Determination of quality criteria for use of green liquor dregs (GLS) for reclamation of acidic mine waste

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Green liquor dregs is an alkaline (carbonate based) fine grained by-product from paper mills that might be suitable for reclamation of historical sulfidic mine waste piles by slurry injection. There is however a lack of information about both the quality criteria for the suggested method and the quality variation in the produced by-product.

This paper aims to define quality criteria for suitable green liquor dregs for slurry injection and study the quality variation within the mill and between different mills in order to match reclamation with slurry injection and green liquor dregs. Both experience from a pilot test using slurry injection in a waste rock pile and laboratory scale test will be used to discuss criteria for usefulness and some simple methods for determining quality.

Slurry injection is performed by installing steel pipes in the waste rock deposit and pumping a slurry with suitable viscosity into the deposit. Amount of slurry needed for remediating a waste pile is determined by the buffering capacity of the slurry. It is also very important that the injected green liquor dregs stays within the deposit and prevent water intrusion (or at least decrease it) in addition to buffer present and formed acidity.

During laboratory scale test in form of funnel test it was noted that the optimal viscosity was very sensitive to water content and that different green liquor dregs had very different water content (17-53% dry matter) at the same viscosity. Presence of lime stone grit in some green liquor dregs poses a serious problem potentially clogging pumping lines.

Buffering capacity was measured in batches with measurement of pH at fixed intervals. Green liquor dregs from different mills has roughly the same buffering curves and correspond to between 33 and 72 % $CaCO_3$.

Important aspects to determine for the different green liquor dregs are suggested to be dry matter content, buffering capacity, dry matter content at optimal viscosity and presence of lime stone grit.