

CHARACTERIZATION OF SLUDGE IN SAPS SYSTEM¹

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Abstract: Sludge characterization was performed to evaluate the impact on the treatment of passive system located at Yahryong 5 pit mine. This system is in Gangneung city, Northeast part of South Korea and is being operated with the sequence of SAPS - oxidation pond - aerobic wetland. Sludge accumulation of 26 cm deep was observed on the surface of SAPS and has started since the system was constructed in Oct. 2003. The chemical analysis results of the mine water showed not only low pH (3.4) and DO (1.6 mg/L) but also high ratio of Fe²⁺ / total Fe. Although sludge accumulation could not occur in the above conditions with the basis of chemistry aspects, there are 415 m³ of sludge resulting in low permeability for SAPS system. According to the XRD, XRF and size distribution analysis of sludge, it showed amorphous phase of Fe, S, and Al oxy/hydroxides. Sludge also had a homogenous distribution size of 4 ~ 10 µm. Loss on ignition (LOI) showed about 57 % of organic matter content in sludge. Those results revealed that sludge has been produced by rapid Fe oxidation and it is possible to suggest there might be some medium for rapid Fe oxidation. Isolation results of sludge showed Fe-oxidizing bacteria (*Acidithiobacillus* spp., *Thiomonas* spp.) dominated to lead the rapid oxidation and precipitation of Fe.

Additional key words: sludge, SAPS, Fe-oxidizing bacteria

¹ Poster was presented at the 2009 National Meeting of the American Society of Mining and Reclamation, Billings, MT, *Revitalizing the Environment: Proven Solutions and Innovative Approaches* May 30 – June 5, 2009. R.I. Barnhisel (Ed.) Published by ASMR, 3134 Montavesta Rd., Lexington, KY 40502.

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