

WATER TREATMENT AND DISPOSAL

1. SCOPE

This work shall consist of furnishing all equipment, labor, materials, and incidentals that may be necessary to treat and discharge all water from the project area.

2. EFFLUENT LIMITATIONS

2.1. Sampling and Testing: Any impounded mine water encountered, either surface water or underground water, during the performance of the project shall be sampled and analyzed by AML personnel with the appropriate equipment and experience before its release. In the event that the receiving stream has limiting effluent parameters that cannot be tested in the field, DAML will collect a sample and submit it for analysis to a laboratory with an existing contract with the Commonwealth. Calibrated meters, field kits, litmus paper are approved field testing methods for pH, total iron, acidity, alkalinity, and sulfates.

If the impounded water is determined to contain pollutants in excess of the concentrations specified, then water treatment will be necessary before release into a receiving stream. The Resident Inspector will conduct periodic sampling and testing throughout the treatment and discharge process.

2.2. Effluent Limitations: The maximum effluent limitations shall be a total iron content of 25 mg/L and pH of 6.0-9.0. If the KY Division of Water (DOW) has established a Total Maximum Daily Load (TMDL) for the receiving stream the stricter limitations will apply. This applies to surface impoundments and deep mine sources where the construction efforts will increase the discharge from the source, such as draining a mine.

2.3. Maximum Concentration: In the event the maximum pollutant concentrations specified are exceeded by any sample, the method of water treatment shall be immediately adjusted or changed to achieve compliance.

DAML will check the discharge to evaluate the new treatment level or procedure. If the pollutant concentrations prove to be within the specified limits, then further adjustments will not be needed. If the pollutant concentrations continue to exceed the specified limits, the ENGINEER may require that some or all other activities at the project site cease until the pollutant concentrations are within the specified limits.

2.4. Non-degradation: Per 401 KAR 10:029 Section 1 no water may be released that will degrade the receiving stream's water quality.

2.5. Noncompliance: Failure to meet the effluent limitations shall constitute a violation of the Federal Water Pollution Control Act and KY Division of Water, Water Quality regulations that may be subject to such penalties as are provided in KRS 224.994 and 224.995. The CONTRACTOR shall bear the responsibility for all violations.

3. WATER TREATMENT

3.1. General: Accomplish water treatment through mixing of the untreated water and the treatment agent to assure maximum contact. Provide aeration to maximize the treatment effect. At a minimum surface ditches should be very rough to create aeration. The Contractor must use mechanical aeration for surface impoundments greater than three (3) feet deep unless exempted in writing by the ENGINEER.

3.2. Powered Hydrated Lime Method: Use initial water sample test (quality and quantity) to estimate initial application rates, and then adjust as needed through field trial methods to maintain the target final water quality parameters.

Pump water from impoundments into an agitating tank, add hydrated lime creating a lime based slurry, and agitate until thoroughly mixed. Once the first batch of reagent is mixed, this process will be continuous with the mixed reagent discharged into the suction hose of the circulating pump. Situate the circulating pump in a manner that will cause the most even blending of treated water with untreated water. **The water must be aerated during the treatment process, and any stratification of the pooled area must be eliminated.** Continue treatment until the entire pooled area has a pH of 6.0-9.0.

If water is not within quality standard, apply additional treatment with the same process of treatment and testing. When the water quality is acceptable for release, pump or drain into a silt control structure.

3.3. Pelletized Hydrated Lime Method: This method requires the use of a powered application device that will grind the pellets into a powder prior to application into the water. See the Water Wheel Powered Doser technical specification for more information. Use initial water sample test (quality and quantity) to estimate initial application rates, and then adjust as needed through field trial methods to maintain the target final water quality parameters. Apply the powered material to water in a zone of high turbulence to maximize mixing. Settling areas or sumps should not be located within 50-100' downstream to maximize the mixing zone effectiveness.

3.4. Sodium Hydroxide Method: Use initial water sample test to estimate initial application rates, and then adjust as needed through field trial methods to maintain the target final water quality parameters. A minimum 20% solution is required. When conditions allow, a 50% solution is preferred. The contractor is responsible for ensuring the air temperature is appropriate for the concentration strength selected. Do not use a 50% solution when the air temperature is below 65°F.

Release the chemical into the water to be treated and thoroughly agitate, mix, and circulate the treated water in a manner that will cause the most even blending of treated water with untreated water. **The water must be aerated during the treatment process, and any stratification of the pooled area must be eliminated.** Continue treatment until the entire pooled area has a pH of 6.0-9.0.

If water is not within quality standard, apply additional treatment with the same process of treatment and testing. When the water quality is acceptable for release, pump or drain into a silt control structure.

3.5. Limestone Sand Method: The ENGINEER may require the placement of limestone sand within ditches, waterways, and streams for additional water treatment. Place temporary silt collection berms and basins downstream of the application when possible. The limestone sand should be a minimum of 85% calcium carbonate with 100% passing a 3/8 inch sieve.

3.6. Alternative Treatment Agents or Methods: The CONTRACTOR may use a treatment method or agent other than that specified, subject to the approval of the ENGINEER. The CONTRACTOR shall request in writing permission to use the alternate method or agent and shall provide any information necessary to evaluate the request.

4. OTHER POLLUTANTS

If it is determined during the course of the project that pollutants in the impounded water other than those noted in this specification occur in such concentrations as to prove deleterious to the receiving stream, stop discharge and make adjustments and/or changes to treat all pollutants prior to restarting discharge. The effluent limitations that shall pertain to any pollutants not specified herein shall be as promulgated by the U.S. EPA in 40 CFR 434 or a current KY DOW standard for the receiving stream.

5. DISCHARGE OF WATER

Once properly treated, water shall be ready for discharge from the source. The Resident Inspector will monitor the water quality at least two (2) times per day during release to ensure the discharge is meeting the effluent requirements. In the case of impounded water, cuts to release water shall not exceed 6 inches and the cuts shall be in original or stable ground as approved by the ENGINEER. Halt the discharge of water if it causes either a hazard or potential hazard, or the water suddenly falls below the acceptable standard.

Perform the dewatering operation at a controlled rate, which will prevent downstream flooding, erosion of the existing stream channels, transportation of sediment outside the project area, and damage to the aquatic life and its habitat.

6. MONITORING RECORDS

The DAML Resident Inspector shall keep a record of all water monitoring results.