

Got aluminum? – Removing suspended metals with peat sorption media

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Mine water often contains elevated levels of metals that must be removed prior to discharge. Conventional technologies exist but generally are labor intensive and expensive. Peat-based sorption material can be a less expensive alternative and is easily deployed in either “semi-active” or passive treatment designs. APTsorbTM, a hardened granular material produced by American Peat Technology from natural reed sedge peat, is a uniform material with a hydraulic conductivity of around 1 cm/sec, and metal removal capacity ranging from 1 -15% on a dry weight basis. It has been used successfully to remove suspended and dissolved copper from the Soudan iron mine in Minnesota and suspended and dissolved Pb, Zn and Cd from a base metal mine in North America.

Recently discharge limits for aluminum have been reduced in West Virginia and many coal mines are being faced with potential violations unless they can further reduce the aluminum in their treated discharge. Since discharge water needs to be above pH 6.5 and contain TSS below 30 mg/l, most of the aluminum is present as small particulates that do not readily settle. Similar conditions exist at the Soudan Mine, but the discharge contains elevated copper; 75% of which is suspended and mostly present as particles less than 3 microns. These size particles are not generally removed in either standard sand filters or multimedia filters which can remove particles down to 10-20 microns to 5-10 microns, respectively.

The peat sorption media has a high specific surface area and has been able to remove about 75% of the suspended copper and reduce the typical outflow concentrations to below limits. Treatability testing will be conducted with a variety of water from several coal mine discharges to determine if similar removal for aluminum can be achieved.