

SGS CEMI

ENVIRONMENTAL SERVICES FOR THE MINING INDUSTRY

In 2008, SGS acquired Canadian Environmental and Metallurgical Inc. With extensive experience in waste water treatment and leaching testwork for the prediction and characterization of acid mine drainage, SGS CEMI is the partner of choice for North American and overseas mining companies seeking solutions to environmental challenges.

SGS CEMI offers a comprehensive range of services to allow the management of effluents and encourage sustainable development. Our environmental process expertise allows us to provide specialized testing and innovative solutions. We provide:

- Water treatment testing, process design, piloting and Engineering, Procurement, Construction Management (EPCM) for new water treatment plants
- Water treatment plant audits and assessments
- Environmental and metallurgical laboratory testing including Acid Base Accounting (ABA), humidity cell testing, and column testing
- On-site pilot plant testing
- Direction and analysis of testwork for water treatment by High Density Sludge (HDS) and other techniques

A thorough understanding of your project's geological and environmental situation is a key part of your responsibility to sustainable development. Environmental data from SGS CEMI provides you with the necessary information to plan, build, operate and eventually close your mine.

WATER TREATMENT

Our environmental and water treatment group has a wide range of expertise including:

- Environmental testing
- Process design
- Cost estimation
- Process control
- Project management

The water treatment group has completed a number of major full scale installations of the HDS (High Density Sludge) process for a diverse range of clients. These clients include companies from the mineral processing, chemical and steel fabrication industries. The plants range from about 200 L/min at the low end to over 60,000 L/min at the high end with metals concentrations from several milligrams per litre to several grams per litre of total dissolved metals.

ENVIRONMENTAL LABORATORY

Our Vancouver laboratory features a dedicated room for humidity cell and column testing that is temperature controlled to maintain a consistent, high quality analytical environment. We focus on environmental testing including acid/base accounting, humidity cell testing, column leaching, leach extraction tests, water treatment consulting, etc.

ON-SITE PILOT PLANT TESTING

A key advantage of our testing service is the capability to provide on-site pilot plant testing. SGS CEMI's involvement at the initial stages of problem investigation can reduce the time required for the development of a practical solution to the treatment of acid mine drainage, acid rock drainage and acidic industrial effluents.

By testing continuous effluent samples on a 24 hour per day operation, credible baseline information can be developed to establish reliable design parameters for a treatment plant. SGS CEMI 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 adjusted with minor modifications to the plant to suit each site.



HDS (HIGH DENSITY SLUDGE) TECHNOLOGY

The HDS process results in effective removal of base metals in a stable form. This is the result of the formation of a calcium precipitate and a co-precipitate with iron on the surfaces of recycled sludge particle. High Density Sludge Technology is beneficial to operations which produce high sulphate from pressure oxidation and bio-oxidation processes.

The HDS process can be summarized as follows: Limestone/lime and recycled sludge are added to the lime-sludge mix tank at the head of the process and this becomes the main neutralization agent.

This mixture is discharged to the rapid mix tank where it is mixed with influent thereby achieving neutralization. This mixture is fed to the main lime reactor where a combination of aggressive aeration and high shear agitation ensures optimum process chemistry and clarifier performance. The discharge from the lime reactor is treated with flocculant in the flocculation tank. The clarifier separates the treated effluent from the sludge, a portion of which is recycled to the head of the process.

The HDS process works on the same principle as the Low Density Sludge (LDS) process except a high degree of sludge recycle is added to the system. In the HDS process, settled sludge density increases from about 4% of solids to approximately 20% of solids. Sludge volume reductions in the order of 95%

are not uncommon. Today, SGS CEMI leads the industry in the application of HDS technology to a variety of mining and industrial effluents. These include several arsenic removal projects where sludge stability and exceptionally tight water clarification specifications are met.



ADVANTAGES OF THE HDS PROCESS

The HDS process has many advantages over other lime precipitation systems. The most important of these is a substantial reduction in sludge volume resulting from an increase in sludge density. An increase from 2% to 30% solids reduces the volume of sludge by over 95%. The resulting reduction in sludge disposal costs further improves the cost effectiveness of the process. In addition to reduced sludge volume and superior sludge density, there is an increase in sludge stability, both chemically and physically. Within several days of deposition, the sludge drains to in excess

of 50% solids and possesses enough physical stability to support the weight of people walking on the surface of the impoundment area.

Following fifteen years of impoundment at one facility, there has been no contamination of the surrounding groundwater or any other evidence of metal reversion. Other advantages of the HDS process include:

- A high quality effluent is produced
- The process is easily automated
- HDS is a proven technology and operating plants are comprised of standard equipment

SGS CEMI has an unsurpassed reputation for delivering quality solutions to environmental challenges. Work with us to ensure your project is developed in a responsible and sustainable manner.

CONTACT INFORMATION

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WHEN YOU NEED TO BE SURE

SGS