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GOLDCORP: ACHIEVING 20/20/20 OPERATIONS WITH DYNAMIC RECOVERY TARGET

In 2016, Goldcorp launched an ambitious plan, dubbed "20/20/20," that aims to achieve a 20% increase in gold production, a 20% increase in gold reserves, and a 20% reduction in all-in sustaining costs. As part of that plan, the company initiated a PI System pilot project at its mine in Peñasquito, Mexico, to provide operators with real-time data and deliver dynamic performance targets to enhance metal recovery from the feed moving through the plant. In its first year, the project achieved a rapid return on investment, boosting the recovery rate of metals and effectively adding the equivalent of four to five days of additional production at Peñasquito.

USING HISTORIC DATA FOR DYNAMIC TARGETS

Peñasquito is the fifth largest silver mine in the world that generates more than 33% of Goldcorp's revenue. The deposits at Peñasquito contain a blend of valuable metals, including gold, silver, zinc and lead. The composition of the ore blend feeding into the process plant varies widely and can change by the hour. When the ore blend changes, operational processes need to change in order to recover metals most efficiently. Plant managers found that when the feed changed, it typically took 2.5 hours for operators to fully adapt to the new conditions, resulting in significant losses.

Before 2016, plant operators had a single fixed target of 70% for metal recovery. The company has been using the PI System at

the Peñasquito mine and plant since 2012 to capture historical data, and with the 20/20/20 initiative, they decided to use this historical data to set dynamic recovery targets based on variable ore blends and grades.

With PI Performance Equations, managers were able to develop dynamic targets that changed in real time along with the feeds coming into the plant, speeding up operators' reaction times and improving plant operations. The company developed a target simulator and other intuitive dashboards in PI Vision that helped operators make better, more data-driven decisions.

"We basically closed the loop, using PI as the key tool," said Derek Shuen, a superintendent at Peñasquito. "Based on PI data from past history, we were able to generate a very impactful algorithm and implement that online, put that to the operator, give it to him or her to

HIGHLIGHTS:

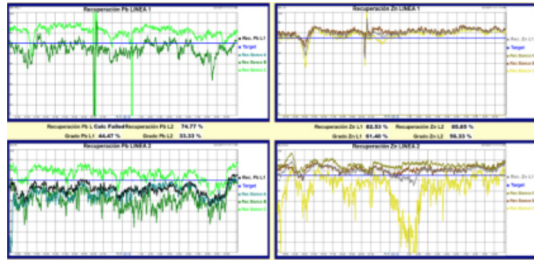Shifted from **fixed target to dynamic, real-time targets** based on changing feed grades
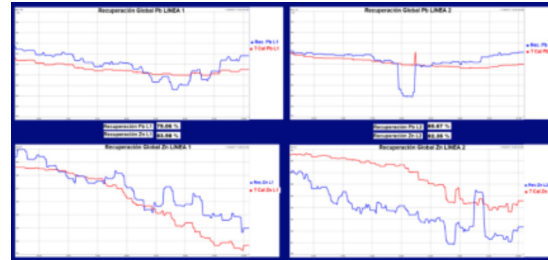
Zinc recovery **increased 4%** within 6 months

Achieved equivalent of **4 to 5 days** of **additional production**

BEFORE–NO SIMULATOR

- Flotation operator had a fixed target (70%)
- Target was entered manually
- Target was rarely updated
- Operators ignored dashboards

AFTER–WITH SIMULATOR

- Flotation operator dynamic target based on feed grades
- Target is updated automatically
- Enables Flotation operator to increase recovery
- Operators depend on current dashboards

Goldcorp shifted from a fixed target for metal recovery to a dynamic target based on feed grades. The result: more stable operations and increased recovery.

respond in a timely manner, and really make a huge impact on our bottom line."

THE VALUE OF REAL-TIME DATA

The project quickly proved its value. Metal recovery has increased across the board. In the first six months, Peñasquito operators increased their zinc recovery by 4%. A look at the data revealed that after the project implementation, plant operation became more stable. Dramatic dips in performance that had once been a problem whenever there were changes in the feed composition, or shift changes on the plant floor, were no longer occurring.

"This dynamic simulator was able to reduce the variations, reduce the shift change oscillations. It reduced the losses when someone had to go take a bathroom break," Shuen said. "It basically enabled greater accountability to operators... we actually had a KPI for them to follow."

CHANGING THE CULTURE

Another benefit from the project was more subtle: Plant operators began relying on the new tool for decision-making. The culture of the plant was becoming more data-driven.

It took a breakdown for Shuen to realize the impact the simulator was having on the floor of the plant. One day, the team was installing a patch on PI Vision, and the system went down for a few hours. Within 15 minutes, Shuen said, he got an urgent email from a supervisor asking for the simulator to be turned back on.

"It became a tool that was indispensable for operations," he said. "It really changed our culture."

Goldcorp undertook the metal-recovery project at Peñasquito as a proof of concept for a larger Enterprise Agreement (EA) with OSIsoft. Now that the project has demonstrated real value for the company, Shuen said, Goldcorp is looking to expand the scope of the project to other areas of focus. In addition to metal recovery, the company is looking at ways to use data to drive improvements in water and energy management, environmental and health outcomes, and mine-to-plant integration.

For more information about Goldcorp and the PI System, watch the full presentation here.

PI System™ Components Used:

PI Server™
- Data Archive
- Asset Framework
- Asset Analytics

PI Vision™

PI Performance Equations™

Enterprise Agreement (EA)

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— Derek Shuen, Superintendent of Electrical, Instrumentation, Process Control and Energy Management, Goldcorp

Shuen, Derek. "Real Time Data Critical to Mining" <https://www.osisoft.com/Presentations/Real-Time-Data-Critical-to-Mining/>