

Essential Expertise for Mineral Processing

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Essential Expertise for Mineral Processing

Today's mineral processing industry is constantly challenged to improve safety, profitability, efficiency, product quality and environmental performance. Nalco Water combines global leadership, years of industry experience, innovative technologies and local expertise to deliver the results you need.

Industries we serve

- ▲ Alumina
- ▲ Coal
- ▲ Copper & base metals
- ▲ Gold, silver & platinum
- ▲ Industrial minerals
- ▲ Iron ore
- ▲ Phosphate & potash
- ▲ Sand, gravel & aggregate

Your goals are our goals

Nalco Water partners with mineral processors worldwide to deliver economic and environmental value, through our reliable, cost-effective and safe solutions. Our ultimate goal is to deliver a measurable return on investment. We help you:

Place safety first

- improve environmental safety of applied solutions
- establish and practice safety culture at all levels



Improve quality

- enhance product purity
- control moisture
- improve product selectivity



Increase profitability

- increase yield/recovery
- optimize plant performance
- reduce total cost of operation



Meet environment, health and safety standards

- conserve energy
- reduce water consumption
- meet EH&S standards and regulations



Improve efficiency

- increase throughput
- automate operations
- reduce downtime



APPLICATION BY INDUSTRY

Program	Alumina	Coal	Copper & base metals	Gold, silver & platinum	Industrial minerals	Iron ore	Phosphate & potash	(Sand/gravel) aggregate
Agglomeration aids			✓	✓		✓		
Anticake additives					✓		✓	
Biocontrol					✓		✓	
Coke oven additives		✓						
Corrosion inhibitors	✓				✓		✓	
Crystal modifiers	✓				✓		✓	
Dust control	✓	✓	✓	✓	✓	✓	✓	✓
Filter aids	✓	✓	✓		✓	✓	✓	
Flotation		✓	✓	✓		✓		
Foam control	✓	✓	✓	✓	✓	✓	✓	
Freeze conditioning		✓				✓		✓
Humate removal	✓							
Mine and waste water treatment	✓	✓	✓	✓	✓	✓	✓	✓
Scale inhibition	✓	✓	✓	✓	✓	✓	✓	
Solid-liquid separation	✓	✓	✓	✓	✓	✓	✓	✓
Tailings management	✓	✓	✓	✓	✓	✓		✓
Viscosity modifiers	✓		✓	✓	✓		✓	
Boiler water treatment	✓			✓	✓	✓	✓	
Cooling water treatment	✓			✓	✓	✓	✓	
Heavy metals removal	✓		✓	✓	✓			

Value delivered



RRA™ program delivers over US\$1 million in soda savings and equipment integrity

An alumina refinery was experiencing bottleneck problems in its red mud settler operations. Seeking to increase underflow densities, improve overflow liquor filterability, and reduce settler vessel scaling, refinery management approached Nalco Water for a solution.

After application of the recently released rigid-rod architecture (RRA) flocculant program, benefits were observed almost immediately. Average underflow densities increased and there was a noticeable improvement in security filtration performance, resulting in extended operating life.

With such encouraging results, RRA dosing has continued uninterrupted to all the settlers. Nalco Water is now working with the customer to extend the benefits of the RRA program to the washers in the next phase of optimization. The substantial productivity gains and potential savings in equipment and maintenance costs also significantly reduced the customer's overall flocculant cost.

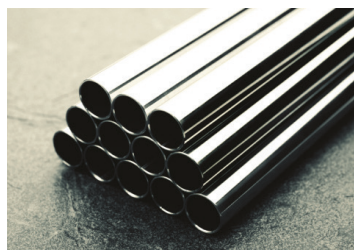


Coal flotation program delivers 100% output increase

A coal mine set out to increase yield from the flotation circuit of its coal handling and preparation plant (CHPP). After analyzing the systems and challenges, the total coal flotation program was recommended.

Program implementation involved two stages. First, a new collector was introduced, enabling the system to select coarse coal to float, which immediately improved profitability. Second, a frother was introduced to improve production efficiency. The new

collector and frother worked in tandem, increasing filter cake output. A further 14 percent increase in average cake thickness was achieved. Nalco's coal flotation program achieved another breakthrough as the system was able to float oxidized coal, which effectively doubled its output.



SCALE-GUARD™ solution resolves scaling issues and improves productivity

At a large coal operation, mine dewatering was a round-the-clock activity with 5 ML of water pumped daily. The water, at 60 percent salt level of seawater, contained high levels of iron, manganese and calcium. The existing pre-treatment program kept the process water (for use in the RO plant and the CHPP) free from iron and low in manganese, but high levels of calcium sulfate were still a problem.

To address the heavy scaling on downstream pumps and pipes caused by the lime-based pre-treatment, Nalco Water recommended SCALE-GUARD antiscalant solution. Feedwater quality showed immediate improvement after implementation. Continued application resulted in positive improvements to the operations of the RO plant and the CHPP. The customer achieved tangible returns through higher equipment availability, as well as significant reductions in change-outs of pump components and lower maintenance costs.



OreBind™ tails management technology saves water and allows for land rehabilitation

A mineral sands wet processing operation was binding up valuable water (400 to 750 m³/hr) in the tailings (waste) stream from the plant. With the water unavailable for recycling, pressure was placed on dwindling groundwater recovery bores, especially in the hot summer months.

Nalco Water commenced on-site investigations and worked with the customer to apply Nalco Water's OreBind technology. The comprehensive solution involved design and implementation of chemical additive preparation, dosing, and mixing systems with specific requirements for

operation in isolated and difficult mine site areas.

Benefits were observed immediately after program application. 65-74 percent of water in the tails was recovered (260 to 535 m³/hr), dramatically reducing the demand for fresh water makeup. An added environmental benefit was realized with more rapid rehabilitation of farming land to its native state due to the faster waste consolidation.

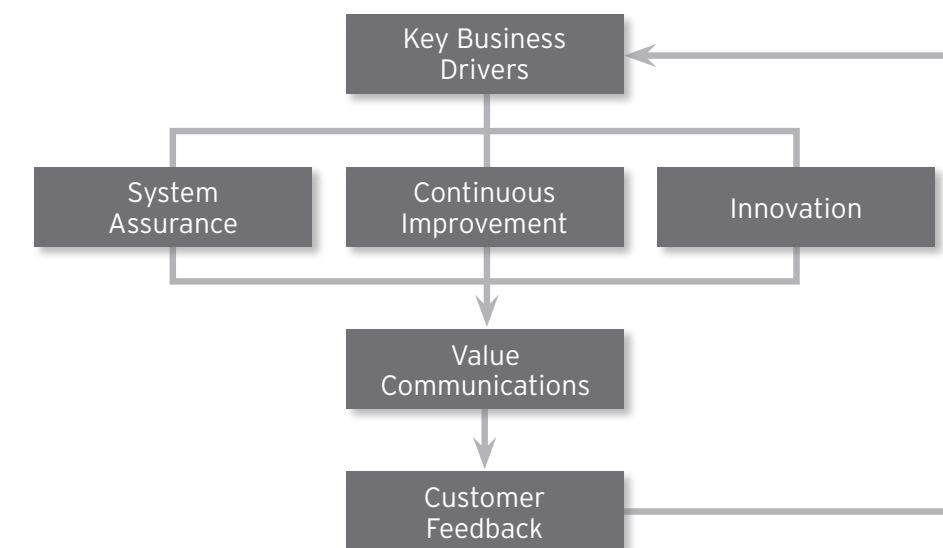
Sustainability

Water plays a critical role in virtually all mining and mineral processing activities. In the context of decreased availability and growing demand, water has become a strategic resource. Mineral processors now require solutions that demonstrate sustainable ongoing water management. Our mining process technologies and application expertise, coupled with our core water treatment knowledge, make Nalco Water the ideal partner to assist with all aspects of improved sustainable water use.



CMV process

Through CMV (communicating & maintaining value) process, our local account team works directly with you to discover your prioritized needs. We audit your systems and work together to develop a service and improvement plan to deliver maximum performance from your existing applications. We leverage industry leading people, processes and technologies in a manner that is tailored to your operations and key business drivers to achieve measured results.



Your partner for sustainable growth

Nalco Water is an Ecolab company. Ecolab Inc. is the global leader in water, hygiene and energy technologies and services that protect people and vital resources. Ecolab delivers comprehensive solutions and on-site service to ensure safe food, maintain clean environments, optimize water and energy use, and improve operational efficiencies for customers in the food, healthcare, energy, hospitality and industrial markets in more than 170 countries around the world.

With an 80-year track record, Nalco Water is the world's leading process and water treatment solutions provider. Our innovative solutions are carefully designed to deliver significant environmental, social and economic sustainability. Supported by a comprehensive network of supply chain facilities and research centers, our global presence enables us to offer a consistently high level of service to local, regional and multinational customers.

