

KEEP Performance Against Target in 1999

KEEP activities began in March of 1999, with the goal of reducing KUC's operating costs by 10 percent in 1999 and another 10 percent in 2000. Reaching these goals would reduce KUC's gross cash costs on a sustainable basis from 69.7 cents per pound of copper (the 1999 budget) to 62.7 cents per pound of copper by year-end 1999, and 56.5 cents per pound of copper by the end of 2000.

Year-to-date gross cash costs through July 31, 1999, were 63.6 cents per pound of copper, or 87 percent of the 1999's target.

Greater Awareness Is Reducing Cost

Greater awareness about costs is beginning to significantly affect some important expenses, bringing them in noticeably below budget. In fact, hundreds of thousands of dollars are being saved just because so many KUC employees are watching what they spend and are looking for ways to slash expenses.

For example, the budget for office supplies this year was \$500,000, which is about the same as spent on office supplies last year. Right now, actual expenditures on office supplies is running way below budget -- \$170,000 for the first six months of the year. If this rate is maintained for the entire year, spending on office supplies will total about \$340,000. That's 32 percent below budget.

Meals are another area where cost consciousness is providing substantial results. These are expenses for meals and entertainment related to out-of-town visitors, some employee meetings and special occasions. The year's budget for meals was \$222,000, but in the first six months, only \$75,000 was spent. Assuming this rate of spending is maintained, expenditures on meals for the year will total about \$150,000, which would also represent a 32 percent savings.

Big savings are also being clipped from the travel budget. In the first six months of the year, \$350,000 was spent on travel, which suggests travel expenses for the year will come to about \$700,000. That's \$400,000 below the budget of \$1,100,000 for a savings of 36 percent. This is impressive and is the result of travelers being smarter about their travel plans, such as planning ahead and getting fares lower than are available when making reservations at the last minute.

KUC spent \$310,000 on bottled water, coffee, soups and hot chocolate last year. This is a lot of money and represent a benefit KUC did not always provide in the past. There was a question as to whether it was worth continuing to provide these benefits given their costs. An all-around satisfactory solution has been found. By using a different vendor, which filters, cleans and chills tap water (rather than using bottled water), and uses a concentrate coffee system, costs will be reduced \$100,000, or about 32 percent, for the year. This new system has been tested at the mine, smelter and refinery, and has been well received. That's a win-win: costs have been significantly reduced, a welcome perk has been retained and the quality of the benefit is as good as ever.

Questions About Incentive Plan

A few questions about the incentive plan have been mentioned by a number of KUC employees. These include:

Is there a cap to the incentive plan? No, the plan has no cap or limits.

What pay is eligible for the incentive plan? There are about 75 pay codes and we cannot cover each here but, in general, the pay that is eligible includes: base pay, overtime, vacation, jury duty. Among the pay codes excluded are some allowances, such as those to purchase tools. More detailed information will be available at a later date. The incentive plan applies differently to salaried workers.

Can the payout be made before the end of year? The payout on the incentive plan is scheduled for the beginning of next March. Some one would like to see that date moved up to before the year end. Nothing has yet been decided on this, but the possibility of moving up the date of the payout is being looked into.

Making More With Less: Reducing Moly Cyanide Leach

Sometimes less is more. Take the cyanide leaching of molybdenum. Historically, we've leached all the moly that left the plant. This wasn't cheap. Leaching copper out of moly to produce a number one grade product was costing at least \$280,000 a year, and sometimes more than \$400,000. We've found that by monitoring the product with an x-ray device and looking at daily assays, we can reduce the leaching that needs to be done by 35 percent. In other words, not all moly has to be leached to get the quality we need. The reduction in costs, including savings on maintenance and caustic soda, will run about \$186,000 per year. Sometimes you really are better off doing less.

The Mark McGuire Of Reagents: Cytec 8985 Hits A Home Run

Cytec 8985, a reagent that's far more exciting than its name, promises big-time savings. It is a modified flotation reagent that's been run through four sets of independent tests and found to increase the recovery of copper, gold, silver and molybdenum by 1.2 percent. That boost in metal production translates into more than \$8 million in additional annual revenue at today's prices. Yes, \$8 million, that's not a misprint. That's a home run by any definition, and the reagent costs the same as the one we've been using. The mysteriously named Cytec 8985, it will be used at both Copperton and the North Concentrator starting in October, which is the fastest the supplier can get it to us. Cytec 8985 was developed by the technical group in Copperton in conjunction with Cytec.

Super Pumps Provide Quick Truck Turnaround

Trucks are now getting their nutrition at a speed that would make fast-food restaurants proud,

resulting in better productivity and equipment utilization, thanks to suggestions from drivers. The old pumps at the Code 80 Lube Station pumped gasoline at 53 gallons a minutes. New pumps now installed deliver at 113 gallons a minute. Not only have the pumps gotten a boost, but rescheduling to take advantage of drivers' lunch periods also is helping to improve efficiency. Previously, trucks sat unused during the 20 minutes drivers take for lunch. Now, between 11:00 a.m. and 1:00 p.m., which is when drivers have lunch, 10 trucks are scheduled for refueling and having tire and fluid checks. No longer are trucks sitting around waiting for their drivers to return from lunch, they are being feed and taken care of, too.

Getting Those Tracks Out Of The Way

As big as the mine is, it is running out of space. According to Charlie Masson, director of projects, during the next six years, we're going to need someplace to dump 400 to 600 million tons of waste rock. Bingham Canyon is the likely repository for this material, but there's a hitch. At the bottom of the canyon sits the railroad system that conveys ore to the North Concentrator. There is also the reload station where the ore is dumped before being loaded onto the trains. The challenge: Keep the North supplied with ore, while removing the railroad track and reload station to just below Dry Fork Shops. If this can be accomplished, Bingham Canyon could be filled up like an ice cream cone that had almost no limits.

The solution decided upon: We are moving the railroad and reload station. The trip to the North will increase by about 10,000 feet, and the cost of building the new reload station is estimated to be between \$8 million and \$12 million. But the payoff promises to be considerable: \$30 million net present value. Originally, this was scheduled to be done in 2004, but because of the momentum generated by KEEP, the relocation will take place in 2000. At this point, the form of the reload station is still being analyzed. It may be a shovel loadout or a conveyor loadout station.

What Was Once Profitable Is Profitable No More

Early in the century, it was discovered that the water in Bingham Creek contained a bunch of copper. Drop some iron into the water and it turned blue as the copper plated itself to the iron. Some enterprising Kennecott worker figured out that there was copper -- and money -- being sent down the creek and in the mid-1920s, a small precipitation plant was built to recover the copper.

In the 1950s, a more aggressive approach was taken where water was actively pumped onto the dumps. At that time, it was possible to recover 16 to 18 pounds of copper per thousand gallons of water. That represented good money. But, over time, the productivity of this process has declined. Today, 1.3 to 1.4 pounds of copper is recoverable per thousand gallons of water. Given the cost of pumping (there's 25,000 gallons a minute pumped) and other considerations, the precipitation plant has become uneconomical. In fact, one can say that the nature of the plant has changed from being a metal recovery system to becoming a water management system. It has been decided to stop the active pumping of leach water onto the dumps -- we will no longer be in

the business of pumping and treating leach water -- which will dramatically reduce our power and iron consumption.

MIMS System Getting Major Improvement

The Mincom Information Management System (MIMS) is a large database system used to capture and analyze lots of different kinds of information. Its modules address such areas as maintenance, materials management and financial information. We've been getting many ideas to improve the functionality of the system, and suggestions on how to better capture, measure and report information.

The goal of the current MIMS improvement project is to make it more user friendly and enhance its ability to capture and report business information used to analyze performance. There's no dollar savings that we can yet place on this project, but it promises considerable benefits.

MIMS was first implemented in November 1994. It is a system with decided weaknesses, including an absence of system administration tools and controls to monitor changes. Many at KUC have access to the system and can change its configuration to meet their needs. Table files have, according to Scott Lawson, "gotten out of control." Users have over 500 components they can pick from. Such lack of standardization makes it difficult to identify problem areas, and to measure and monitor performance improvement.

The goal is to reduce the choices to less than 100. "If we don't improve the functionality of the system, it inhibits our ability to capture information and performance," notes Lawson. "MIMS is a tool to improve efficiency."

John Steindl from Australia has been recruited as the project manager for the MIMS project. He will be working with a steering committee that will oversee the reconfiguration of the system and to install system administration procedures. Future changes will have to go through an approval process. A representative from each plant will be on the steering committee.

Covers On Electro Refining Cells Reduce Need For Natural Gas

If you've ever boiled water in a pot, you know you improve efficiency by covering the pot. It works that way, too, when heating electrolytes. At the suggestion of Tracy Brown, we've been running tests on the effects of using covers on the electro refining cells in the refinery. The thinking is that these will cut down on heat loss with the electrolytes which must reach 143F degrees. By cutting down heat loss, use of natural gas declines. We've run a few tests and by covering the cells 16 hours, it appears that annual savings of \$500,000 are possible. There is a blank corrosion problem that first must be solved before the program for using the covers is fully implemented. This is currently being worked on.

Liberator Cells Promise To Liberate \$100,000 In Savings

There's a bleed involving the electrolytes from the refinery that is used to keep impurities within a range. This project aims to reduce the amount of copper in the bleed from 45 grams per liter to 30 grams per liter by using liberator cells in the tank house. By reaching this goal, \$100,000 a year in sodium hydrosulphide (a reagent) will be saved.

KEEP Keeps Making Progress

The KEEP project has really taken shape during the past few weeks. Tom Probert notes that 16 major projects have been identified and teams have been formed to each of these projects, along with a team leader. Implementation plans are either complete or soon to be for all of them.

One project of note is the flash smelting furnace throughput. It has team members from all over KUC including Mike Fulton, Rich Harper and David George Kennedy. The essence of the project is to figure out where it is most cost effective to blend the material out of the mine so that we maximize the throughput in the smelter. This would help mitigate the smelter as a bottleneck.

One part of this project will be a variability study, which will be done by Rio Tinto's Research & Technical Development team out of Perth, Australia. The study they do, which they've done for other major Rio Tinto divisions, is to analyze the variability from the mine through the process plants. The goal is to help determine how to smooth out that variability with respect to impurities in the ore (such as arsenic, lead, bismuth and magnesium oxide). They'll also be working on ways to get the copper-to-sulfide ratio up as high as possible.

At the same time there will be other projects at the smelter designed to maximize throughput. In August, we started to implement a new process control strategy designed to control very short term variability. There is also a project underway to modify the burner to better distribute the feed as it falls through the burner and furnace.

The bottom line of all this: \$5 million in more revenue generated by increasing the average concentrate feed rate by about six tons per hour and increasing the online time by about three percent. We're also working on lengthening the time between furnace rebuilds from the current two years to over five years.

KEEP South Numbers As Of Sept. 8, 1999

Ideas received: 2,721

Ideas prioritized: 2,683

Ideas analyzed: 667

Ideas completed: 384 (includes 164 ideas that have been rejected)

KEEP South 2nd Tier Projects

Project/Estimated Savings

Finer grind/increased retention time in flotation cells at North Concentrator: Savings not yet known

Reducing unproductive use of energy: \$400,000

Cyanide leaching of molybdenum concentrate: \$100,000

Reducing spillage in flotation area: \$200,000

Installing moly recovery plant at North Concentrator: \$3,000,000

Replacing flocculent emulsion with dry flocculent, at Copperton: \$900,000

Lowering prices and consumption of reagents: Est. Savings: \$1,500,000

Optimize crusher capacity: \$600,000

Improve shovel/drill interface: \$500,000

Improve fueling time at Code 80 fuel station: \$200,000

Turn assay laboratory into a profit center: \$100,000

Contract out rail maintenance using existing locomotive shop: \$300,000

Renegotiate Caterpillar contract for mine equipment: \$500,000

Make haul roads more durable: \$300,000

Create a centralized repair facility: \$300,000

Share equipment across KUC: \$200,000

Reliability centered maintenance (RCM) -- Pilot project, haul trucks: \$600,000

Direct electronic link with suppliers: \$400,000

Who Are The People Working At KEEP North?

Tom Probert: Tom has 29 years with Kennecott and was formerly the Smelter Manager. Tom's responsibilities include overall management of KEEP North, analysis review and approval, communications and senior management interface.

Ted Himebaugh: Ted has been with Kennecott for 22 years. Prior to joining the KEEP team Ted was Superintendent of Smelter By-Products. Ted is the KEEP North implementation coordinator and the team leader of two Tier One projects.

Tracy Braun: Tracy has worked for Kennecott for 26 years. His assignment prior to joining KEEP was with Kennecott Minerals. Tracy's primary focus since coming to KEEP has been the analysis of Arbor Park ideas.

Bud Wells: Bud has 29 years with the company and prior to KEEP, was responsible for analysis and implementation of Precious Metals Plant optimization projects. Since joining KEEP, Bud's primary focus has been on the palladium recovery project that will net \$1.6 million in the year 2000.

Scott Lawson: Scott has worked for Kennecott for 26 years. Prior to joining the KEEP North team, Scott was working on maintenance systems optimization. Scott's work on maintenance systems has been brought under the KEEP umbrella and is now in the implementation phase.

Pat Keenan: Pat has been with Kennecott for five years. Prior to KEEP, Pat was the refinery cost

analyst. Since coming to KEEP Pat has been responsible for the Tier One Value Driver analysis, budget preparation and analyst support.

Fred Rudloff: Fred has 18 years with the company primarily in research and development work and trouble-shooting. Prior to KEEP, Fred was involved in a variety of smelter, refinery and concentrator optimization projects. Fred's KEEP duties are a natural extension of these projects.

Roger Bridgman: Roger has worked for Kennecott for 20 years. Prior to KEEP, he was providing technical group support to the anode casting and furnaces areas of the smelter. As a KEEP analyst Roger's primary focus is on smelter ideas.

Gary Westerdale: Gary has been with Kennecott for three years. Prior to joining the KEEP team Gary was an off-shift maintenance supervisor at the smelter. His main focus is on the analysis of maintenance ideas, such as rationalizing the mobile equipment fleets.

Bill Day: Bill has four years with the company. Prior to KEEP, Bill was the maintenance supervisor in the furnaces area of the smelter. After coming to KEEP Bill's main focus has been implementation of some of the cost savings ideas he and his crew had initiated, such as improving the waste heat boiler rappers.

Joe Dick: Joe is an M3 consultant engineer out of Tucson, AZ. In the past, he was a maintenance and warehouse person at Kennecott's Greens Creek operation in Alaska. Joe's primary function on the KEEP team is development of maintenance workflow and materials flow systems.

Judy Sing: Judy has worked with Kennecott for 11 years. Judy has been a buyer and warehouse manager in recent times and, since joining KEEP, has been a leader in developing some of the materials management initiatives.

Tony Weddick: Tony has been with Kennecott for 23 years. He has been involved part time as an analyst since KEEP was formed, developing detailed budget analysis and a fact book for analysts.

Bruce McDougall: Bruce is a Comalco employee on loan to KUC until December 1999. Bruce was an analyst in the Performance Enhancement Program (PEP) process, which has been underway at the Australian aluminum facilities for the past two years. His experience has been a benefit to the Kennecott KEEP program.

Ken Britton: Ken has been with Kennecott for 12 years. Prior to KEEP Ken was responsible for smelter budgets, forecasting, record keeping and the smelter lab. As a member of the KEEP team Ken has designed, implemented and maintained the systems used by the KEEP North team.

In addition to the permanent salaried KEEP staff, a number of temporary analysts have come out of the operation to help. These include:

Mike Corona: Smelter Anode Casting

Jack Anderson: Smelter Maintenance

Dave Burt: Smelter Maintenance
Matt McDaniel: Smelter Hot Metals
Jim Westfall: Smelter By-Products
Frank Little: Smelter Hot Metals
Dave Steinke: Refinery Tankhouse
Vern Simonsen: Refinery Tankhouse
Richard Gonzales: Smelter Maintenance
Peter Anthony: Smelter Anode Casting
Kent Breinholt: Smelter By-Products
Marty Terry: Smelter Maintenance
Lynn Hendricks: Smelter Maintenance
Vince Martinez: Smelter By-Products
Mick Moore: UPP Maintenance

The Analysts Working At KEEP South

Bill Furniss: Located at the mine, Bill's area of responsibility is operations.
Ron Harris: Located at the mine, Ron's area of responsibility is operations.
Gary Cole: Located at the mine, Gary's area of responsibility is operations.
Jay Collledge: Located at the mine, Jay's area of responsibility is maintenance.
David James: Located at the mine, David's area of responsibility is maintenance.
Randy Sorenson: Located at the mine, Randy's area of responsibility is maintenance.
Gary Yengich: Located at the mine, Gary's area of responsibility is maintenance.
Bill Wassmer: Located at the mine, Bill's area of responsibility is maintenance.
Gary Broadbent: Located at the mine, Gary's area of responsibility is maintenance.
Steve Baierline: Located at the mine, Steve's area of responsibility is technical.
Lewis Gonzales: Located at Bingham Distribution Smelter (KEEP North), Lewis' area of responsibility is materials.
Judy Sing: Located at Bingham Distribution Smelter (KEEP North), Judy's area of responsibility is materials.
Hans Olsen: Located at the Magna Engine House, Hans' area of responsibility is rail.
Bill Batt: Located at Copperton, Bill's area of responsibility is maintenance.
Dennis Edmunds: Located at Copperton, Dennis' area of responsibility is maintenance.
Steve McElroy: Located at Copperton, Steve's area of responsibility is maintenance.
Reynold Pehrson: Located at Copperton, Reynold's area of responsibility is maintenance.
Steve Voss: Located at Copperton, Steve's area of responsibility is maintenance.
Bob Crebs: Located at the Copperton Tech Lab, Bob's area of responsibility is operations.
Randy Dew: Located at the Copperton Tech Lab, Randy's area of responsibility is operations.
Bryan Petersen: Located at the Copperton Tech Lab, Bryan's area of responsibility is operations.
Pedro Rocha: Pedro's area of responsibility is the Filter Plant.
Brent Wilson: Brent's area of responsibility is the Filter Plant.
Mitch Calhoun: Mitch is involved with tailings/water services.
Sterling King: Sterling is involved with tailings/water services.
Kerry Bugger: Located at the North Concentrator, Kerry's area of responsibility is operations.
Chip Gray: Located at the Magna Pipe/Electrical Shop, Chip's area of responsibility is

maintenance.

Bryan Reed: Located at the Magna Pipe/Electrical Shop, Bryan's area of responsibility is maintenance.

Kelly Sullivan: Located at the Magna Pipe/Electrical Shop, Kelly's area of responsibility is maintenance.

Norm Bartell: Located at the Magna Pipe/Electrical Shop, Norm's area of responsibility is maintenance.

FSF Throughput Project Team Structure

Team Leader: Ted Himebaugh

Team Members:

Mike Fulton

Rich Harper

Bob Leary

Chris Newman

Fred Rudloff

Matt Weaver