



FrothPro™ 507 Reduces Total Cost of Operation and Improves Performance at a Copper Concentrator in South America



CASE STUDY – MINING
CH-2000



Nalco Water understands that Mineral Processing Operations must constantly find ways to increase recovery, optimize reagent consumption and reduce total cost of operation and footprint. In copper sulfide concentrations, we've helped customers address a number of site-specific flotation challenges using our FrothPro line of frothers.

SITUATION:

A South American copper mine enlisted Nalco Water to help meet their operational goals to:

- Improve copper recovery
- Reduce total cost of operations
- Increase productivity
- Enhance safety

We worked with the customer to develop a customized plan specific to their operations in order to achieve their goals.

The ore mineralogy was predominantly chalcopyrite (CuFeS_2), and bornite (Cu_5FeS_4), with covellite (CuS) associated with gangue minerals, including pyrite and magnetite. The existing frother program — Methyl Isobutyl Carbinol (MIBC) and Polypropylene

CUSTOMER IMPACT	eROI SM by Ecolab	ECONOMIC RESULTS
Decrease exposure to operators of handling large volumes of chemicals	 HUMAN HEALTH & SAFETY	\$225 K/year maintenance & services
Reduce footprint	 ASSETS	37% decrease of Chemical consumption
Yield increase		Copper recovery increased by 2,526 Tons/year, \$12.6MM/year*
Reduced total cost of operation	 COSTS	\$2.15 million/year Direct Saving \$14.98 million/year Total Impact

eROI is our exponential value: the combined outcomes of improved performance, operational efficiency and sustainable impact delivered through our services and programs.

*At \$5,000/ton

glycol — could not achieve adequate results in this complex matrix. Chemical usage was excessive and dosage was difficult to control by the operators. Marginal recovery improvements were possible, but required difficult manual adjustments. In addition, from an environmental and safety standpoint, MIBC is not ideal and the plant wanted to reduce handling of this type of material.

Further, the feed of large volumes of the flotation reagents presented additional material handling, safety, environmental and labor challenges.

PROGRAM:

Nalco Water worked with plant personnel to thoroughly understand the process mineralogy, a critical step in evaluating and recommending a frother. Laboratory screening indicated that FrothPro™ 507 would deliver the best technical and cost performance. Dosage optimization under real operational conditions refined the recommendations from the lab analysis.

RESULTS:

The new frother FrothPro™ 507 demonstrated superior performances compared to the standard reagent used in this copper concentrator. The FrothPro™ 507 helped to increase copper recovery by 2.4 p/p, increasing production at a lower treatment cost. (See Figure 1).

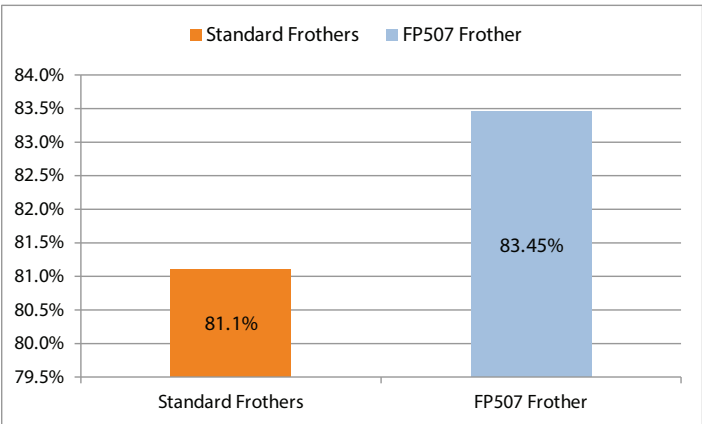


Figure 1. FrothPro™ 507 Increased Copper Recovery by 2.4% versus Standard Reagent in the plant

The flotation treatment cost was reduced by 37% with FrothPro™ 507 compared to the standard treatment. The customer estimates direct annual savings of US\$2.1 million by switching to the Nalco Water frother. Additionally, indirect cost savings in maintenance, safety and environmental footprint impacted the overall improvement in Total Cost of Operation.

CONCLUSIONS:

Frothers impact surface tension, loading capability and mass removal rate, all of which influence flotation performance. As a result, choosing the proper frother can have significant impacts on recovery, selectivity, and productivity as well as environmental footprint.



The use of FrothPro™ 507 improved copper recovery plus maintained copper concentrate grade even with the challenging ore type — and reduced overall reagent use. The switch reduced TCO, enhanced safety and reduced environmental footprint.

Nalco Water has both local field presence and global technical experts for critical onsite program development and troubleshooting. Working closely with our customers allows us to understand their process, challenges and build strong business partnership based on join commitment to continuous improvement and sustainability.