

# VIRGINIA DEPARTMENT OF ENERGY MINED LAND REPURPOSING

## **GUIDANCE MEMORANDUM<sup>1</sup> No. 40-20**

**Issue Date: November 30, 2020**

**Subject: Underground Mine Hydrology Post Mine Closure Evaluation**

This Guidance Memorandum is developed to provide review of underground mine hydrology post mine closure. Its purpose is twofold. It is to ensure that proper evaluation has been conducted of existing or potential mine pool formations and barrier designs for prevention of blow-outs and flooding. Secondly, it is to provide a water quality evaluation of existing or potential mine pools to minimize the potential for polluttional discharges.

Requirements for bond releases of permits having underground mines are covered by regulations §4VAC25-130-800.40, §4VAC25-130-784.14(g), and §4VAC25-130-817.41 through 42 of the Virginia Coal Surface Mining Reclamation Regulations (VCSMRR) as related to underground mine hydrology. Specifically, this Guidance Memorandum addresses the evaluation of underground mine hydrology that is needed prior to submittal of the first bond release request.

### **To all permittees holding a Virginia MLR permit containing underground mine workings:**

After completion of all underground mining, but prior to the first bond release request, a Closure Evaluation must be submitted and approved that addresses the underground mine hydrology. This will evaluate the potential of polluttional discharges and outcrop failures. If minimal potential is determined, the bond release process can continue without further action. If potential problems exist, the bond release process will not be granted until the issues have been properly resolved. This evaluation shall be submitted to the Virginia MLR in the form of an Electronic Permit Application in E-forms. This evaluation shall consist of the following:

#### **1. Blow-out and Flooding Potential**

An evaluation shall be conducted of blow-out and flooding potential based upon completed mining, outcrop barrier stability, and the potential to discharge through constructed wet seals. This evaluation shall include not just the permitted mine workings but also any impact from adjacent, overlying, and underlying underground or surface mine workings. This evaluation shall be submitted in the Outcrop Barrier Section 18.5 of the Electronic Permit Application.

This evaluation shall be based on the maximum potential pool level and hydraulic head that would be expected to develop. This shall be based upon such factors as mine floor and roof

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<sup>1</sup> This Memorandum is to be considered a guideline issued under the authority of § 45.1-230.A1 of the Code of Virginia which reads:

In addition to the adoption of regulations under this chapter, the Director may at his discretion issue or distribute to the public interpretative, advisory or procedural bulletins or guidelines pertaining to permit applications or to matters reasonably related thereto without following any of the procedures set forth in the Administrative Process Act (§ 2.2-4000 et seq.). The materials shall be clearly designated as to their nature, shall be solely for purposes of public information and education, and shall not have the force of regulations under this chapter or under any other provision of this Code.

elevations, direction and dip of mining, elevations of wet seals or other discharge locations, mining thickness, and depth of cover. This information shall then be used to determine the outcrop stability at the worst case location(s). Underground barrier pillars and seals used as bulkheads shall be evaluated to determine that they are adequately sized to prevent failures and minimize seepage. This evaluation shall include the review of potential hydraulic connectivity created by uncased and/or unplugged drill holes, gas wells, or monitoring wells.

Adjacent mine workings, including those above and below, should be identified and considered in the calculation of hydraulic head, water influx or loss, and effect on outcrop barrier designs. Accounting of all water contributing to the underground mine pool should be addressed, using measurements from all known wells, water monitoring points, and discharges of both the permitted mine and all adjacent mine workings.

## **2. Mine Pool Water Quality Evaluation**

An evaluation of the mine pool water quality shall be assessed. If wet seals are currently discharging, this evaluation can be made through sampling and laboratory testing. If no current discharge is available for sampling, but the potential exists for a mine pool to discharge, in-situ monitoring and sampling may be required to ensure accurate post-mining assessments and PHC verification. This evaluation shall include whether or not pollution of surface or subsurface water is occurring, its known impacts, and the cost for abatement. Should specific mine water quality data not be available, the evaluation shall provide adequate surrogate data demonstrating that drainage from the underground mine should not result in damage to the hydrologic balance outside the permit area or result in violations of any State or Federal water quality laws or regulations. This evaluation of the underground mine hydrology for water quality and potential to discharge shall be submitted in Section 6.1 of the Electronic Permit Application.

## **3. Mapping**

A final underground mine map shall be included with this evaluation that shall include, at a minimum, structural information of the mine workings (elevations and mining heights) and all known discharges, wells, and other water monitoring points of the present or potential mine pool. Mapping of adjacent mine workings, including mine workings located above and below, shall also be submitted with similar information as is available. Profiles or cross-section views should be included where appropriate to better illustrate mine pool levels. All mapping and drawings associated with this evaluation shall be included in Section 21 of the Electronic Permit Application.

**Note 1:** MLR highly recommends adding water monitoring wells to provide direct measurement of the mine pool level and sampling of water quality, particularly when the pool does not discharge through constructed wet seals or when potential exists for hydraulic connectivity with adjacent, overlying, and underlying mines.

**Note 2:** Water monitoring points that are pertinent to the analysis of the underground mine hydrology shall continue to be monitored and will not be eligible for discontinuation until such time that the final PHC is approved and final bond release is pending. In the event that the Closure Evaluation is conducted prior to either a Phase I or Phase II bond release, the findings of the Closure Evaluation will be revisited during the final PHC assessment to ensure that all determinations remain valid.

**Note 3:** In locations where wet seals are required after completion of mining, all seals in a set of portals will be equipped with wet seals, not just the one having the lowest elevation. This requirement will not apply to seals constructed before issuance of this Guidance Memorandum.