

Technical Guidance Major Revision

563-2112-217: Alkaline Addition for Surface Coal Mines

Originally issued on June 30, 1997, this guidance was designed to be used by mine operators wishing to use alkaline addition as a mine drainage pollution prevention method as well as by the Department staff to help when reviewing alkaline addition proposals submitted by mine operators.

This guidance defines where the Department will consider the use of alkaline addition and provides information to assist mine operators in maintaining and achieving compliance with environmental protection standards. It also includes guidance for the calculation of application rates and placement of the alkaline material.

An update was needed to the document based on the Department's experience in issuing permits with alkaline addition over the last 20 years and a comprehensive post-mortem study conducted in 2019. The results of this study can be found on the Bureau's website. As a result, there were four main updates to the guidance document:

1. Rates for qualifying as a best management practice;
2. Best practices regarding location and mixing of the alkaline material;
3. Use of coal ash and co-products/general permits for alkaline addition; and
4. Updating the process of determining target net neutralization potential required for a site.

Best management practice (BMP): Historically, based on best professional judgment, rates of 200 tons/acre or less of alkaline addition were considered to be a BMP and were therefore excluded from the requirements of the guidance document. The results of the post-mortem study conducted in 2019 showed that sites with rates less than 500 tons/acre and that used calculations to achieve a net neutralization potential of 6 (with thresholds) consistently produced alkaline water quality with low metals. The BMP rate has been revised from 200 tons/acre to 500 tons/acre contingent upon a net neutralization potential of 6 (with thresholds) in the calculation. This change will mostly affect special protection watersheds as they are only eligible to be mined if BMP-only rates are necessary for permit issuance.

Alkaline material on the pit floor: At the time of the publication of the current guidance, the Department allowed up to 10% of the required net alkaline material for a site to be placed on the pit floor. Although the placement provides a noticeable, albeit short-term, improvement to the quality of the discharge, the alkaline material is quickly consumed. This material is no longer able to contribute to the target neutralization potential (NP) and ends up shorting the required alkaline addition. Experience has shown that effectively mixing the alkaline material in the backfill, in essence replicating natural alkaline overburden, ensures a greater likelihood of alkaline water. If an operator wishes to use alkaline material on the pit floor, it must be in addition to the amount needed to reach the target NP.

Use of coal ash as alkaline material: When used as a primary source of alkaline material, coal ash does not produce net-alkaline mine drainage. A co-products/general permits section was included to clarify the approval and/or use of these materials as a source of alkaline addition. Both coal ash and co-products/general permits should only be applied as a safety factor, following natural alkaline materials.

Target net neutralization potential: The matrix used to determine the target net neutralization potential required for a site was updated. The matrix works by using the type of site (abundant remaining, some remaining, or virgin) compared to the water quality of the receiving stream at the site (degraded, supports aquatic life, or special protection) to produce the net neutralization target ranges.