak Woodland/Forest Hills

## 2. WATER QUALITY INFORMATION

In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(2)] and federal antidegradation policy at Title 40 Code of Federal Regulation (CFR) Section 131.12 (a), the Missouri Department of Natural Resources (MDNR) developed a statewide antidegradation policy and corresponding procedures to implement the policy. A proposed discharge to a water body will be required to undergo a level of Antidegradation Review which documents that the use of a water body's available assimilative capacity is justified. Effective August 30, 2008, a facility is required to use *Missouri's Antidegradation Rule and Implementation Procedure (AIP)* for new and expanded wastewater discharges.

### 2.1. WATER QUALITY HISTORY:

The facility discharges to Mary's Creek. The facility's permit was reissued in March 2012 and the facility is in compliance with its operating permit, but under a schedule of compliance to meet more protective effluent limits on Outfall 001. Outfall 003 is a temporary discharge while the mine is being dewatered.

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	RECEIVING WATERBODY	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	16.71	Secondary	Mary's Creek	0.0
003	7.3	Secondary	Meramec River	0.0

## 3. RECEIVING WATERBODY INFORMATION

WATERBODY NAME	CLASS	WBID	LOW-FLOW VALUES (CFS)			DESIGNATED USES **
			1Q10	7Q10	30Q10	
Mary's Creek	P	03661	0.10	0.10	1.0	AQL, LWV, WBC(B)
Meramec River	P	01846		179		AQL, CLF, IND, IRR, SCR, WBC(A)

\*\* Protection of Warm Water Aquatic Life and Human Health-Fish Consumption (AQL), Cold Water Fishery (CDF), Cool Water Fishery (CLF), Drinking Water Supply (DWS), Industrial (IND), Irrigation (IRR), Livestock & Wildlife Watering (LWW), Secondary Contact Recreation (SCR), Whole Body Contact Recreation (WBC).

#### **4. GENERAL COMMENTS**

CDG Engineers prepared, on behalf of Pea Ridge Resources, the *Antidegradation Report Proposed Dewatering of Pea Ridge Resources Mine* dated August 3, 2012. The Mary's Creek discharge is existing and both receiving streams are gaining for discharge purposes (Appendix A: Map). Applicant elected evaluated all pollutant of concern in both receiving streams and conducted an alternatives analysis on the best option for dewatering the mine in fifteen months. An alternative analysis was conducted to fulfill the requirements of the AIP. Information that was provided by the applicant in the submitted report and summary forms in Appendix C was used to develop this review document.

#### **5. ANTIDegradation REVIEW INFORMATION**

The following is a review of the *Antidegradation Report* dated August 3, 2012.

##### **5.1. TIER DETERMINATION**

Below is a list of pollutants of concern expected to be discharged into Mary's Creek and into the Meramec River. Pollutants of concern are defined as those pollutants "proposed for discharge that affects beneficial use(s) in waters of the state. POCs include pollutants that create conditions unfavorable to beneficial uses in the water body receiving the discharge or proposed to receive the discharge." (AIP, Page 7). CDG Engineers used the facility assimilative capacity equation to determine what category the parameters were in. Except for copper in the Meramec River, all the parameters were Tier 2. Copper in the Meramec River appears to be a Tier 1 pollutant; however the Meramec River is not listed as impaired for copper and there is not a Total Maximum Daily Load established, either. If there is not a TMDL or listing, per the Antidegradation Implementation Procedure, copper discharges must meet water quality standards, which is what the facility proposed as the effluent limit. Total Suspended Solids, pH, and Iron are covered under the federal effluent limit guidelines for ore mining, 40 CFR 440. Chemical oxygen demand was added, as biochemical oxygen demand is not an appropriate parameter for monitoring the oxygen demands in the stream.



TABLE 2: OUTFALL 003, MERAMEC RIVER TIER DETERMINATION

	Effluent Concentration (mg/L)	EWQ (mg/L)	Chronic Criterion (mg/L)	FAC (lbs/day):	New Discharge Load (lbs/day):	%of Increased Load to FAC:	Tier Determination
Fluoride	16.30	0.10	4.00	3931	642.55	16.35%	Tier 2: SD
Copper	0.0320	0.0163	0.0122	-3.53	1.2614	-35.78%	Tier 2: MD
Iron	14.00	0.41	1.00	610	551.88	90.44%	Tier 2: SD
Selenium	0.0763	0.0001	0.0050	4.94	3.0077	60.92%	Tier 2: SD
Oil & Grease	5.00	0.00	10.00	10068	197.10	1.96%	Tier 2: MD
Aluminum	0.022	0.178	0.750	583	0.87	0.15%	Tier 2: MD
Arsenic	0.0270	0.0003	0.0200	19.85	1.0643	5.36%	Tier 2: MD
Cadmium	0.0002	0.0001	0.0003	0.21	0.0075	3.65%	Tier 2: MD
Chloride	5,100	3.85	418.13	417261	201042	48.18%	Tier 2: SD
Cobalt	0.0055	0.0000	1.0000	1006.83	0.2168	0.02%	Tier 2: MD
Lead	0.0026	0.0030	0.0037	0.82	0.1025	12.45%	Tier 2: MD
Mercury	0.0002	0.0003	0.0005	0.21	0.0079	3.70%	Tier 2: MD
Nickel	0.0360	0.0000	0.0704	71	1.4191	2.00%	Tier 2: MD
Silver	0.0005	0.0015	0.0060	4.59	0.0197	0.43%	Tier 2: MD
Sulfate	688.90	9.65	500.00	494079	27156	5.50%	Tier 2: MD
Zinc	0.1100	0.0445	0.1600	118	4.3362	3.67%	Tier 2: MD
Beryllium*							Tier 2: SD
Thallium*							Tier 2: SD

\* Tier 2 significant degradation assumed.

\*\* Effluent concentration from sampling of mine water on 3/13/2012

The following Antidegradation Review Summary attachments were used by the applicant:

- Tier Determination and Effluent Summary (in Appendix C)
- Attachment A, Tier 2 with significant degradation
- Attachment B, Tier 2 with minimal degradation.

## 5.2. EXISTING WATER QUALITY

Water quality data from Mary's Creek, the Meramec River at Sullivan and the existing water of the mine was used to evaluate options and alternatives. The pollutants of concern are for the most part minimally degrading; however a few are significantly degrading. See Appendix B for mine data. A copy of existing water quality for Meramec River is available upon request.

## 5.3. DEMONSTRATION OF NECESSITY AND SOCIAL AND ECONOMIC IMPORTANCE

Missouri's antidegradation implementation procedures specify that if the proposed activity does result in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required. Pea Ridge Resources and CDG Engineers evaluated ten alternatives from non-degrading to less degrading in handling the water in the mine. CDG Engineers' alternatives analysis has shown that the high concentration of POC's in the lower stratum of mine water is the controlling factor because of concentrations that are too high to discharge to Mary's Creek.

The first option evaluated was to do nothing. This option does not allow the mine to be emptied of the water to allow for the facility to be reopened. The mine needs dewatered to allow the facility the opportunity to explore if the mine is viable for mining operations. Also considered under this option was pumping all the water to Outfall 001, without treatment is not practical because it will not meet water quality standards since the water quality in the lower portion of the mine is poor.

The second option evaluated was to use the mine water in the magnetite process. The first option evaluated was to do nothing. The magnetite separation process uses approximately 1800 gallons per minute (gpm), the mine needs to be pumped at approximately 10,000 GPM to be empty in 15 months which is Pea Ridge Resources timeline for dewatering. Reusing mine water alone is not practical.

Option three was to use the existing site based treatment of settling, phytoremediation and adsorption to treat the water. Pumping any of the water from the mine through the existing treatment systems is not practical. The existing treatment system at the mine utilizes settling, phytoremediation, and adsorption. The system is designed to treat water from the processing of magnetite at approximately 2,000 gpm. Pea Ridge Resources desires to empty the mine in 15 months, which requires a pump rate of 10,000 gpm, the existing treatment system could not treat that flow rate.

The fourth alternative evaluated was to set up a water treatment system, either temporary or permanent plant capable of filtration and reverse osmosis. CDG Engineers considered three treatment plants: mobile treatment trailers, a permanent treatment plant, and a temporary treatment plant all using filtration and reverse osmosis. The proposed treat plants were able to clean the lower stratum of mine water to get effluents to within water quality standards for Mary's Creek. The treatment was not practical because of waste water streams generated from the treatment. Approximately 30% of the water that went through the treatment system would be discharged to a waste stream that would contain high concentration of POC's. Water from the waste stream would have to be either stored on site, disposed of offsite or run through the existing treatment system. The mine site does not have the capabilities to store that amount of water on site, there is not a way to dispose the water off site and running the water through the existing treatment system would likely overwhelm it. This alternative may be reevaluated if the preferred alternative does not work to ensure water quality is met in Mary's Creek and in the Meramec River.

The fifth alternative was to adjust pump levels to mix the upper and lower stratas of water to discharge to Mary's Creek. Mixing is not practical because the mixing ratio required to bring the lower water into compliance with Mary's Creek water quality standards is a mixing ratio of 99.9 to 0.1, upper water to lower water. This is not practical or efficient way of removing water.

The sixth alternative evaluated was evaluation of alternative discharge locations, such as land application, groundwater injection, and possibly provide for others. CDG Engineers began analyzing alternative discharge locations since the lower stratum of mine water could not be treated effectively enough to be within water quality standards for Mary's Creek. Land application, groundwater injection, and providing to others by shipping off site were all deemed not practical. Land application is not practical because the low infiltration rate of surrounding topography. The amount of wells that would need to be drilled makes groundwater injection impractical. Shipping the water off site is not practical since the pumping rates would require that a tanker truck be filled approximately every 45 seconds.

The seventh alternative evaluated and the preferred alternative is to use a combination of the alternatives to achieve the goal of pumping the mine water out in fifteen months. The variation in the POC concentrations near the top of the mine shaft and the POC concentrations near the bottom of the mine shaft caused CDG Engineers to consider the mine water as two separate volumes of water that could be discharged at different locations. Water in the upper stratum of the mine meets water quality standards for Mary's Creek and could be pumped directly to outfall #001, potentially causing significant degradation to Mary's Creek for some

pollutants of concern because of the relatively large flow rate compared to the flow rate of Mary's Creek. The large flow rate is a onetime event that is expected to last fifteen months and would empty approximately half of the mine. The magnetite separation process would also use 1,800 gpm of the water from the upper stratum of the mine. While the upper stratum of mine water is being pumped to Mary's Creek the lower stratum could be pumped to the Meramec River after being treated at a temporary precipitation treatment plant. Even after treatment the water pumped to the Meramec River will likely significantly degrade. The discharge to the Meramec River is a onetime event that would last approximately 15 months and would end once the mine was completely emptied.

From the seventh alternative, CDG Engineers evaluated two operating scenarios for dewatering the mine. The first alternative is to pump 7,200 gpm from the mine to the Meramec River, treating the lower stratum before pumping to the Meramec River and using 1,800 gpm from the mine for the magnetite separation process for a total dewatering rate of 9,000 GPM. Significant degradation would likely occur for approximately eight months during the dewatering of the lower stratum of mine water. This alternative is practical; however it would require Pea Ridge Resources to lay 25,500 feet of new piping across resident's property all the way to the Meramec River.

The second operating scenario and the preferred alternative is to split the flow between Mary's Creek and the Meramec River. This part of the alternative discharges 5,700 gpm of the upper water directly to Mary's Creek and using an additional 1,800 gpm of the upper water for the magnetite separation process for a total of 7,500 gpm of upper water. At the same time the upper stratum is being pumped the lower stratum would be pumped to a treatment plant then to the Meramec River at approximately 3,275 gpm. Once the upper water is pumped out of the mine the process plant will utilize 1,800 gpm from the lower stratum after treatment. This option would not require any additional infrastructure except for the treatment plant and would significantly degrade both Mary's Creek and the Meramec River during the 15 month dewatering process. This alternative could use the existing infrastructure to pump the water to the Meramec River.

### 5.3.1. REGIONALIZATION ALTERNATIVE

Within Section II B 1. of the AIP, discussion of the potential for discharge to a regional waste water collection system is mentioned. There is not a regional wastewater treatment plant available to take the flow being pumped out of the mine.

NEEDS A WAIVER TO PREVENT CONFLICT WITH AREA WIDE MANAGEMENT PLAN APPROVED UNDER SECTION 208 OF THE CLEAN WATER ACT AND/OR UNDER 10 CSR 20-6.010(3) (B) 1 OR 2 CONTINUING AUTHORITIES? (Y OR N) N

After the mine is dewatered and if the mine is determined to be stable and able to be mined, there is large job potential, along with potential increase to the tax base. To operate a mine the size of Pea Ridge, it is expected that two hundred plus jobs will be created. The industry trade associations estimate is that six indirect jobs are created with each direct mine job, which would be approximately 1,200 jobs that could be created.

## 6. GENERAL ASSUMPTIONS OF THE WATER QUALITY AND ANTIDegradation REVIEW

1. A Water Quality and Antidegradation Review (WQAR) assumes that [10 CSR 20-6.010(3) Continuing Authorities and 10 CSR 20-6.010(4) (D), consideration for no discharge] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
2. A WQAR does not indicate approval or disapproval of alternative analysis as per [10 CSR 20-7.015(4) Losing Streams], and/or any section of the effluent regulations.
3. Changes to Federal and State Regulations made after the drafting of this WQAR may alter Water Quality Based Effluent Limits (WQBEL).

4. Effluent limitations derived from Federal or Missouri State Regulations (FSR) may be WQBEL or Effluent Limit Guidelines (ELG).
5. WQBEL supersede ELG only when they are more stringent. Mass limits derived from technology based limits are still appropriate.
6. A WQAR does not allow discharges to waters of the state, and shall not be construed as a National Pollution Discharge Elimination System or Missouri State Operating Permit to discharge or a permit to construct, modify, or upgrade.
7. Limitations and other requirements in a WQAR may change as Water Quality Standards, Methodology, and Implementation procedures change.
8. Nothing in this WQAR removes any obligations to comply with county or other local ordinances or restrictions.
9. If the proposed treatment technology is not covered in 10 CSR 20-8 Design Guides, the treatment process may be considered a new technology. As a new technology, the permittee will need to work with the review engineer to ensure equipment is sized properly. The operating permit may contain additional requirements to evaluate the effectiveness of the technology once the facility is in operation. This Antidegradation Review is based on the information provided by the facility and is not a comprehensive review of the proposed treatment technology. If the review engineer determines the proposed technology will not consistently meet proposed effluent limits, the permittee will be required to revise their Antidegradation Report.

## 7. MIXING CONSIDERATIONS

**Mixing Zone (MZ):** One-quarter (1/4) of the stream volume of flow; length one-quarter (1/4) mile. [10 CSR 20-7.031(4)(A)4.B.(III)(a)].

**Zone of Initial Dilution (ZID):** One-tenth (0.1) of the mixing zone volume of flow, not to exceed 10 times the effluent design flow. [10 CSR 20-7.031(4)(A)4.B.(III)(b)].

	7Q10 (cfs)	MZ (cfs)	ZID (cfs)
<b>Mary's Creek</b>	0.1	0.025	0.0025
<b>Meramec River</b>	179	44.75	4.48

## 8. PERMIT LIMITS AND MONITORING INFORMATION

WASTELOAD ALLOCATION STUDY CONDUCTED (Y OR N):     N          USE ATTAINABILITY ANALYSIS CONDUCTED (Y OR N):     N          WHOLE BODY CONTACT USE RETAINED (Y OR N):     Y    

WET TEST (Y OR N):     Y          FREQUENCY:     TWICE/YEAR          AEC:     SEE PERMIT          METHOD:     MULTIPLE    

## 9. RECEIVING WATER MONITORING REQUIREMENTS

No receiving water monitoring requirements recommended at this time.

## 10. DERIVATION AND DISCUSSION OF LIMITS

Wasteload allocations and limits were calculated using two methods:

- 1) Water quality-based – Using water quality criteria or water quality model results and the dilution equation below:

$$C = \frac{(C_s \times Q_s) + (C_e \times Q_e)}{(Q_e + Q_s)} \quad (\text{EPA/505/2-90-001, Section 4.5.5})$$

Where C = downstream concentration  
C<sub>s</sub> = upstream concentration  
Q<sub>s</sub> = upstream flow  
C<sub>e</sub> = effluent concentration  
Q<sub>e</sub> = effluent flow

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow at the edge of the mixing zone (MZ). Acute wasteload allocations were determined using applicable water quality criteria (CMC: criteria maximum concentration) and stream volume of flow at the edge of the zone of initial dilution (ZID). Water quality-based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

2) Alternative Analysis-based – Using the preferred alternative's treatment capacity for conventional pollutants such as BOD<sub>5</sub> and TSS that are provided by the consultant as the WLA, the significantly-degrading effluent average monthly and average weekly limits are determined by applying the WLA as the average monthly (AML) and multiplying the AML by 1.5 to derive the average weekly limit (AWL). For toxic and nonconventional pollutant such as ammonia, the treatment capacity is applied as the significantly-degrading effluent monthly average (AML). A maximum daily can be derived by dividing the AML by 1.19 to determine the long-term average (LTA). The LTA is then multiplied by 3.11 to obtain the maximum daily limitation. This is an accepted procedure that is defined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

Note: Significantly-degrading effluent limits have been based on the authority included in Section III. Permit Consideration of the AIP. Also under 40 CFR 133.105, permitting authorities shall require more stringent limitations than equivalent to secondary treatment limitations for 1) existing facilities if the permitting authority determines that the 30-day average and 7-day average BOD<sub>5</sub> and SS effluent values that could be achievable through proper operation and maintenance of the treatment works, and 2) new facilities if the permitting authority determines that the 30-day average and 7-day average BOD<sub>5</sub> and SS effluent values that could be achievable through proper operation and maintenance of the treatment works, considering the design capability of the treatment process.

10.1. OUTFALL #001 – MARY’S CREEK OUTFALL LIMIT DERIVATION

TABLE 3: OUTFALL 001 EFFLUENT LIMITS

PARAMETER	UNITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	BASIS FOR LIMIT (NOTE 1)	MONITORING FREQUENCY
FLOW	MGD	*		*	FSR	ONCE/DAY
CHEMICAL OXYGEN DEMAND	MG/L	*		*	NA	ONCE/WEEK
TOTAL SUSPENDED SOLIDS	MG/L	30		20	TBEL	ONCE/WEEK
TOTAL HARDNESS AS CaCO <sub>3</sub>	MG/L	*		*	NA	ONCE/WEEK
OIL AND GREASE	MG/L	15		10	FSR	ONCE/WEEK
PH	SU	6.5–9.0		6.5–9.0	FSR	ONCE/WEEK
FLUORIDE	MG/L	6.6		3.3	WQBEL	ONCE/WEEK
CHLORIDE	MG/L	377.5		188.2	WQBEL	ONCE/WEEK
SULFATE	MG/L	499.2		248.8	WQBEL	ONCE/WEEK
COBALT, TOTAL RECOVERABLE	MG/L	1.6		0.8	WQBEL	ONCE/WEEK
IRON, TOTAL RECOVERABLE	MG/L	1.6		0.8	WQBEL	ONCE/WEEK
ALUMINUM, TOTAL RECOVERABLE	µg/L	748.8		373.2	WQBEL	ONCE/WEEK
ARSENIC, TOTAL RECOVERABLE	µg/L	32.8		16.4	WQBEL	ONCE/WEEK
BERYLLIUM, TOTAL RECOVERABLE	µg/L	8.2		4.1	WQBEL	ONCE/WEEK
CADMIUM, TOTAL RECOVERABLE	µg/L	0.6		0.3	WQBEL	ONCE/WEEK
CHROMIUM (III), TOTAL RECOVERABLE	µg/L	187.9		93.6	WQBEL	ONCE/WEEK
CHROMIUM (VI), TOTAL DISSOLVED	µg/L	16.4		8.2	WQBEL	ONCE/WEEK
COPPER, TOTAL RECOVERABLE	µg/L	23.1		11.5	WQBEL	ONCE/WEEK
LEAD, TOTAL RECOVERABLE	µg/L	7.3		3.6	WQBEL	ONCE/WEEK
MERCURY, TOTAL RECOVERABLE	µg/L	0.8		0.4	WQBEL	ONCE/WEEK
NICKEL, TOTAL RECOVERABLE	µg/L	133.8		66.7	WQBEL	ONCE/WEEK
SELENIUM, TOTAL RECOVERABLE	µg/L	8.2		4.1	WQBEL	ONCE/WEEK
SILVER, TOTAL RECOVERABLE	µg/L	8.0		4.0	WQBEL	ONCE/WEEK
THALLIUM, TOTAL RECOVERABLE	µg/L	10.3		5.2	WQBEL	ONCE/WEEK
ZINC, TOTAL RECOVERABLE	µg/L	183.8		91.6	WQBEL	ONCE/WEEK

NOTE 1 – WATER QUALITY-BASED EFFLUENT LIMITATION --WQBEL; OR MINIMALLY DEGRADING EFFLUENT LIMIT--MDEL; OR PREFERRED ALTERNATIVE EFFLUENT LIMIT-PEL; TECHNOLOGY-BASED EFFLUENT LIMIT-TBEL;OR NO DEGRADATION EFFLUENT LIMIT--NDEL; OR FSR --FEDERAL/STATE REGULATION; OR N/A--NOT APPLICABLE. ALSO, PLEASE SEE THE GENERAL ASSUMPTIONS OF THE WQAR #4 & #5.

\* - Monitoring requirements only.

- **Flow.** In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the department, which may require the submittal of an operating permit modification.
- **Chemical Oxygen Demand:** Monitoring only.
- **Total Suspended Solids:** Effluent limitations have been retained from previous state operating permit. Due to the fact that this is re-opening of the mining activity at this mine, New Source Performance Standards are applicable. Per 40 CFR Part 440.14(a) 30 mg/L as a Daily Maximum and 20 mg/L as a Monthly Average.

- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.
- **Iron, Total Recoverable:** Due to the fact that this is re-opening of the mining activity at this mine, New Source Performance Standards are applicable. Per 40 CFR Part 440.14(a) 2.0 mg/L as a Daily Maximum and 1.0 mg/L as a Monthly Average. The water quality based effluent limits for discharge to Mary's Creek is more protective than the new source standards.
- **Total Hardness as CaCO<sub>3</sub>:** Monitoring requirement only is being established due to the fact that several of the Metal pollutants' toxicity is affected by the level of Total Hardness.
- **pH.** pH shall be maintained in the range from 6.5 to nine (6.5– 9.0) standard units [10 CSR 20-7.015 (8)(A)2.].
- **Calculations for other parameters:**

Design Flow (gpm)	7500
Design Flow (cfs)	16.71
Marys Creek 7Q10 (cfs)	0.1
Chronic Flow (cfs)	0.025
Acute Flow (cfs)	0.0025
LTA <sub>A</sub>	0.321
LTA <sub>C</sub>	0.527
MDL	3.11
AML	1.55
Hardness (mg/L)	170

Parameter	Units	Chronic Criteria	Acute Criteria	WLA <sub>C</sub>	WLA <sub>A</sub>	LTA <sub>C</sub>	LTA <sub>A</sub>	Max Daily Limit	Avg. Monthly Limit
Fluoride	mg/L	4	N/A	4.01	N/A	2.11	N/A	6.57	3.28
Chloride	mg/L	230	860.00	230.34	860.13	121.39	276.10	377.53	188.20
Sulfate	mg/L	500	500.00	500.75	500.07	263.89	160.52	499.23	248.81
Iron	mg/L	1	N/A	1.00	N/A	0.53	N/A	1.64	0.82
Aluminum	µg/L	N/A	750.00	N/A	750.11	N/A	240.79	748.84	373.22
Arsenic	µg/L	20	N/A	20.03	N/A	10.56	N/A	32.83	16.36
Beryllium	µg/L	5	N/A	5.01	N/A	2.64	N/A	8.21	4.09
Cadmium	µg/L	0.36	7.97	0.36	7.97	0.19	2.56	0.59	0.29
Chromium (III)	µg/L	114.47	879.96	114.64	880.09	60.42	282.51	187.89	93.64
Chromium (VI)	µg/L	10	15.00	10.01	15.00	5.28	4.82	16.41	8.18
Cobalt	mg/L	1	N/A	1.00	N/A	0.53	N/A	1.64	0.82
Copper	µg/L	14.09	22.15	14.11	22.15	7.44	7.11	23.13	11.53
Lead	µg/L	4.46	14.45	4.47	14.45	2.35	4.64	7.32	3.65
Mercury	µg/L	0.5	2.40	0.50	2.40	0.26	0.77	0.82	0.41

Nickel	µg/L	81.52	734.02	81.64	734.13	43.03	235.66	133.81	66.69
Selenium	µg/L	5	N/A	5.01	N/A	2.64	N/A	8.21	4.09
Silver	µg/L	N/A	8.03	N/A	8.03	N/A	2.58	8.02	3.99
Thallium	µg/L	6.3	N/A	6.31	N/A	3.33	N/A	10.34	5.15
Zinc	µg/L	184.08	184.08	184.36	184.11	97.16	59.10	183.80	91.60

Hardness Dependent Metals:

Effluent limitations for total recoverable metals were developed using methods and procedures outlined in EPA/505/2-90-001 and “The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion” (EPA 823-B-96-007). General warm-water fishery criteria apply and water hardness = 162 mg/L. Hardness was determined from data submitted with the Antidegradation Report and the 25<sup>th</sup> percentile of the Mary’s Creek was 170.0 mg/L

Due to the absence of contemporaneous effluent and instream data for total recoverable metals, dissolved metals, hardness, and total suspended solids with which to calculate metals translators, partitioning between the dissolved and adsorbed phases was assumed to be minimal (Section 5.7.3, EPA/505/2-90-001). Freshwater criteria conversion factors for dissolved metals were used as the metals translator as recommended in guidance (Section 1.3, 1.5.3, and Table 1, EPA 823-B-96-007). If concurrent site-specific data for total recoverable metals, dissolved metals, hardness, and total suspended solids are provided to the department, partitioning evaluations may be considered and site-specific translators developed.

10.2. OUTFALL #003 – MERAMEC RIVER OUTFALL LIMIT DERIVATION

TABLE 4: OUTFALL 003 EFFLUENT LIMITS

PARAMETER	UNITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	BASIS FOR LIMIT (NOTE 1)	MONITORING FREQUENCY
FLOW	MGD	*		*	FSR	ONCE/DAY
CHEMICAL OXYGEN DEMAND	MG/L	*		*	NA	ONCE/WEEK
TOTAL SUSPENDED SOLIDS	MG/L	30		20	TBEL	ONCE/WEEK
PH	SU	6.5–9.0		6.5–9.0	FSR	ONCE/WEEK
OIL AND GREASE	MG/L	15		10	FSR	ONCE/WEEK
TOTAL HARDNESS AS CaCO <sub>3</sub>	MG/L	*		*	WQBEL	ONCE/WEEK
FLUORIDE	MG/L	46.8		23.3	WQBEL	ONCE/WEEK
CHLORIDE	MG/L	4876.7		2430.5	WQBEL	ONCE/WEEK
SULFATE	MG/L	805.3		401.3	WQBEL	ONCE/WEEK
COBALT, TOTAL RECOVERABLE	MG/L	11.7		5.8	WQBEL	ONCE/WEEK
IRON, TOTAL RECOVERABLE	MG/L	2.0		1.0	TBEL	ONCE/WEEK
ALUMINUM, TOTAL RECOVERABLE	µg/L	1207.9		602	WQBEL	ONCE/WEEK
ARSENIC, TOTAL RECOVERABLE	µg/L	233.8		116.5	WQBEL	ONCE/WEEK
BERYLLIUM	µg/L	58.5		29.1	WQBEL	ONCE/WEEK
CADMIUM, TOTAL RECOVERABLE	µg/L	3.7		1.9	WQBEL	ONCE/WEEK
CHROMIUM (III), TOTAL RECOVERABLE	µg/L	1161.6		578.9	WQBEL	ONCE/WEEK
CHROMIUM (VI), TOTAL DISSOLVED	µg/L	116.9		58.3	WQBEL	ONCE/WEEK
COPPER, TOTAL RECOVERABLE	µg/L	11.7		5.8	WQBEL	ONCE/WEEK
LEAD, TOTAL RECOVERABLE	µg/L	43.3		21.6	WQBEL	ONCE/WEEK
MERCURY, TOTAL RECOVERABLE	µg/L	5.8		2.9	WQBEL	ONCE/WEEK
NICKEL, TOTAL RECOVERABLE	µg/L	823.3		410.3	WQBEL	ONCE/WEEK
SELENIUM, TOTAL RECOVERABLE	µg/L	58.5		29.1	WQBEL	ONCE/WEEK
SILVER, TOTAL RECOVERABLE	µg/L	9.6		4.8	WQBEL	ONCE/WEEK
THALLIUM, TOTAL RECOVERABLE	µg/L	73.7		36.7	WQBEL	ONCE/WEEK
ZINC, TOTAL RECOVERABLE	µg/L	256.1		127.6	WQBEL	ONCE/WEEK

NOTE 1 - WATER QUALITY-BASED EFFLUENT LIMITATION --WQBEL; OR MINIMALLY DEGRADING EFFLUENT LIMIT--MDEL; OR PREFERRED ALTERNATIVE EFFLUENT LIMIT-PEL; TECHNOLOGY-BASED EFFLUENT LIMIT-TBEL; OR NO DEGRADATION EFFLUENT LIMIT--NDEL; OR FSR -- FEDERAL/STATE REGULATION; OR N/A--NOT APPLICABLE. ALSO, PLEASE SEE THE **GENERAL ASSUMPTIONS OF THE WQAR #4 & #5.**

\* - Monitoring requirements only.

- **Flow.** In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the department, which may require the submittal of an operating permit modification.
- **Chemical Oxygen Demand:** Monitoring only. The discharge contains parameters that can exert a high demand on available oxygen, thus sampling is required.
- **Total Suspended Solids:** Effluent limitations have been retained from previous state operating permit. Due to the fact that this is re-opening of the mining activity at this mine, New Source Performance Standards are applicable. Per 40 CFR Part 440.14(a) 30 mg/L as a Daily Maximum and 20 mg/L as a Monthly Average. However, the effluent limitations have not been modified.

- **Total Hardness as CaCO<sub>3</sub>:** Monitoring requirement only is being established due to the fact that several of the Metal pollutants' toxicity is affected by the level of Total Hardness.
- **pH.** pH shall be maintained in the range from 6.5 to nine (6.5– 9.0) standard units [10 CSR 20-7.015 (8)(A)2.].
- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.
- **Iron, Total Recoverable:** Due to the fact that this is re-opening of the mining activity at this mine, New Source Performance Standards are applicable. Per 40 CFR Part 440.14(a) 2.0 mg/L as a Daily Maximum and 1.0 mg/L as a Monthly Average. The facility calculated water quality based effluent limits and minimally degrading effluent limits, however the technology based effluent limits are more protective.
- **Calculations for other parameters:**

<b>Design Flow (gpm)</b>	3275
<b>Design Flow (cfs)</b>	7.2967
<b>Meramec 7Q10 (cfs)</b>	179
<b>Chronic Flow (cfs)</b>	44.75
<b>Acute Flow (cfs)</b>	4.475
<b>LTA<sub>A</sub></b>	0.321
<b>LTA<sub>C</sub></b>	0.527
<b>MDL</b>	3.11
<b>AML</b>	1.55
<b>Hardness (mg/L)</b>	143

Parameter	Units	Chronic Criteria	Acute Criteria	WLA <sub>C</sub>	WLA <sub>A</sub>	LTA <sub>C</sub>	LTA <sub>A</sub>	MDL	AML
Fluoride	mg/L	4	N/A	28.5	N/A	15.0	N/A	46.8	23.3
Chloride	mg/L	417.15	674.97	2975.5	1088.9	1568.1	349.5	4876.7	2430.5
Sulfate	mg/L	500	500	3566.5	806.6	1879.5	258.9	805.3	401.3
Iron	mg/L	1	N/A	7.1	N/A	3.8	N/A	11.7	5.8
Aluminum	µg/L	N/A	750	N/A	1210	N/A	388.4	1207.9	602
Arsenic	µg/L	20	N/A	142.7	N/A	75.2	N/A	233.8	116.5
Beryllium	µg/L	5	N/A	35.7	N/A	18.8	N/A	58.5	29.1
Cadmium	µg/L	0.32	6.74	2.3	10.9	1.2	3.5	3.7	1.9
Chromium (III)	µg/L	99.36	763.74	708.7	1232.1	373.5	395.5	1161.6	578.9
Chromium (VI)	µg/L	10	15.	71.3	24.2	37.65	7.8	116.9	58.3
Cobalt	µg/L	1	N/A	7.1	N/A	3.8	N/A	11.7	5.8
Copper	µg/L	12.16	18.82	86.7	30.4	45.7	9.7	142.2	70.9
Lead	µg/L	3.7	95.07	26.4	153.4	13.9	49.2	43.3	21.6
Mercury	µg/L	0.5	2.4	3.6	3.9	1.9	1.2	5.8	2.9
Nickel	µg/L	70.42	634.10	502.3	1023	264.7	328.4	823.3	410.3
Selenium	µg/L	5	N/A	35.7	N/A	18.8	N/A	58.5	29.1

Silver	µg/L	N/A	5.960	N/A	9.6	N/A	3.1	9.6	4.8
Thallium	µg/L	6.3	N/A	44.9	N/A	23.7	N/A	73.7	36.7
Zinc	µg/L	158.99	158.99	1134.1	256.5	597.7	82.3	256.1	127.6

#### Hardness Dependent Metals:

Effluent limitations for total recoverable metals were developed using methods and procedures outlined in EPA/505/2-90-001 and “The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion” (EPA 823-B-96-007). General warm-water fishery criteria apply and water hardness = 162 mg/L. Hardness was determined from data submitted with the Antidegradation Report and the 25<sup>th</sup> percentile of the Meramec River was 143.0 mg/L

Due to the absence of contemporaneous effluent and instream data for total recoverable metals, dissolved metals, hardness, and total suspended solids with which to calculate metals translators, partitioning between the dissolved and adsorbed phases was assumed to be minimal (Section 5.7.3, EPA/505/2-90-001). Freshwater criteria conversion factors for dissolved metals were used as the metals translator as recommended in guidance (Section 1.3, 1.5.3, and Table 1, EPA 823-B-96-007). If concurrent site-specific data for total recoverable metals, dissolved metals, hardness, and total suspended solids are provided to the department, partitioning evaluations may be considered and site-specific translators developed.

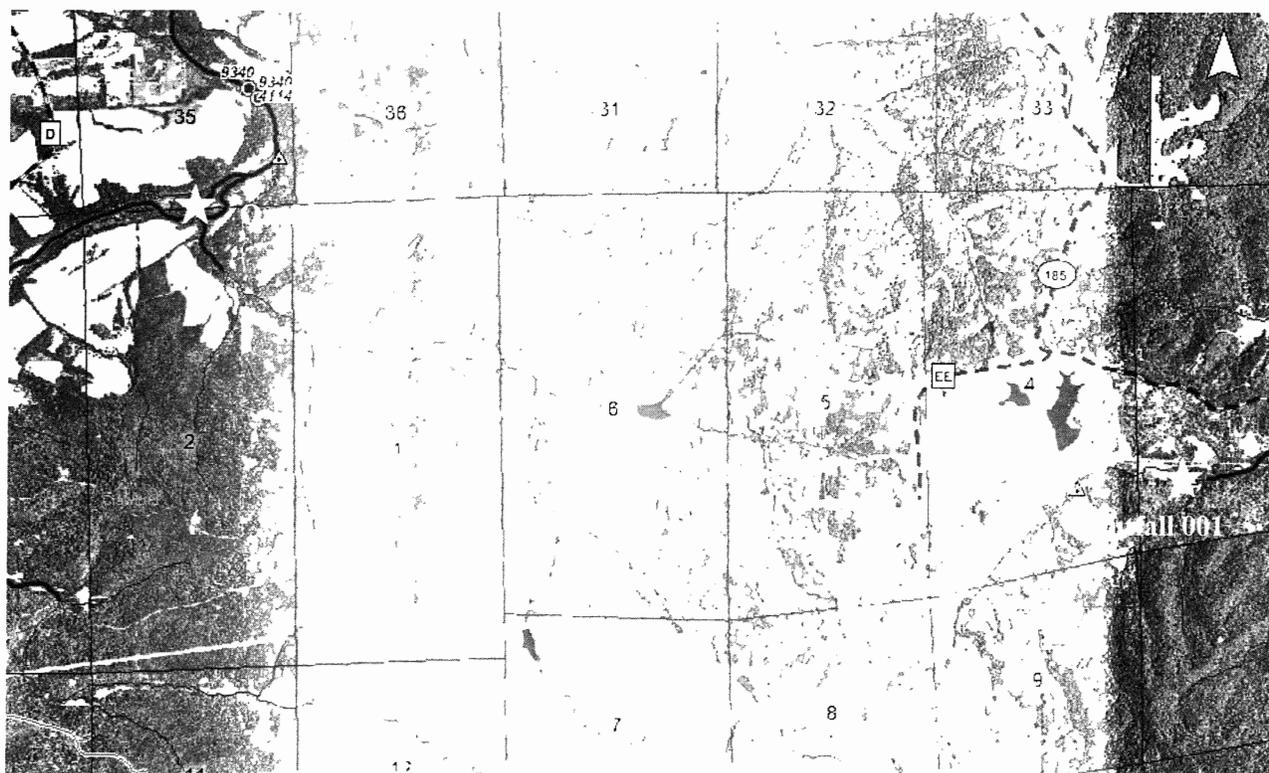
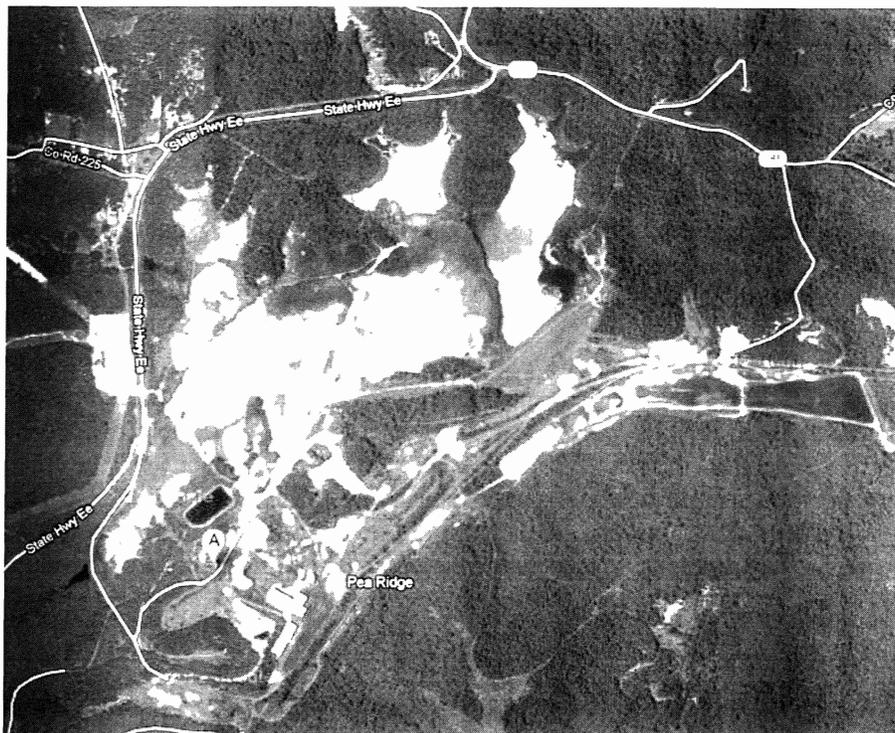
### **11. ANTIDEGRADATION REVIEW PRELIMINARY DETERMINATION**

The proposed mine dewatering discharge from Pea Ridge Resources will result in a mixture of short term minimal and significant degradation to the Meramec River and to Mary’s Creek. The facility’s preferred alternative is to use a combination of approaches: pumping, use of the existing treatment plant, and a water treatment plant to meet effluent limits in Mary’s Creek and in the Meramec River. The cost effectiveness and practicability of the other technologies were evaluated, and the combination of various alternatives was found to be the cost effective alternative. The time to dewater the mine is expected to take fifteen months.

Per the requirements of the AIP, the effluent limits in this review were developed to be protective of beneficial uses and to attain the highest statutory and regulatory requirements. MDNR has determined that the submitted review is sufficient and meets the requirements of the AIP. No further analysis is needed for this discharge.

Reviewer: Leasue Meyers  
Date: 09/05/2012, revised 11/26/2012  
Unit Chief: John Rustige, P.E.

Appendix A: Map of Discharge Location



Appendix B: Mine Water Sampling at Various Depths

Parameter	Units	Depth (ft)															
		360	620	870	1375	1525	1538	1600	1900	2090	2130	2190					
Bromide	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	0.62	0.61	3.4	0.63	4.1						
Chloride	mg/L	55	48	49	49	49	230	230	210	1400	3500						
Fluoride	mg/L	1.2	0.98	0.96	0.97	1	6.9	6.6	7.2	6.8	<10						
Nitrate	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5						
Nitrite	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5						
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<10	<10	<10						
Sulfate	mg/L	290	290	280	330	270	3300	4600	6600	4800	10000						
Sulfide	mg/L	<2.0	<2	<2	<2	<2	<2	<2	<2	<2	<2						
TOC	mg/L	0.72	0.88	0.94	0.77	0.95	0.83	0.7	0.79	1.6	1						
Acidity	mg/L	-220	-220	-270	-260	-270	-500	-500	-510	-140	-140						
Alkalinity	mg/L	270	260	<2	270	270	500	500	510	150	150						
Conductivity	umhos/cm	1100	1100	1100	1100	1100	5500	5500	5500	9800	11000						
Cyanide	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005						
Cr 6	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005						
O&G	mg/L	<5	<5	<6	<5	<5	<5	<5	<5	<5	<5						
Oxidation Reduction Potential	mV	220	340	230	240	230	240	240	240	230	220						
pH	SU	8	8	7.9	7.9	7.8	6.8	6.8	7	8	8						
TDS	mg/L	800	730	800	790	780	6100	6000	6200	11000	12000						
TSS	mg/L	<2	<2	2	<2	2.8	41	45	70	33	51						
Ammonia	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	0.24	0.24	0.15	<0.1	<0.1						
Chloride	mg/L	49	49	51	50	50	220	220	220	5900	1800						
Fluoride	mg/L	1	0.95	0.97	0.98	0.97	6.3	7.2	5.4	9.5	7.7						
Sulfate	mg/L	280	280	270	280	280	3300	3300	6700	2200	9100						
Aluminum	mg/L	0.0017	0.0019	0.0025	0.003	0.0033	0.0016	0.0022	<0.001	0.0011							
Arsenic	mg/L	0.00061	0.00062	0.00068	0.0006	0.00059	0.0017	0.0017	0.0015	0.0074							
Beryllium	mg/L	<0.001	<0.001	<0.0001	<0.0001	<0.0001	0.0007	0.00079	0.00084	<0.0001	<0.0001						
Cadmium	mg/L	0.00012	0.00018	0.00015	<0.0001	0.00012	0.0001	<0.0001	<0.0001	<0.0001	<0.00010						
Chromium	mg/L	0.002	0.0023	0.0024	0.0022	0.0023	0.007	0.0078	0.0041	0.033	0.043						
Cobalt	mg/L	0.00023	0.00024	0.00027	0.00028	0.00033	0.13	0.13	0.087	0.012	0.0015						
Copper	mg/L	0.0011	0.0011	0.0014	0.0015	0.002	0.0054	0.0057	0.0079	0.02	0.023						
Iron	mg/L	<0.01	<0.01	<0.01	<0.01	0.11	8.9	9	0.28	<0.01	<0.010						

Lead	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/L	0.0065	0.0065	0.0074	0.0067	0.0071	0.047	0.05	0.046	0.032	0.015	0.018						
Selenium	mg/L	0.0019	0.0019	0.0022	0.0021	0.002	0.0056	0.006	0.0059	0.0049	0.025	0.033						
Silver	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00012	<0.0001	<0.0001	<0.0001	<0.0001	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011
Zinc	mg/L	0.058	0.066	0.063	0.059	0.064	0.045	0.04	0.015	0.011	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012

Total Metals

		360 ft	620 ft	870 ft	1375 ft	1525 ft	1538 ft	1600 ft	1900 ft	2090 ft	2130 ft	2190 ft
Aluminum	mg/L	0.0026	0.0048	0.019	0.0086	0.019	0.015	0.015	0.031	0.019	0.0064	
Arsenic	mg/L	0.00059	0.00075	0.00075	0.00073	0.00073	0.0026	0.0027	0.0045	0.0027	0.0088	
Beryllium	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.0013	0.0014	0.004	0.0018	0.00005	
Cadmium	mg/L	0.00005	0.00023	0.00019	0.00012	0.00023	0.00015	0.00015	0.00031	0.00012	0.00015	0.00011
Calcium	mg/L	90	91	90	90	97	560	550	550	550	290	270
Chromium	mg/L	0.0012	0.0018	0.0021	0.002	0.0024	0.0086	0.019	0.036	0.019	0.1	0.18
Cobalt	mg/L	0.00024	0.0003	0.00044	0.00035	0.00052	0.14	0.14	0.19	0.089	0.0017	0.002
Copper	mg/L	0.0012	0.0019	0.0026	0.0022	0.0032	0.01	0.01	0.021	0.01	0.019	0.016
Hardness	mg/L	490	490	490	490	520	3400	3400	3400	3400	5100	4900
Iron	mg/L	0.043	0.055	0.096	0.066	0.13	9.7	9.8	22	25	3	6.2
Lead	mg/L	0.00039	0.001	0.0016	0.00096	0.0017	0.003	0.0028	0.0051	0.0013	0.00052	0.0004
Magnesium	mg/L	64	65	64	64	69	500	490	490	490	1100	1000
Mercury	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Nickel	mg/L	0.0046	0.006	0.061	0.0064	0.0068	0.044	0.048	0.078	0.042	0.023	0.24
Selenium	mg/L	0.0016	0.0019	0.002	0.0019	0.0017	0.0058	0.0065	0.012	0.0073	0.037	0.026
Silicon	mg/L	5.2	5.3	5.2	5.2	5.2	12	12	12	12	0.72	0.89
Silver	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	
Thallium	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.0001	0.00016	0.00005	0.00005	0.00005
Zinc	mg/L	0.048	0.078	0.062	0.062	0.069	0.069	0.061	0.14	0.1	0.041	0.022
Chromium III	mg/L	0.0025	0.0025	0.0025	0.0025	0.0025	0.009	0.019	0.036	0.019	0.1	0.18

Aluminum	µg/L	2.6	4.8	19	8.6	19	15	15	31	19	6.4	
Arsenic	µg/L	0.59	0.75	0.75	0.73	0.73	2.6	2.7	4.5	2.7	8.8	
Beryllium	µg/L	0.05	0.05	0.05	0.05	0.05	1.3	1.4	4	1.8	0.05	
Cadmium	µg/L	0.05	0.23	0.19	0.12	0.23	0.15	0.15	0.31	0.12	0.15	0.11
Chromium	µg/L	1.2	1.8	2.1	2	2.4	8.6	19	36	19	100	180
Cobalt	µg/L	0.24	0.3	0.44	0.35	0.52	140	140	190	89	1.7	2
Copper	µg/L	1.2	1.9	2.6	2.2	3.2	10	10	21	10	19	16
Iron	µg/L	43	55	96	66	130	9700	9800	22000	25000	3000	6200
Lead	µg/L	0.39	1	1.6	0.96	1.7	3	2.8	5.1	1.3	0.52	0.4
Mercury	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nickel	µg/L	4.6	6	61	6.4	6.8	44	48	78	42	23	240
Selenium	µg/L	1.6	1.9	2	1.9	1.7	5.8	6.5	12	7.3	37	26
Silver	µg/L	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
Thallium	µg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.16	0.05	0.05	0.05
Zinc	µg/L	48	78	62	62	69	69	61	140	100	41	22
Chromium III	µg/L	2.5	2.5	2.5	2.5	2.5	9	19	36	19	100	180

### Appendix C: Antidegradation Review Summary Attachments

The attachments that follow contain summary information provided by the applicant, Pea Ridge Resources, MDNR staff determined that changes must be made to the information contained within these attachments. The following were modified and can be found within the MDNR WQAR:

- 1) Tier Determination and Effluent Limit Summary Sheet: Iron effluent limits for Outfall 003, Tier 1 status for copper on Outfall 003

**9. SUMMARY OF THE PROPOSED ANTI-DEGRADATION REVIEW EFFLUENT LIMITS**

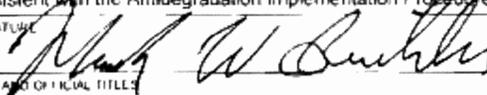
What are the pollutants of concern and their respective wastewater effluent limits for the proposed treatment plant in compliance with the Antidegradation Review report and all supporting documentation?  
See Attached

Pollutant of Concern	Units	Wasteload Allocation	Average Monthly Limit	Daily Maximum Limit
BOD5				
TSS				
Dissolved Oxygen				
Ammonia				
Bacteria (E. Coli)				

These proposed limits must not violate water quality standards, be protective of beneficial uses and achieve the highest statutory and regulatory requirements.

Attach the Antidegradation Review report and all supporting documentation.

**CONSULTANT:** I have prepared or reviewed this form and all attached reports and documentation. The conclusion proposed is consistent with the Antidegradation Implementation Procedure and current state and federal regulation.

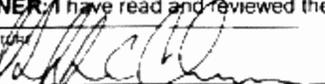
SIGNATURE:  DATE: 08/03/2012  
NAME AND OFFICIAL TITLE: Mark Birchler, Principle, PE, RLS

COMPANY NAME: CDG Engineers

ADDRESS: 1 Campbell Plaza CITY: St Louis STATE: MO ZIP CODE: 63139

TELEPHONE NUMBER WITH AREA CODE: 314-781-7770 E-MAIL ADDRESS: birchler@cdgengineers.com

**OWNER:** I have read and reviewed the prepared documents and agree with this submittal.

SIGNATURE:  DATE: 8-3-12  
NAME AND OFFICIAL TITLE: Bob Niemeler, Director of Special Projects, P.E.

ADDRESS: 8800 Page Ave CITY: St Louis STATE: MO ZIP CODE: 63114

TELEPHONE NUMBER WITH AREA CODE: 314-733-2339 E-MAIL ADDRESS: bniemeler@albenci.com

**CONTINUING AUTHORITY:** Continuing Authority is the permanent organization that will be responsible for the operation, maintenance and modernization of the facility. The regulatory requirement regarding continuing authority is found in 10 CSR 20-6.010(3) available at [www.sos.mo.gov/adrules/csr/current/10csr/10c20-6a.pdf](http://www.sos.mo.gov/adrules/csr/current/10csr/10c20-6a.pdf).

I have read and reviewed the prepared documents and agree with this submittal.

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

NAME AND OFFICIAL TITLE: \_\_\_\_\_

ADDRESS: \_\_\_\_\_ CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP CODE: \_\_\_\_\_

TELEPHONE NUMBER WITH AREA CODE: \_\_\_\_\_ E-MAIL ADDRESS: \_\_\_\_\_

