CASE STUDY

A Customized Frother Program Increases Copper and Moly Recovery in a Western US Mine

eROI℠ by Ecolab

INTRODUCTION

For the last several years, Nalco Water has developed customized products to solve specific flotation problems at a variety of operations. This case study summarizes the success in the area of copper / moly flotation and highlights improved metallurgical performance for both metals.

SITUATION

A copper mine in the southwestern United States was challenged with processing a more difficult type of ore with daily variability, and decided to look for a treatment program that would help improve the recovery for both copper and moly, reducing the total cost of operation. The ore contained a sufficient grade of molibdenite to concentrate, making it even more critical to increase the recovery for both minerals.

The ore is composed of intrusive stocks with chalcocite, in a matrix of quartz, mica, feldspar (mostly altered clay), and sediments that also contains chalcopyrite associated with gangue minerals, including magnetite, pyrite, garnet chlorit, and epidote. This composition made it very difficult for the plant to achieve its production goals.

The mill was using a collector plus a dual frother reagent scheme based on the ore type processed. The performance of the incumbent program was regular only when processing the normal ore, but poor results were obtained when processing the skarn ore from the new pit.

PROGRAM

Nalco Water's comprehensive approach was based on determining the mineralogy of the ore, surveying the operational conditions of the circuit, and knowing the metallurgical objectives of the customer, to better identify and design a customized FROTHPRO™ 507 program. Extensive laboratory tests and a plant trial contributed to a modification of this new reagent technology that affords superior metallurgical performance while reducing reagent consumption and minimizing volatile organic compounds for copper sulfide and primary molybdenite. The technology also has the unique ability to capture ultra-fine molybdenite that is not recovered using traditional flotation reagents.

ANNUAL SAVINGS

HUMAN HEALTH & SAFETY

Less exposure to chemicals through reduced annual deliveries.

Lowered cost of potential liabilities

ASSETS

Freed a bulk container with the need to only store one frother, allowing room for a speciality collector to be stored.

Approximately

$10,000

of cost mitigated due to reduced equipment requirements

NALCO Water
An Ecolab Company

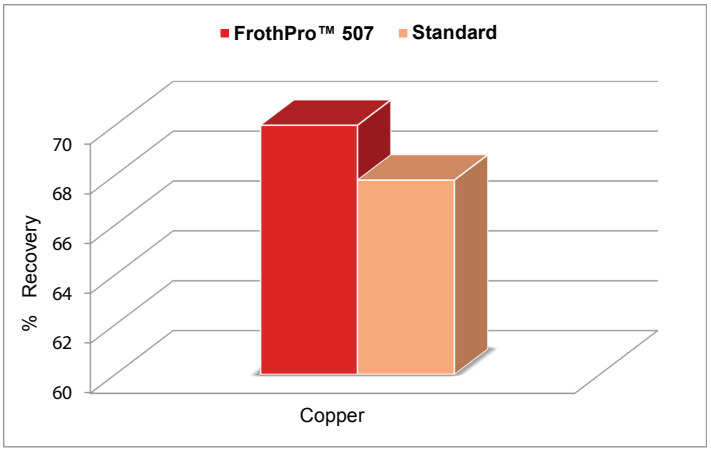


Figure 1 – *Copper Flotation Recovery*

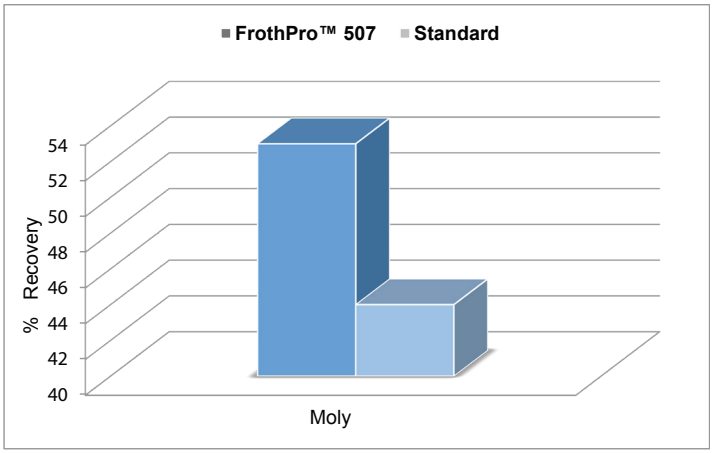


Figure 2 – *Moly Flotation Recovery*

RESULTS

After testing different schemes of collectors and flotation reagents, the laboratory and field results showed significant advantages with the new frother, FROTHPRO™ 507, with respect to the standard program used in the copper mine. The Nalco Water frother recovered 2% more copper at the same dose as the standard product (See Figure 1).

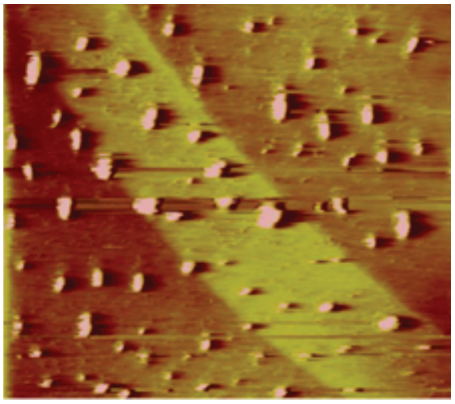
Moly recovery was even greater at 9% when compared with the same dose as the standard product from competitor (See Figure 2).

The statistical analysis showed the difference is significant at a 95% confidence level.

CONCLUSION

More often, customers are challenged to improve recovery with increasingly complex ores with high pyrite and clay content, and mixed compositions. When facing these types of conditions, froth quality and metallurgical performance can suffer when using traditional flotation reagents. These circuits require flexible reagent programs that enable operators to quickly respond to changing ore conditions in the plant feed. The Nalco Water FROTHPRO™ 507 frother program delivered an increase of 2% of copper recoveries and 9% of moly recoveries, without negatively affecting the grade, which also contributed to a reduction of the total cost of operation.

Nalco Water is committed to assist customers in adapting and implementing the right flotation program to help operators meet their production goals, producing more with less, and positively impacting the product quality.



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