Intrepid Potash New Mexico LLC
East & West Mine Underground Tour, West Mine Flotation Plant Tour
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Introduction

Intrepid Potash as a company was incorporated in 2004 after acquisition of the East and West Mines from Mississippi Chemical Corporation by Intrepid Oil and Gas. Today, the company consists of seven shafts and three plants, which mill and concentrate ore by compaction, flotation, and crystallization. All are located in the Carlsbad Potash District, a vast underground mining area in the southeastern corner of New Mexico. Of the twelve ore horizons outlined by the USGS, the East and West Mines of Intrepid Potash currently mine only three. Reserves of potash minerals, including sylvite, langbeinite, leonite, kainite, and carnallite, are slated to last up to 200 years at present rates of extraction.

Underground Methods and Mining

At Intrepid Potash, ore is mined from the active faces via Joy remote-controlled continuous mining machines (Fig 1). Cuttings from the rotating carbide-tipped cylinder are loaded onto electric underground haulage vehicles, which transport the ore to the conveyor. Two types of haul vehicles are used; one employing an on-board conveyor to offload ore and another using a type of telescoping ram mechanism. The long-haul roof-mounted conveyors transport ore to storage pockets near the production shaft, where it is loaded onto ~5 ton skips to be hoisted to the surface. Currently, Intrepid's manually-operated hoists works 24 hours a day, and produces roughly 8200 tons during that period.

Stability of the ribs and back in the mine is fair, as even though the ore and surrounding rock and mineral layers are comprised of soft materials, they have high cohesion. The pressure of the back on the ribs, however, causes flaking which makes the clearing of transportation thoroughfares a

Figure 1. An employee operates a remote-controlled continuous miner
day, and produces roughly 8200 tons during that period.

Figure 2. A roof-mounted expansion bolt. 36" bolt shown.
constant task. Failures, though rare, ordinarily happen from the bottom up as overpressure on the ribs causes buckling of the floor. Back stability is dealt with using expansion bolts (Fig 2) which range from 3 to 6 feet in length. These are placed in regular patterns in permanent avenues, after scaling of loose material and sounding tests are performed. Large lenticular slabs of the back, called "blisters", can quickly form where the bolt grid is either too widely spaced or absent all together.

Mine & Flotation Plant Tour

The tour of the Intrepid Potash West Mine, organized and led by mine engineer Alexander Tamm, was given on the morning of Tuesday, March 13. After a short orientation to and distribution of safety equipment, the class was led down the West Mine access shaft to ore zone #7, the current producing area at ~900 feet below the surface. Transportation was by foot and diesel jeep. The first area visited was the active mine face, where machinery and methods where showcased. Numerous samples of potash ore were collected for use in various student projects. The continuous miner operator gave a short demonstration of his machine, and also pointed out to the class a rare occurrence of anomalous blue halite, a mineral whose color and origin remain somewhat of a mystery (Fig 3). Further time was spent at an inactive zone in the East Mine, where continuous mining machines had previously encountered an igneous intrusion that had to be blasted. The dike was approximately 4 meters in width at its intersection with the tunnel, and was oriented vertically. Evaporite minerals remobilized by fluids heated by the intrusive are seen infilling fractures in the dike, becoming thicker and more common further from the dike's center. The composition of the dike is unknown, pending further analysis under thin section. Visual inspection underground suggests a mafic porphyritic rock, perhaps andesitic or dacitic in composition.

The second half of the tour, given by a plant employee, showed the surface flotation plant operations from where the ore leaves the skip to where it leaves the drying kilns. Ore from the West Mine is first crushed and sieved, then washed and mixed with the flotation agent Alene. Waste is separated from the product during flotation and pressed before transport to tailings piles, and the potash product is dried using a 400° natural gas kiln before being loaded onto trucks. From there, the product
is either taken directly to market or to Intrepid Potash's North Compaction Plant, where it is pressed into pellets. In all, the tour was a complete success and ran as smoothly as ever. Students were able to witness mine operations from the ore face to the truck, as well as investigate the finer points such as the structure and mineralogy of the mine.

Acknowledgments

The information included in this report was provided by Alexander Tamm and his colleagues at Intrepid Potash, as well as from the company publication "Intrepid Potash: West Mine Flotation Plant, Carlsbad, New Mexico". All of the included photographs were taken by Jeremy Fairbanks. Thanks goes out to those who took time out of their day to show the class the mine and its operations, and assure that all present had an informative, enlightening, and most importantly safe visit to Intrepid's West Mine.