

### **Investigation of Jigging as a Method for Removing Dolomite from High-MgO Phosphate Ores\***

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#### **Abstract**

Dolomite [ $\text{CaMg}(\text{CO}_3)_2$ ] is an intolerable impurity in phosphate ores due to its MgO content. As high grade phosphate reserves become depleted, the need to develop a cost effective method for the removal of dolomite from high-MgO phosphate ores becomes increasingly important. The jigging process has been investigated as a method for the beneficiation of high-MgO sedimentary phosphate ores. A laboratory scale jig was constructed and tested using a semi-continuous, “through-the-screen” jigging process. Two types of sedimentary phosphate ores were used; a sample from Plant 1 in the 4.00x0.85mm size range containing 1.55% MgO, and a sample from Plant 2 in the 3.40x0.85mm size range containing 3.07% MgO. These were tested, using previously optimized jigging parameters, at high and low feed rates. For the Plant 1 phosphate ore, a phosphate concentrate that contained 0.89% MgO was achieved with a BPL recovery of 32.0%. For the Plant 2 phosphate ore, a phosphate concentrate that contained 1.38% MgO was achieved with a BPL recovery of 74.7%. Minimum achievable MgO grades were determined by analyzing samples from Plant 1 and Plant 2 that were hand separated by pebble color and texture. Minimum achievable grades were determined to be 0.53%MgO for Plant 1 and 1.15%MgO for Plant 2.