

4100 Shovel Hoist and Drive Motor Upgrades

The mine's three 4100 model shovels, the largest at the mine, are equipped with hoist motors too small to handle the higher production rates the shovels are now seeing. The motors get too hot, which causes them to shut down. This reduces the motor's life and reduces production. Last year we lost 560,000 tons of production with just one shovel, says John Kinneberg, KEEP manager of idea analysis and implementation. A new, larger hoist motor by manufacturer P&H is being bought for one shovel, and the other two shovels will be upgraded next year. The cost of upgrading one shovel is \$570,000, which should provide an average annual savings of \$220,000 over a 12 year period.

Blast Optimization Team (BOT)

The Blast Optimization Team has been organized with a mission statement that says: The purpose of the team is having a partnership with employees, customers and vendors that creates a minimum of \$1 million of value within three years through a blast optimization process that is best in class.

The team, which includes mine personnel as well the explosives vendor, Dyno Intermountain, will look at safety and blast procedures, and the design of blasts and manufacture of explosives. It has identified 40 opportunities in the drilling and blasting operations of Bingham Canyon that will provide benefits of \$1 million through improved productivity, cost savings and safety improvements.

R-6 Cut KAR Project

KAR -- Keep Achieving Results -- is a recent addition to our KEEP program. It's a process to improve project planning and communications, which will provide faster results. We do this by launching a project with team members (these are key stakeholders in the project) who get together to clarify the mission, roles and responsibilities of team members. Once that's done, they build a case for change, plan the change and design communications to get all the key stakeholders aligned. The R-6 Cut is the first KAR group.

We have fallen behind plan in mining in the R6 cut because of higher mill throughput and mechanical problems with shovels working in the R6 cut. As a result, there is the possibility the mine will run out of ore to send to the mills. What we're doing: Creating a team of mine employees to help spearhead improved coordination and communication of mining activities in the R-6 cut. To get stripping back on track, we have set the following goals: 1. Everyone returns home safely each day; 2. Load 155 trucks per shift with the 4100 shovel, and 115 loads per shift with our XPBs ; Drill 12 holes per shift; Haul at least 13 loads per shift throughout the mine; and maintain at least 90 percent equipment availability for the drills and shovels. 3. Accelerate mining by one month or 7.9 million tons by October 31. The combined talents of everyone will be needed to overcome the delays in the R-6 cut. The R-6 KAR Team includes: Lynn Davis, Gary Olson, Justin Obray, Kelley Butterfield, Cal Hoskins, Charlie Hartwell, Chris Carter, Jim

Vickery, Randy Thomas, Gene Gonzalez, Sunny Vigil, Danny Gallegos, Joe Ortiz, Geoff Bedell, John Kinneberg.

SAG Mill Liners

Scott Bird, Copperton Concentrator manager, reports that using computer modeling, we can model what's inside a SAG mill, and define new liner configurations that could result in more throughput. Preliminary indications are that this is resulting in 2 to 3 percent more throughput, though we need to see if the liners last as long as previous configurations. A second iteration may result in additional productivity increases. Bird says the potential increase may reach as much as 10 percent. A second set of tests are to be done in September. Each 1 percent increase in throughput is worth \$3 million.

Automatic Density Control Valve

We have been running the mix of the material at the North Concentrator/Magna Flotation plant at a 34% solids, but tests suggest that the optimum solids is, in fact, 32%. Tests also show that a deviation from 32% solids by 1 percentage point results in a recovery loss of 0.4%, says Bill Sadler, senior analyst for KEEP South. Also, the percent of solids has been varying quite a bit. As a result, we're installing an automatic density control which will automatically detect the density on a continuous basis (it has been done in the past by hand, hourly). This should increase production by 350 tons of copper a year, resulting in a \$282,000 profit increase. Note, these are very preliminary figures. The total cost of the materials for the valve will run about \$28,000.

Bulk Lubes at North Concentrator

We are now buying oil in bulk rather than in barrels, producing a savings of 75 cents a gallon. This should provide a \$30,000-a-year savings. A second benefit is the oil will be heated in the tank. The problems with cold oil is that it sets off the alarm sensor which shuts down the mill when the oil doesn't flow as well.

General KEEP Info

Frank Little has recruited 25 people in the hot metals department across all four shifts to run tests. These include testing lance pipe, improving personal protection equipment, building a place to store supplies, rationalizing 70 equipment lockers, and designing and installing rebar.

Another group, all from the refinery, are working on two projects: 1. Preventing the copper nodules that drop into the electrolyte when the copper anodes are being processed from getting to the Precious Metals plant; 2. Developing a system to roll the covers over the electrolytic cells. The covers help retain heat and have been deployed, until now, by hand.

Russ Johnson, who works at the smelter's anode plant, is testing a single pin pushup to release

the anodes from the molds instead of using the current double pin pushup. This will save about \$100,000 a year. He has also joined the team that will study the purchase of No. 2 copper scrap in order to process it through the anode furnaces. Secondary copper is now on the market as a result of three plants closing down around the country.

Garth Gullickson, along with smelter powerhouse personnel, is working on a project involving the conservation of high pressure air. We're doing it because right now we only have three compressors installed. The original design called for running two and keeping one as spare, but now all three are running all the time. We are trying to reduce the wastage of air so we can again run only two compressors. This also saves a significant amount of electrical power.

Lief Osthed, from the filter plant, will be working on projects to improve filter plant operation and maintenance including improving the accessibility of maintenance equipment and studying ways to reduce corrosion and extend equipment life.

Other projects, which have been implemented, include: Slag launder modifications to reduce slag pot washout -- we've saved \$400,000 during the past six months compared with the same period last year; Returning the clarifier unflow to the flash converting furnace which will enable more concentrate to be added to the flash smelting furnace; Extending the life of the flash converting furnace tap-hole inserts; Reducing the silica in the matte tapped from the flash smelting furnace, which improves the operation of the flash converting furnace. At the refinery we are rationalizing the bleed streams to reduce the hydromet plant operating expenditures.

KEEP Videos

Garth Gullickson, a chemist at the smelter laboratory, is developing three videos under the aegis of the KEEP program in conjunction with the safety department.

One video is about hazards recognition specific to the smelter, and is designed to acquaint visitors with specific hazards such as acid leaks, to encourage them to obey traffic signs and to know about the different vehicles found onsite.

Another video is about the Kress Hauler Road, where there are specialized pieces of equipment. This video is for contractors, outsiders and new employees.

The topic of the third video is management of change. It addresses the importance of following processes and procedures and to do proper documentation and record keeping. It also discusses the philosophy of change, its importance, why it is needed and its ramifications.