

TO:	Permitting and I&E Personnel
SUBJECT:	Post Underground Mining Assessment (PUMA)
DATE:	June 13, 2016
APPROVAL:	Harold D. Ward, Acting Director

This information is to clarify the November 15, 2012, policy titled, “*Underground Mine Outcrop Barriers and Post Mining Hydrology Evaluation*,” which is included in the Permitting Handbook, Section 24 and the Inspection and Enforcement Handbook, Series 15, pages 4-5.

The November 15, 2012 policy requires the submittal of hydrologic analyses for underdrainage mines and mines having blowout potential, or other possible adverse offsite impacts. Its intent is twofold. First, in cases where there is no discharge from a mine at the time of a request for Phase I bond release, it provides a quantitative method to demonstrate that the post-mining discharge will be in compliance with applicable water quality standards; thereby, providing rationale in support of the approval or denial of the release application. Secondly, the policy is intended to be forward-looking to assure that during the permit review of new mining applications or expansions of existing underground mines, the permit review team will require adequate pre-mining and during-mining groundwater and/or surface water monitoring, as necessary, to enable the permittee to demonstrate that the predictions in the Probable Hydrologic Consequences (PHC) remain valid, prior to the initial bond release. This required supplemental information for the PHC has become known as the Post Underground Mining Assessment (PUMA).

Therefore, based upon its defined scope, a PUMA is not necessary for all deep mines or when resulting mine discharges are compliant with applicable water quality standards. Only underdrainage mines or other mines having an elevated blowout risk or those lacking sufficient data to demonstrate the validity of the predictions of the PHC will require such analyses. Typically, PUMAs are not required for above-drainage mines unless elevated risks of blowout or other adverse offsite impacts exist, e.g., artesian effects, subsidence material damage, stream dewatering, etc.

All underground mine permits must be evaluated to determine the need for a PUMA, with such determination documented in the permit record. Therefore, within thirty (30) days of the completion of underground mining operations, the permittee shall submit a **Deep Mine Abandonment Plan** in the form of an Article 3 permit revision. This revision will provide the documentation necessary to uphold the approved PHC and Hydrologic Reclamation Plan (HRP), thus affirming that a PUMA is not required for the permit. Otherwise, a PUMA will be required for the permit. The associated permit revision will require all relevant PUMA information and resulting updates to the PHC, HRP, and existing mine seal designs necessary for approval. The regional Geologist IV will be responsible for conducting the review of the submitted information, with engineering assistance as required.

Should a pending Phase I release application exist for an underground permit, the inspector, after conferring with the region’s Geologist IV and the I & E Supervisor, will order the permittee on an MR-6 inspection form to perform a PUMA evaluation. Likewise, the revision should either include a PUMA, or present adequate documentation supporting why a PUMA is not applicable.

The assigned inspector is to immediately contact the assigned Release Specialist or the Release Supervisor and make them aware of this outstanding requirement. **Under no circumstance is the release application to remain pending while the required PUMA revision is being prepared or under agency review. The applicant may either withdraw the application or it will be denied until the requirement is met.**

Additionally, there may be permits approaching Phase II and Phase III release that achieved Phase I status prior to the November 15, 2012 Policy. If such permits require PUMAs, as determined by the region's Geologist IV and I&E Supervisor, the inspector will order the permittee on an MR-6 inspection form to submit a permit revision incorporating all applicable PUMA requirements prior to processing the release request. It will be the responsibility of the regional Geologist IV to review any resulting permit revisions.

The PUMA shall at a minimum include the following information to support all PHC predictions, as follows:

- Final mine map depicting coal seam contours, areas of known water inundation, limits of mining, adjacent mining operations, topographical features, the location of all boreholes (both vertical and horizontal), mine barriers, and dewatering sites.
- Detail map showing coal seam elevation contours, outcrop barrier widths, and if applicable, internal barrier widths adjacent to other mine workings.
- For above-drainage mines, identify any seeps or punch-outs on the down dip end of the mine and provide any available water data from seeps and/or punch-outs.
- Identification of any overlying or underlying mines.
- Resulting hydraulic head calculations reflecting the effects from superjacent, subjacent, and adjacent mining extents; potential barrier interaction between mines; and fracture-induced permeability increases from multiple seam and longwall mining.
- Comprehensive outcrop barrier evaluation comparing existing dimensions and potential hydraulic heads to originally approved values in permit. For significant departures, a factor of safety reevaluation will be necessary.
- Depiction of existing or anticipated mine pool elevations for the mine and inclusion of requirements for monitoring and mine pool level maintenance to control artesian or other adverse effects, if applicable.
- Supporting analyses and descriptions of all underground water discharge(s) from the permit and associated underground mining limits.
- Provide the most recent water data from the approved Article 3 surface and groundwater monitoring sites. At a minimum, provide six (6) consecutive months or, if monitoring quarterly, two (2) years of samples.
- Identification of any pump stations, their pump rates, and sampled water qualities
- Assessment of any injection sites and associated injected volumes affecting mine pool elevations.
- Discussion of past stream dewatering events or well impacts and associated remediation for the specific mine.
- Evaluation of all water sources intentionally introduced to the mine void.

More data may be required, at the discretion of the reviewing geologist.