

WATER TREATMENT FOR THE MINING INDUSTRY

Minimizing the impact of mining operations on local water resources is a top priority of the mining industry. SGS has been providing practical water treatment solutions, including the treatment of ARD (Acid Rock Drainage) and heavy metal contaminated wastewaters, to clients in the mining industry since 1998. During this time, SGS has developed a reputation as an organization with exceptional understanding of water treatment, providing innovative and practical treatment solutions to the mineral processing industry. Partner with SGS and let our experienced experts help you achieve affordable, efficient water treatment results.

WATER TREATMENT PROCESS

At SGS, we focus on helping you develop a truly sustainable water management plan, not just an end-of-pipe solution. We have the technical expertise to provide effective mitigating strategies and innovative, practical solutions that reduce the environmental impact of your operations. Our water treatment experts will conduct the following procedures to ensure your water treatment project is completed efficiently and affordably:

- Plant or site audit and recommendations
- Laboratory testing
- Pilot-scale testing when necessary
- Design and engineering of water treatment solutions
- Construction management

SGS will continue during and after your project start-up to ensure operational excellence and provide modifications and calibrations as required.

Put SGS, the world's leading inspection, verification, testing and certification company to work for you, and let us reduce your operational risks and liabilities. Our water treatment specialists are ready when you are.



PLANT AUDIT

SGS personnel typically begin a water treatment project with a thorough in-plant audit to better understand your treatment needs. In-plant audits, including a site water balance and review of current water treatment practices, will allow SGS to gain a more comprehensive understanding of the scope of your treatment requirements. Typical water treatment problems encountered by our mining clients include:

- ARD
- Acid industrial effluents
- Heavy metal contaminated wastewaters

A complete audit of current water treatment practices and requirements and an analysis of the inflows and outflows of water at your operation (process water, mine water, surface water, and precipitation) are important steps towards the development of a practical water management plan, or the enhancement of an existing strategy.

SGS is the global benchmark for quality and integrity. Our goal is to provide you with the most effective water treatment services possible beginning with a solid understanding of your current effluent and drainage situation. Our experts will ensure that each stage of your plant audit is handled professionally and efficiently.

LABORATORY TESTING

The execution of analytical procedures for environmental purposes must be completed with the utmost attention to accuracy and reliable operating procedures. SGS provides a wide range of laboratory testing services to assist you in the preparation of environmental audits and impact studies, as well as in the resolution of existing effluent problems. Some of our standard laboratory tests include:

- Acid Base Accounting sulfur speciation and ABA (EPA-Sobek) to determine if waste is potentially acid producing.
- Shake flask extraction tests (EPA-1312) or modified extraction tests to quickly assess quality of run-off
- Special waste testing classification for waste disposal.
- Column leaching tailings and waste rock disposal utilizing: blending, limestone addition, layering, surface and underground disposal, etc.

- Lysimeter testing - a method for improving assessment by generating data with a larger sample.
- Subaqueous column weathering tests to determine effects of disposing waste rock and tailings underwater.
- Humidity cell weathering tests – to simulate weathering conditions and characterize waste.

As well, we can perform:

- Cyanide detoxification studies
- Effluent treatment
- High Density Sludge (HDS) processing
- Precipitation and removal of dissolved metals
- Suspended solids settling
- Cyanide destruction using peroxide or SO₂ processes

All laboratory work is performed in accordance with recognized global standards such as American Society for Testing and Materials (ASTM) and International Standards Organization (ISO). Our experienced staff members operate in laboratories with state-of-the-art instrumentation, using industry standard best practices to provide you with complete accredited, accurate and timely water analysis. Once laboratory testing is completed, our experts will proceed with you to the pilot-scale testing phase of your water treatment project.

ON-SITE PILOT-SCALE TESTING

An important advantage of SGS' water treatment solution is our ability to provide on-site pilot plant testing. Our involvement at the initial stages complete of our investigations can save you time and money in the development of practical solutions to the treatment of ARD, acidic industrial effluents, and metals contaminated wastewaters on your site. By testing continuous effluent sample on a 24-hour/day operation, credible baseline information is developed to establish reliable design parameters for a treatment plant. SGS has a mobile pilot plant available for this service as well as a larger mobile treatment plant for batch treating contaminated solutions. The

treatment capacity of the larger treatment plant can be modified easily to suit each site.

Our mobile HDS pilot plant has been used for pilot studies in Australia, Brazil, Canada, Peru, Chile and USA. The pilot plant requires an area of 10 ft. by 12 ft. (3 m x 3.7 m) to set up and is self-contained for full operation, requiring only 16 hours for full assembly. This pilot plant has been used at more than 25 sites, and constant upgrades continue to optimize its performance. The data generated from this unit has been used to engineer full-scale water treatment plants and engineer retrofitting of existing conventional neutralization operations.

During your pilot plant operations, unforeseen problems may arise, usually revealing issues that are better addressed before full-scale operation. As a result of years of experience in water treatment and pilot testing, our staff will quickly provide workable alternatives and inform you of the implications each will have on your overall water management plan.

DESIGN AND ENGINEERING OF WATER TREATMENT SOLUTIONS

SGS has been designing water treatment plants ranging in size from 1,500 L/min to 210,000 L/min since 1998. Our extensive experience in pilot studies, combined with our understanding of ARD and heavy metals, contaminated water, enables us to methodically pilot and design efficient, cost effective water treatment plants based on proven technologies. Our design experts are able to provide you with practical water treatment solutions even at operations with severe site restrictions. Those requiring new water treatment systems may have the option of utilizing a number of effective heavy metal removal technologies including:

- Lime precipitation including the HDS (High Density Sludge) process
- Engineered wetlands
- Carbon adsorption
- Ion exchange
- Reverse osmosis
- Electrodialysis

- Biological systems
- Ozonation

Due diligence based on proven project experience, our laboratory analysis, and the pilot plant testing results, means we ensure your water treatment system is the most efficient and cost effective solution. SGS is able to design systems that effectively handle varying metal concentrations (several milligrams per litre to several grams per litre of total dissolved metals) of a wide variety of heavy metals from various sources including:

- Base metal mining operations (zinc, lead, iron, copper, manganese, nickel)
- Gold mining operations (arsenic, selenium, mercury)
- Others (cadmium, chromium, cobalt, molybdenum)

After the most economical treatment system is selected, we will optimize your water treatment process and ensure proper equipment selection and sizing. Our water treatment experts possess a wealth of experience in designing practical water treatment solutions for the mining industry. Leverage our technical expertise and let us provide you with practical water treatment solutions aimed at minimizing your impact on the local water resource.

CONSTRUCTION MANAGEMENT

SGS offers a range of construction management services to assist you in the construction phase of your project. We will ensure the contractors' designs; drawings and specifications meet with the applicable codes, standards and purchase specifications. Experienced SGS personnel will verify design and stress calculations, working drawings, material specifications, and control-systems to ensure they operate in accordance with construction requirements. At SGS, we are dedicated to ensuring your water treatment project performs according to specification and to your complete satisfaction. Count on us to be your independent representative for all your water treatment construction needs.

SUMMARY

SGS has years of experience effectively managing contaminated effluents for the mining industry including ARD, heavy metals contamination, and acid industrial effluents. We have the analytical, design and engineering experts to assist you through the following project stages to ensure efficient, practical solutions are found for your water treatment requirements:

- Plant audit
- Review of current practices and requirements
- Site water balance
- Development of a water management plan
- Laboratory testing at specialized SGS laboratories
- On-site pilot-scale testing including effluent sampling on a 24-hour/day basis and a mobile treatment plant for batch treating contaminated solutions
- Design and engineering
- Construction management



Partner with the world’s leading inspection, verification, testing and certification company for all your water testing and treatment needs and let SGS help you reduce your operational and environmental risks and liabilities. We have the experience and the technical expertise to provide you with most efficient and affordable methods of managing your water resources.

CONTACT INFORMATION

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