



**Drinking water treatment plant (DWTP)  
filtration system for arsenic removal -  
Toquepala copper mine, Peru**



## Background

The Toquepala mine is a large copper mine in the Tacna Province in Peru, on the border with Chile and Bolivia. The mine is situated far from nearby towns and cities and is operated by between 800-900 employees living on-site.

The soil and water sources surrounding the mine are contaminated with arsenic, classified as Group 1

carcinogen\* and posing a serious risk to human health.

The existing water treatment included only chemical disinfection to provide the local population with water for non-potable purposes, such as showers, toilets and gardening. For potable use, they were drinking only bottled mineral water, and an alternative solution was essential.



\*US Agency for Toxic Substances and Disease Registry 2019 Priority List of Hazardous Substances.

## The Challenge



The design of the plant needed to consider contamination removal (silt, biological material, as well as residual of iron and algae) to reach a level of less than 1 NTU, as well as to bring the arsenic level down from the current 80-100 ppb to less than 10 ppb.

The removal of arsenic proved to be particularly challenging, as it dissolves in water and needs to be altered to its particulate form so it can be captured on the filtration media. The system also had to comply to the strict ASME code design requirements.

The remoteness of the site posed a number of logistical challenges. As the testing labs were distant, water quality results were delayed, making it difficult to determine how to proceed with the final design. Getting supplies and equipment delivered to the site also increased the operational complexity.



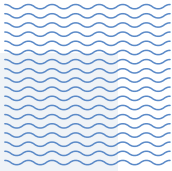
High turbidity & arsenic concentration



ASME compliance



Remote location



# The Solution

Amiad's solution consists of 3 stages:

**Stage 1** Prefiltration: 3" Spin Klin™ disc filters at 55 micron for filtering larger particles

**Stage 2** Main filtration: S-370K AMF microfiber filters at 20 micron and media filters with catalytic media for reducing NTU and arsenic

**Stage 3** Fine filtration: S-370K AMF microfiber filter at 2 micron for polishing

Both the Spin Klin™ disc filters and the 20 micron AMF filters are designed to reduce the particle load on the media filters, reduce chemical consumption and increase water recovery as much as possible.

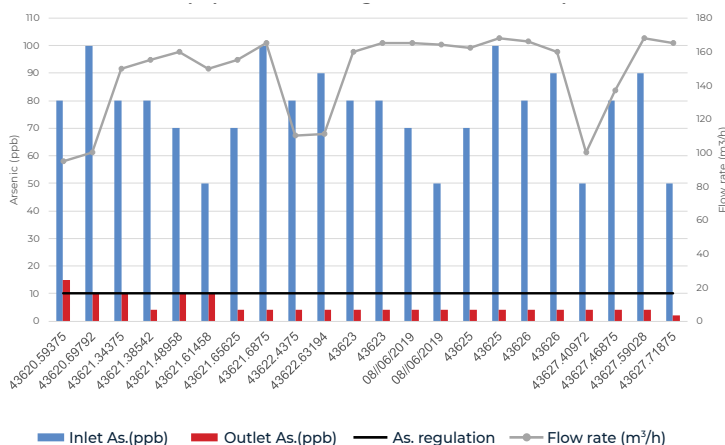
The Solution at a Glance			
	Flow rate	Water source	Filtration degree
<b>Prefiltration:</b> 14 x 3" Spin Klin™ disc filters	176 m³/h (775 gpm)	Open lake	55 micron
<b>Main filtration:</b> 2 x 8" S-370K AMF microfiber filters 5 x 72" media filters			20 micron
<b>Fine filtration:</b> 1 x 8" S-370K AMF microfiber filter			2 micron

# The Results

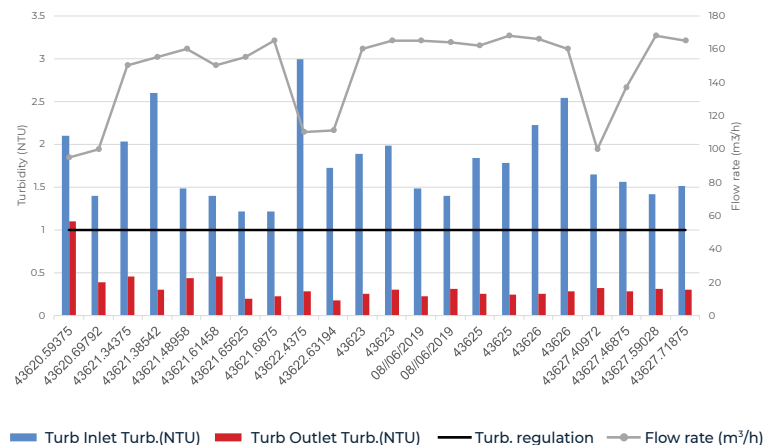
During the DWTP commissioning, the hydraulic and control systems were installed and troubleshooted. The chemical treatment was optimized and fine-tuned and as shown in the graphs on the right, the treated water quality achieved even better results than expected by the client. The turbidity was less than 0.5 NTU (most of the time even less than 0.2 NTU) and the arsenic level decreased from 80-100 ppb to less than 5 ppb.

## Toquepala commissioning

Arsenic result follow up

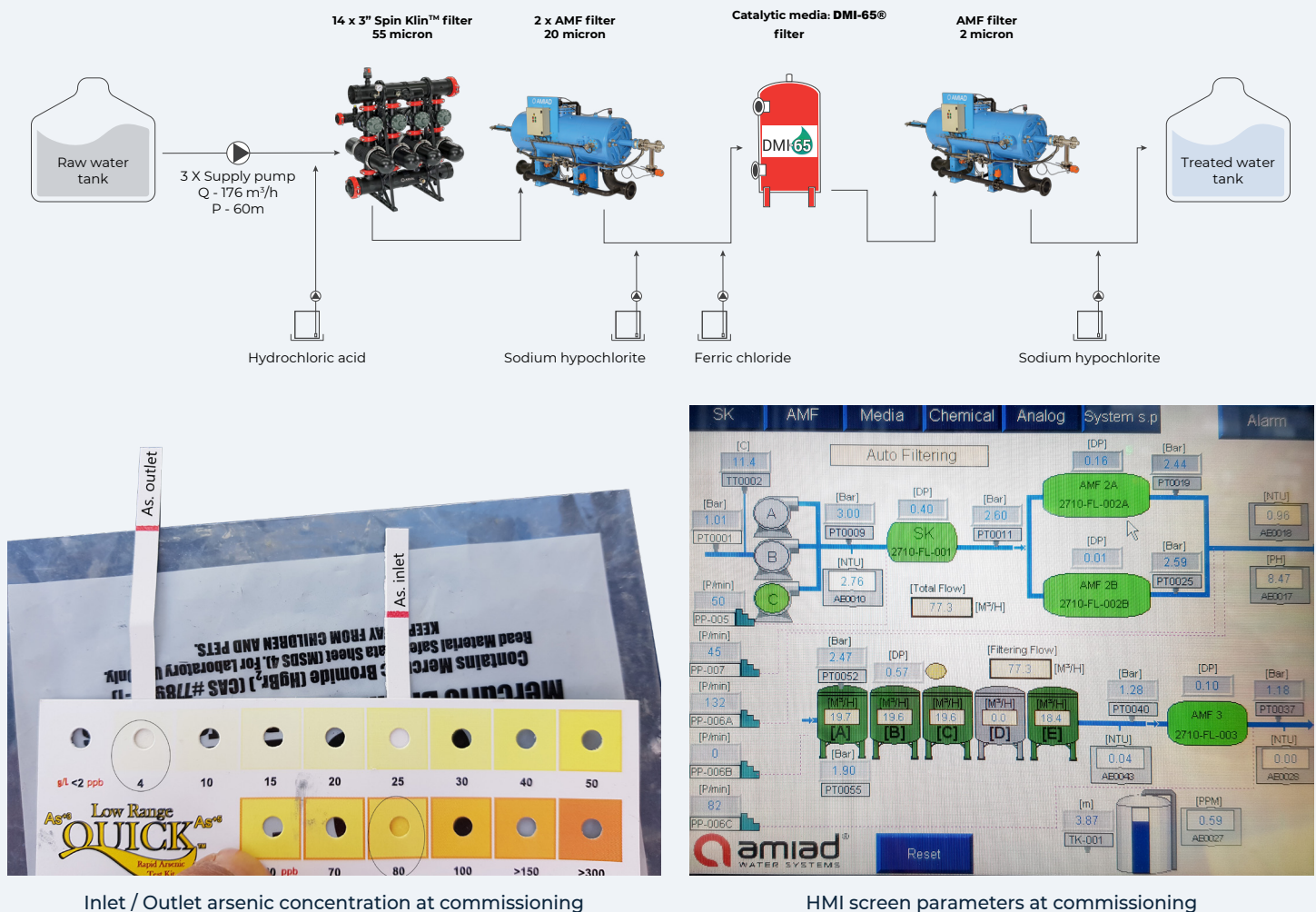


Turbidity result follow up



## Toquepala Mine - AMIAD DWTP

Amiad supplied a complete low OPEX DWTP and delivered safe, high quality water by using its innovative automatic solution.



The Amiad DWTP eliminated the need to use bottled mineral water on site, saving between 300,000-600,000 plastic bottles every year as well as decreasing pollution from their transportation and disposal.

Amiad is continuing to support the local team, and the client is now interested in implementing this solution in an additional nearby mine.

For further information regarding this installation, please contact our Application Engineering Department.



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