

PILOT-SCALE TESTS OF OXIDATION AND NEUTRALIZATION FOR MINE WATER: PRECIPITATION ASPECT ASSESSMENT¹

M. Jang², H.J. Lee², W.H. Ji², H.S. Park², Y.S. Shim², H.H. Kwon², Byung-tae Lee³

Abstract: Pilot-scale tests of 30 m³/d flowrate were conducted to study on the treatment process of mine water in an abandoned coal mine. Four different processes of oxidation basin (1 m³), neutralization basin (0.4 m³), reaction basin (0.4 m³), and settling tank (1 m³) were constructed to have a continuous treatment system. For this study, ferrous oxidation, neutralization, and sequential precipitation of oxidation products were characterized with aeration at oxidation basin, pH adjustment at neutralization basin, and change of retention time. As results, the optimum aeration flowrate for 1 m³ of oxidation basin was 300 L/min in terms of oxidation efficiency. With increase of retention time, efficiencies of ferrous oxidation increased even though the increase trend was not linear. Once the pH at neutralization basin increased to 7.5, almost 100% ferrous was oxidized. The efficiencies of ferrous oxidation were closely linked with sequential precipitation efficiencies of oxidized products. The remained ferrous could increase the turbidity of mine water for a while, and then the precipitation of oxidation products took more hours to give a poor properties in the engineering aspect of settling.

Additional Key Words: oxidation, neutralization, settling, pilot-scale tests

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.

² Min Jang, Senior researcher of water treatment team, Hyun Ju Lee, Won Hyun Ji, Hyun Sung Park, Researcher of water treatment team, Yon Sik Shim, Team leader of water treatment team, and Hyun Ho Kwon, Director, Institute of Mine Reclamation Technology, Korea Mine Reclamation Corporation (MIRECO), 30 Chungjin-dong St., Jongnu-gu, Seoul 110-727, Korea

³ Byung-tae Lee, Post-doc, Department of Chemistry & Geochemistry, Colorado School of Mines, Golden, CO, USA