

**SUBJECT: Policy for NPDES Permitting of Bioreactors for Coal/Quarry NPDES Permits**

**DATE: Revised-April 8, 2016**

**APPROVAL: Harold Ward – Acting Director**

## **Policy for NPDES Permitting of Bioreactors for Coal/Quarry NPDES Permits**

### **Authority**

The West Virginia Department of Environmental Protection has authority for this guidance pursuant to 47CSR30 Section 8.2.c.2.A.

### **Background**

A bioreactor is a structure that is designed to mimic the conditions found in naturally occurring wetlands. Research has shown that naturally occurring microbes that digest selenium, and other parameters, currently exist within most mining operations; however, conditions in active water treatment systems are not conducive to stimulate increased activity. Within a bioreactor, organic media are installed along with a water distribution method to create an anaerobic environment and to provide readily available carbon for the microbes to use as a source of energy.

### **NPDES Permitting**

Prior to construction of a bioreactor, the permittee shall submit an application for modification of the NPDES permit for each outlet where a bioreactor is to be installed. The application shall include, at a minimum, design drawings that accurately reflect the design flow, volume of organic material, and flow distribution system. The permit application shall include specific information which identifying measures to be used to ensure adequate function of the bioreactor for DEP for review and approval. In addition, the permit application shall include a description of the organic materials to be used in the bioreactor, the construction procedures and schedule, the construction and design features of the “polishing pond” prior to discharge from the bioreactor, and the proposed method to remove any suspended solids or particulate

matter that may be discharged from the bioreactor into the “polishing pond.” The permit application shall set forth in detail the methods employed to ensure that the bioreactor does not cause or contribute to a violation of water quality standards in the receiving stream.

### **Monitoring**

A bioreactor is a treatment system that will reduce the concentration of certain parameters in mine discharges. However, monitoring is necessary and prudent to ensure that a newly constructed bioreactor is operating properly. Upon issuance of a permit modification for installation of a bioreactor, the following language shall be added to Section D of the WV/NPDES permit:

The following bioreactor monitoring requirements apply to monitoring station(s) \_\_\_ associated with outlet(s) \_\_\_:

a. Samples shall be collected from the receiving stream monitoring station(s) located immediately below the Outlet(s) discharge at the regular sampling interval for the Outlet(s).

b. Each outlet shall be monitored separately.

c. Pollutant Benchmark Value:

Dissolved Oxygen	≥6 mg/l
Chemical Oxygen Demand	120 mg/l
Biochemical Oxygen Demand	30 mg/l
Total Suspended Solids	100 mg/l
Ammonia Nitrogen	4 mg/l
Nitrate (as Nitrate –N)	10 mg/l
Nitrite (as Nitrite-N)	1.0 mg/l (warm water / non-trout)
Nitrite (as Nitrite-N)	0.06 mg/l (cold water / trout)
pH	6.0 to 9.0 S.U.

When the concentration results from a minimum of twelve consecutive samples of a pollutant are all less than the corresponding benchmark value for the pollutant, a revision requesting reduced monitoring may be submitted (all pH values of the samples must be within the range 6.0 to 9.0 S.U.). Each treatment facility shall submit annual certification that there has not been a significant change in the bioreactor operation or design or the corresponding pollution prevention measures.

When a benchmark value is exceeded; upon discovery the permittee shall within 24 hours notify the local inspector and implement appropriate corrective action to achieve the established benchmark values. Within thirty (30) days of exceeding a benchmark value, the permittee shall submit a letter identifying the revised and implemented procedures for the bioreactor to address the exceedance of the benchmark concentration to the local inspector.

If there is evidence indicating potential or realized impacts on water quality due to any bioreactor covered by this permit, the permit may be promptly modified and/or reissued to include effluent limitations and/or other requirements to control such discharges.