CASE STUDY

Scale and Corrosion Control for		
Mineral Processing Plant		
Custom Antiscalant and		
Corrosion Control agent	t	r e
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background

A mineral processing site in Queensland processes a water-based mineral slurry as part of its concentration process. After removing the mineral solids the water requires treatment to meet environmental discharge compliance.

The client initially engaged WTS over 10 years ago due to persistent challenges. At that time, the plant was struggling to meet its designed production capacity, primarily due to excessive scale buildup throughout the water treatment system. The corrosive nature of the slurry was also creating significant maintenance challenges, leading to frequent downtime and increased operational costs.

The site's unique and challenging water chemistry required a scientific approach and a tailored solution. In response, WTS developed the WTS 6-124CMF—a custom-formulated dual antiscalant and corrosion control agent specifically designed for this application. This solution worked effectively for several years.

However, recent changes to the processing operations necessitated the addition of caustic to increase metals recovery. This adjustment significantly increased the potential for scale formation downstream, requiring a new solution to maintain performance and efficiency.

approach

To address these new challenges, WTS applied its Four-Phase Solution Development Process. This comprehensive approach included a detailed laboratory study and the following steps:

- 1. X-ray diffraction (XRD) and energy-dispersive X-ray spectroscopy (EDS) analyses were conducted to quantify the specific chemistry of the scaling challenge.
- Advanced computer modelling and detailed water analysis were performed to identify the conditions under which scaling and corrosion occurred, enabling precise targeting of the problem
- **3.** Scale coupon tests were used to better understand the new scaling characteristics introduced by recent process changes.
- **4.** Further modelling determined the best dosing regimen to achieve effective scale and corrosion control while ensuring cost efficiency.

After completing these analyses, WTS trialled various solutions in the laboratory to determine the most effective and costefficient antiscalant and corrosion inhibitor.



Sample of scale formation due to caustic dosing that was initiated - taken from clarifier underflow discharge line. With the introduction of the WTS 4-130 this was inhibited.

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solution

Through rigorous testing and evaluation, WTS identified the optimal solution to address the increased scaling potential and maintain operational efficiency:

- Introduction of WTS-4-130: A high-strength antiscalant was introduced at a targeted section of the system with particularly high scaling potential.
- Optimisation of WTS-6-124CMF: The existing WTS-6-124CMF solution was further optimised, including adjustments to dosing locations and rates to ensure effective scale and corrosion control.
- Ongoing Monitoring and Improvement: Regular site visits and continuous monitoring were established to ensure the solution remained effective and to identify opportunities for further improvements.

results and benefits

- Increased productivity The implementation of our solution significantly reduced downtime caused by blockages, restrictions due to scale, and corrosion-related maintenance.
- Regulatory Compliance Our solution ensured compliance with discharge regulations, meeting required standards and reducing the risk of any potential fines or penalties.
- Expert Technical Support Throughout the process, WTS provided expert advice and consultation to all involved parties, ensuring a seamless transition and continuous support. This technical expertise is ongoing, with WTS offering reliable service and guidance to the plant.
- Confidence and Proven Results With over a decade of constructive collaboration, WTS has continuously delivered scientifically proven improvements. This long-standing relationship has built confidence in the long-term effectiveness and reliability of the solution.



Before and after scale-test coupons from the plant (After photo taken after being installed for five months)