

## Acid Mine Drainage Takes Its Time to Burn Out – a case for Interceding with Spot Treatments?<sup>1</sup>

M. Coleman\*, K. E. Butler, and D. Loomer<sup>2</sup>

**Abstract:** The approximately 120 ha Fire Road surface coal mine, located near Fredericton, New Brunswick, Canada, has been a source of acid mine drainage since the 1980's. Lime neutralization of the mine water was initiated shortly thereafter and periodic deposition of accumulated neutralization sludge back into /onto the waste rock has been occurring since the early 1990's. The source of acid mine drainage, 1-2 wt. % pyrite within the sandstone/conglomerate overburden now backfilled into the mine, will burn itself out with time. Monitoring of site water chemistry through sampling of groundwater wells since 1988 and has indicated that most geochemical parameters including sulphate, acidity and dissolved metal concentrations have been dropping considerably across the site. In the quest to answer management's question of how much longer, predictions were made that "zero lime demand" could be possible within ten years back in 2013. But alas, acid mine drainage isn't quite that predictable. After major drops in those geochemical parameters between 2000 and 2006, many of the rates of change have reduced or plateaued over the past six years and pH's are still depressed at < 4.3. Waiting for natural attenuation of the acid generation could take decades more. Looking for additional remedial options, a laboratory research project was conducted to assess using alkaline surface amendments for spot treatment of high acidity areas. Seafood compost was identified as an effective amendment both on cost and in ease of handling. Additional laboratory and field pilot testing will be required before a full-scale application. This presentation will review the decreases in acid generation rates and high conductivity areas. Some of the pros and cons for the application of alkaline materials to assist in reducing the time to zero lime demand will also be discussed.<sup>3</sup>

**Additional Key Words:** conductivity, acid mine water, lime neutralization sludge, alkaline amendments, acidity, coal mining, acid waste rock.

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2. Michele Coleman (\* presenter), Dr. Karl E. Butler, and Diana Loomer, NB Power, 515 King Street, Fredericton, NB Canada E3E4X1.
3. Work reported here was conducted near 46°6'59.2400"N, 66°14'13.1987".