

Nalmet™ Heavy Metal Removal Program Helps to Keep a Spanish Copper Mining Company Environmentally Compliant for Over 10 years

NALCO Water
An Ecolab Company

CASE STUDY - MINING
CH-2129

BACKGROUND

Long-lasting relationships between companies and their suppliers in such a complex industry like mining, are often based on the confidence generated by good results. This has been the case of the 10 year relationship between Nalco Water and a large copper mine in Spain.

In 2008 this mining company asked Nalco Water for assistance to reduce the levels of heavy metals present in its discharged water, that could allow them to comply with environmental legislation.

Exceeding the required environmental heavy metal levels in discharged water would lead to fines and a potential regulatory shutdown. This could lead to significant costs associated with lost production.

SOLUTION

The customer is an open-pit mining complex with a nearby environmentally sensitive aquifer. The mining site also experiences high rainfall which means high flows of waste water are a challenge to manage. The discharged water included drainage water coming from the open pit that is mixed with other streams from the mineral leaching and production plant. This water has a very low pH and high levels of heavy metals that needed to be neutralized before being discharged.

The discharged water treatment consists of a neutralization process with a pH adjustment with lime and slurry thickening using coagulation and flocculation (see Figure 1) to remove suspended solids.

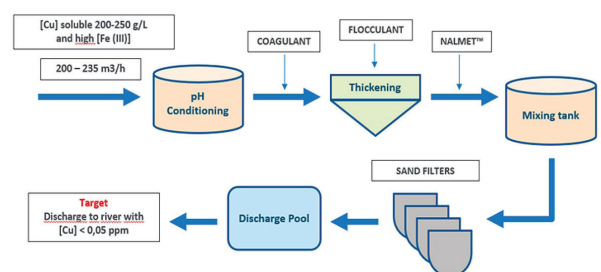


Figure 1. Neutralization Plant Diagram

CUSTOMER IMPACT

Environmental legislation compliance



Prevent production losses due to environmental shutdowns



eROI™

ECONOMIC RESULTS

Avoided potential fines of up to 2M€ and 1-year environmental shutdown

Daily production losses valued at 1,2M€ in case of shutdown

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

Due to the high levels of heavy metals (Cu, Zn, As, Fe, etc.) this treatment is not enough to meet the legal discharge requirements. Nalco Water thus added their Nalmet™ technology heavy metal removal product to effectively precipitate metal ions to a very low level while agglomerating them into large particles that settle and can be removed.

Nalmet 1689 was dosed at 15-20 ppm into a mixing tank followed by 4 sand filters to capture most of the heavy metals present in the water stream. Once filtered, water was collected in a retention pool and discharged to the river once the metal concentrations had been tested to show they are below limits (see Figure 2).

	Cu	As	Zn	Fe
Discharge limit	<50	<50	<100	ND

Figure 2. Discharge limits (→g/L)

Before the implementation of the proposed program, the mining company was experiencing problems to discharge water since the concentration limits were being exceeded. The impossibility of discharging water could lead to plant stoppage due to water collapse in the system, with the consequent production losses (estimated in 1,2M€ per day).

RESULTS

As a result of the Nalmet heavy metal removal program implementation, Nalco Water helped their partner to comply with legal requirements by fine tuning removal rates of main heavy metals present after the neutralization process of their residual water streams.

As described in Figures 3 and 4, not using Nalmet technology would have exceeded the legal limitations of punctual and monthly average measurements for heavy metals.

In the absence of Nalmet, these metals would remain soluble and would not be captured by the filtration system.

		Cu	As	Zn	Fe
Without treatment	Maximum concentration	198	62	565	805
	Monthly Average concentration	73	31	164	168
With Nalmet™	Maximum concentration	46	21	146	159
	Monthly Average concentration	27	15	68	58

Figure 3. Metal concentrations after filtration with and without Nalmet™ (→g/L)

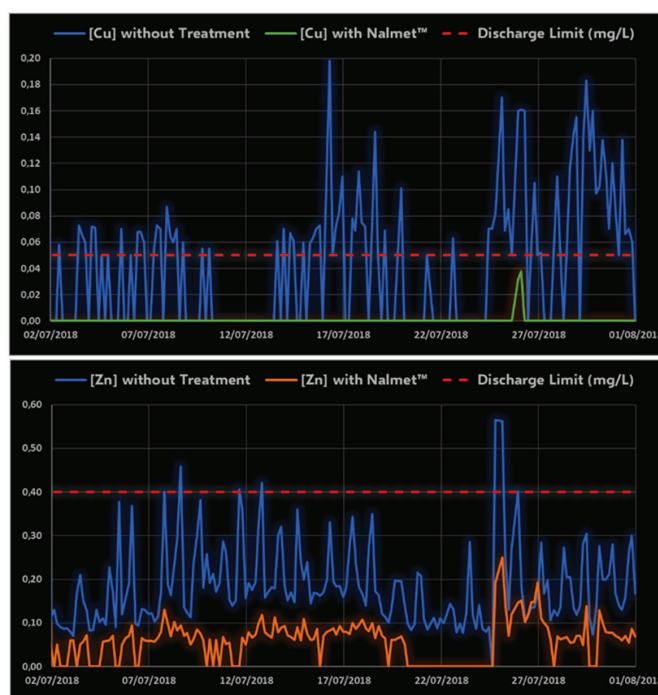


Figure 4. Metal concentration with and without Nalmet™ application (Internal Analytical Control - July 2018)

Compliance with environmental legislation on water quality discharged to river, allows this company to avoid possible up to 2 million € fines and environmental shutdowns that could also end up in huge economical losses due to a lack of production.

Nalco Water is committed to assist customers in adapting and implementing the right heavy metal removal program to help operators meet their production goals and legal requirements, positively impacting their business.

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