Classification and coarse flotation circuits were recently added to the phosphate beneficiation plant at Potash Corp, Phosphate Division’s, Aurora mine. The original plant flow sheet was designed to treat 2,220 tph of 1.0 x 0.1 mm phosphate matrix ore and generally yielded an overall P2O5 recovery of 79% using conventional, mechanical flotation cells. Size-by-size results indicated that the recovery of the coarse component (+0.425 mm) was very poor. To improve the coarse particle recovery, a classification circuit was added to the plant which created both a fine and coarse feed. While the fine feed is now treated in the already existing conventional cells, the coarse feed was routed to fluidized-bed flotation units (i.e., HydroFloat Separators). Laboratory- and pilot-scale testing was carried out to determine the benefits of this approach which indicated higher recoveries, reduced reagent consumption, and an attractive return on investment. Current plant data indicate that the split-feed flotation circuit has increased recovery and provides results consistent with the earlier testing. In addition, this split feed flotation circuit provides added flexibility for plant personnel to meet various production requirements.