

SUBJECT: Selenium Implementation Guidance

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APPROVAL: Harold Ward – Acting Director

INTRODUCTION

The West Virginia Department of Environmental Protection (DEP) has statewide effluent data and in-stream water-quality data indicating selenium concentrations in certain locations exceed the current water quality criteria (WQC) for aquatic life. This memorandum documents permitting procedures that will be implemented to reduce the potential for new mining activities to cause or contribute to selenium WQC violations.

This document reflects the current state of knowledge in selenium regulation and prevention. As more facilities permitted under this guidance are constructed, the DEP will review the effectiveness of the controls set forth herein. Limited situations may arise that are not addressed by this guidance. In those situations, discretion may be exercised by the permit review staff after consultation with DEP headquarters.

As such, if selenium is initially identified as a “Parameter of Concern” (POC), the Probable Hydrologic Consequences (PHC) Statement in application for new Surface Coal Mining and Reclamation Act (SMRCA) permits or permit amendments, submitted after January 1, 2008, shall address whether or not selenium is a POC by providing information as described herein.

Mining activities where selenium has initially been identified as a “POC” as outlined in Section 1 of this document will be required to perform overburden sampling for selenium as set forth in Section 2.

Applicants not wishing to implement the described procedures must provide additional testing of materials, alternative handling procedures, historical water quality or other data that demonstrates selenium is not a “POC” or does not have a reasonable potential to violate the selenium WQC.

A proposed activity will initially be deemed to have selenium as a “POC” if:

- The proposed mining is in the Winifrede to Upper No.5 Block coal seam interval. (Seam nomenclature as defined by the West Virginia Geologic and Economic Survey) or;
- Site-specific or adjacent water quality data (associated with mining in the same geologic strata) shows concentrations equal to or more than 5 µg/l. This water data may include, but is not limited to, application water quality data (e.g. PHC, anti-degradation BWQ sampling), effluent data from adjacent mining operations (e.g. NPDES Table 2 IV C analysis) and in-stream monitoring data from DEP Trend Stations, DMRs, and DEP Stream Assessments or;
- If the immediate receiving stream for a proposed discharge is listed on the operable Section 303(d) List for use impairment related to selenium, or;
- There is an approved selenium Total Maximum Daily Load for the receiving stream or downstream waters that mandates regulation of selenium in the discharges from the activity.

SECTION 2

Surface and deep mining operations initially deemed to have selenium as a POC shall be required to perform overburden sampling, as follows:

Overburden Sampling Plan

The recommended spacing of sample sites will be on approximately 2000 foot spacing², or other spacing approved by the geologist reviewing the surface mining application. The holes will be located on the uppermost part of the strata to be mined and drilled down to 10 feet below the lowest seam to be mined for surface mines and strata a minimum of 50 feet above and 10 feet below the seam to be mined for deep mines. This will help ensure that all the overburden to be disturbed is sampled. The reviewing geologist may require supplemental sampling locations, if deemed necessary. Detailed geologic logs of the drill holes, to include chroma as per Munsell’s chart, are required³.

² Geologic Handbook, pages 29 to 33, published by the DEP in September 2005 for further guidance.

³ Geologic Handbook, pages 23 to 25, published by the DEP in September 2005 for further guidance).

All strata, including the coal seam(s) will be sampled for selenium according to U.S. EPA-600/2-78-054 *Field and Laboratory Methods Applicable to Overburdens and Minesoils*, Chapter 2. This method generally requires sampling every 5 feet for sandstones, 3 feet for shale or other soft rock including coal seams, or each time the strata or chroma changes. The core should be split longitudinally along its length, and a composite analysis shall be done for each stratum. (Stratum sub-sampling is not acceptable.)

Each sample will be analyzed for total selenium by the 3050B (for Acid Digestion of Solids) method. The laboratory performing the test must have a valid DEP Laboratory Certification Program approval to perform metals analysis.

If the total selenium concentration of any strata is equal to or greater than 1 mg/kg, the applicant shall implement a selenium isolation plan or alternatives, as described in Section 3. If all of the tested materials exhibit selenium concentrations less than 1 mg/kg, then the activity will be deemed not to have reasonable potential to cause or contribute to selenium water quality criteria violations.

SECTION 3

Surface Mine and Deep Mine Face-up Operations

Selenium Isolation Plan

Surface mine and deep mine face-up operations with the total selenium concentration of any strata is equal to or greater than 1 mg/kg, shall isolate the following materials:

1. All black/dark grey coal pit materials (Munsell Soil Color Chart of 2.5 or less) that are visibly differentiated in the field. Mining companies typically term this material "pit cleanings."
2. Any overburden stratum greater than 12 inches in thickness with selenium concentrations greater than 1 mg/kg or Munsell Soil Color Chart of 2.5 or less. The reviewing geologist shall also require isolation of strata that are individually less than 12 inches in thickness, if they meet the selenium or Munsell conditions and are proximate to strata of similar characteristics. Provided that where the permit specifically demonstrates that this material has a selenium concentration less than 1 mg/kg, isolation of the material will not be required.
3. The pavement floor shall be removed and isolated if the selenium concentration is equal to or greater than 1 mg/kg to avoid contact with the water/rock interface. Pavement is defined as the pit floor associated with the lowest seam to be mined within any a specific area of the operation and as identified in Item 6 below.

Isolation shall be accomplished as follows:

1. The material shall be isolated promptly to minimize weathering and leaching of

- selenium.
2. The material shall be isolated in an area of the operation that is high and dry, away from watercourse, and under no circumstance shall any of this material be put in a valley fill.
 3. The material shall be put on a free draining pad of at least 10 feet of coarse non-toxic material and the selenium laden material shall be covered with at least 4 feet of the most impervious material available on the surface mining operation.
 4. Provided that DEP shall require revision to this plan, where it is demonstrated as necessary to meet performance standards.
 5. The isolation cells are to be certified by a registered professional engineer or licensed land surveyor that they were constructed as per permit specifications and located geographically (GPS) on the progress maps.
 6. For applications proposing excavated in-stream sediment control structures; any coal seam or dark carbonaceous shale encountered during the excavation of the structure shall be removed, handled, and disposed of in accordance with the procedures specified herein or other appropriate method approved by the Director.

Deep Mining / Augering

Deep mining and augering operations with total selenium concentration of the coal seam being mined, immediate roof, or pavement equal to or greater than 1 mg/kg, will be required to provide the following requirements or meet the following conditions.

The location of openings in coal seams, with total selenium concentration of the coal seam being mined, immediate roof, or pavement equal to or greater than 1 mg/kg, will be situated in such a manner to prevent a gravity discharge, unless the applicant can demonstrate by other methods that the anticipated discharge will not cause or contribute to a violation of the WQS for selenium. During active mining operations with pumped discharges, the applicant shall demonstrate, in their Hydrologic Reclamation Plan (Section J-11) and NPDES application (Modules 7 and 8), the methodologies that will be utilized to ensure compliance with applicable water quality based effluent limitations.

SECTION 4

WV/NPDES Permit Considerations

The WV/NPDES Permit for all operations located in the Kanawha formation, Winifrede to Upper No.5 Block coal seam, shall contain selenium report only requirements. The WV/NPDES Permit for any activity determined to have reasonable potential to cause or contribute to selenium exceeding the current WQC will include selenium effluent limitations and self-monitoring requirements.

For Tier 1 anti-degradation implementation, effluent limitations will require the achievement of selenium water quality criteria end-of-pipe for outlets associated with in-stream treatment

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**This Guidance is also found in
Series 23 of the I&E Handbook and Series 32 of the Permitting Handbook**

structures and all other outlets where no dilution is available in the immediate receiving stream. For outlets with available receiving stream dilution, effluent limitation development will incorporate dilution, but only to the extent that assures compliance with applicable water quality standards. For Tier 2 and higher waters, anti-degradation implementation may result in selenium effluent limitations more stringent than those described herein.

WV/NPDES permits for activities that are determined to not have reasonable potential to cause or contribute to selenium water quality criteria violations shall not contain selenium effluent limitations. Operations that demonstrate the ability to achieve compliance with the WQC for selenium through implementation of procedures described in Section 3 may be determined to not have the potential to cause or contribute to a violation of the WQC for selenium. However, those permits shall contain selenium report only requirements to confirm that the activity is not adversely impacting water quality.