



MEMBRANE ANTISCALANT SERVICE

- Mine Specific Formulations
- Calcium Sulphate Inhibition
- Acid mine drainage waters
- Potable Approval – mine camps
- Leaching Solution Recovery
- Enhanced Metal Recovery

LABORATORY MINE WATER SIMULATION STUDIES

PILOT PLANT TESTING

SPECIALITY MEMBRANE CHEMICAL CLEANERS

SCALING PREDICTION SOFTWARE

Global Scientific Services

The H₂O Innovation in Madrid Spain has conducted over 2,000 membrane autopsies and tested over 5,000 water and deposit samples since 2001.

Services offered are:

Membrane and Cartridge Filter Autopsies

External and Internal Inspections:

Detect physical damage, fouling, or failure points through a detailed examination of membranes and filters.

Fouling Identification:

Advanced techniques such as SEM-EDX, ATR-FTIR, and microbiological analysis are used to precisely identify the composition of foulants.

Performance Testing:

Assess current performance by measuring flow rate, salt rejection, and membrane integrity, identifying areas for improvement.

Water Quality and Pre-treatment Optimization

Particle Size Distribution and Jar Testing:

Evaluate the effectiveness of your pre-treatment process, providing actionable recommendations to prevent membrane fouling.

Water Analysis:

Identify contaminants in feedwater and permeate to optimize your treatment process for sustainability and performance.

Cleaning Procedure Optimization

Laboratory-Based Cleaning Tests:

Customized cleaning tests for membranes and filters are designed to address specific fouling issues, ensuring effective chemical cleaning and minimizing downtime.

Genmine Research Programme

H₂O Innovation received £500,000 funding from the UK government to invest in equipment and research staff. We have also engaged the services of expert consultants in the field of membranes, water treatment and mining who are strategically positioned worldwide to assist in responses to specific requests from different mining operations.

The output from our research is a new range of antiscalant and cleaning products and the development of a tailor made antiscalant formulating service for mines with unusual water chemistry.

Genmine

H₂O Innovation develop, formulate and manufacture speciality antiscalant and cleaning chemistry for Reverse Osmosis (RO), Nanofiltration (NF) and Ultrafiltration (UF) Membrane Separation Technology (MST).

Mining waters are complex, operating at extremes of pH and containing high levels of calcium, sulphate, metals and leaching agents which results in scale formation and fouling of the membranes and water systems.

GENMINE is our mining project to conduct research into mine waters and formulate new antiscalant and cleaning products. These include individual formulations for specific mines, their ore bodies, processes and waters.

This individual project work is supported by modelling software to predict scaling in minewaters and autopsy and laboratory testing.

How Membranes Work

High pressure forces water through semi-permeable membranes creating a concentrated and dilute water stream.

Reverse Osmosis (RO)

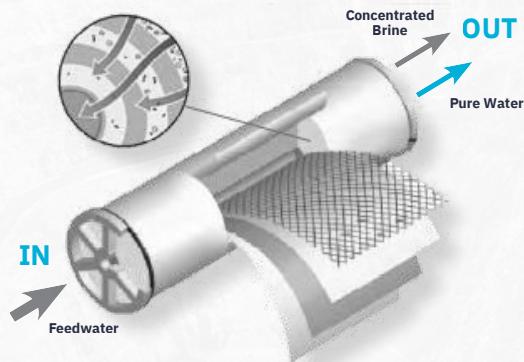
Removes 99.5% of monovalent ions

Nanofiltration (NF)

Removes divalent ions

Ultrafiltration (UF)

Removes suspended solids



Membrane Use in Mining

Acid Mine Drainage Water (AMD) Clean-Up

Sulphide ores and metals, in the presence of water and oxygen, produce AMD. This is stored in tailings ponds for settlement and treatment. Membrane technologies are employed to treat AMD, ensuring that the release of pure water into local waterways complies with environmental discharge consents.

Enhanced Metal Recovery

Membrane plants are utilized to concentrate pregnant and barren liquors, significantly improving recovery rates during the extraction processes.

Leach Solution Recovery

Expensive leaching solutions such as acid, cyanide, and thiosulfate can be effectively separated and recovered using RO (Reverse Osmosis) and NF (Nanofiltration) membranes, optimizing resource efficiency.

Zero Liquid Discharge

Concentrating liquid solutions 5-10 times prior to crystallization processes can be achieved using membrane technology.

Lithium Brine

NF (Nanofiltration) and RO (Reverse Osmosis) membranes are employed to concentrate and separate lithium from brine solutions, enhancing the efficiency of extraction.

Drinking Water

Packaged drinking water units for mine accommodation camps incorporate RO membranes and disinfection units. These systems can utilize a variety of source waters to deliver safe and clean drinking water.

Dewatering

The dewatering of excess minewater is essential both before and during mining and extraction operations. Membrane technology is applied to produce clean water for process use and to ensure compliance with discharge regulations.

Product Selection

Different ore bodies, operating pH and processes means that water streams in mining are some of the most chemically complex. The feedwater to a membrane plant therefore needs very specialised antiscalants to keep membrane surfaces clean. The chart below shows some of the antiscalants we have developed for different membrane mining applications.

COMMODITY	AMD	DEWATER	LEACH SOLUTION RECOVERY	BRINE CONCENTRATE	PROCESS	ZLD
Chromium	AS26			AS65		AS65
Coal	AS26				AS65	AS65
Copper	AS26	AS65	AS65	AS26		AS45
Gold	AS26	AS47	AS65	AS26	AS47	
Lithium				AS65		
Phosphate		AS47			AS51	
Zinc		AS47			AS34	

Antiscalant Product Range

Antiscalant Application

GENMINE AS26 calcium sulphate acidic minewaters

GENMINE AS34 barium and silica specific

GENMINE AS45 calcium carbonate and silica specific

GENMINE AS47 broad spectrum for neutral and alkaline minewater

GENMINE AS51 silica specific

GENMINE AS65 calcium sulphate specific neutral and alkaline minewater

Cleaning Product Range

Cleaner Application

GENMINE C11 clay, organics, colloidal foulants, incorporates micro-bubbles

GENMINE C14 biofouling, clay

GENMINE C15 calcium sulphate, metals

GENMINE C17 complex deposits containing metals and calcium sulphate

GENMINE C18 metals, inorganic scale, incorporates micro-bubbles

GENMINE C20 inorganic scale, metals

GENMINE C21 inorganic scale, metals

The benefits of GENMINE chemicals

- Increased membrane life/reduced replacement costs
- Reduced downtime Increased energy efficiency
- Reduced cleaning frequency

Increasingly we are finding that individual mining sites require bespoke antiscalants and cleaners which we can formulate and test in our pilot plants.

Research & Development Capability

Our experience in the mining industry shows us that every water is different and operators face a unique set of challenges operating membrane plant efficiently.

We can simulate individual mine waters and have the ability to analyse effects of antiscalant performance, scaling potential and cleaning efficiency.

Our chemists have fully equipped laboratories in which to carry out detailed analysis of minewater scaling issues, simulate individual cases and formulate and develop products that really work.

For detailed research papers see: <https://www.genesysro.com/>



- Developed using models from global minewater analyses
- Analyses scaling
- Potential for specific mine waters
- Aids plant design and optimisation

Scaling Prediction Software

Conventional scaling prediction software concentrates on a limited range of pH 5 to pH 9 which covers most industrial and municipal applications.

Minewaters are different with heap leaching solutions operating at pH 10-11.5 and metal recovery stripping solutions and acid mine drainwater operating at pH 1.5 – 4.

The GENMINE research project has evaluated scaling tendencies under extreme minewater conditions and developed new antiscalant chemistries. These results have allowed us to build algorithms to power our minewater specific scaling software.

Company Overview

Founded in 2000, H₂O Innovation Inc designs, manufactures, assembles and commissions water and wastewater treatment systems, provides globally distribution of specialty products and ensures operation and maintenance services to utilities.

The Corporation is headquartered in Quebec City, Canada and has manufacturing facilities as well as regional engineering & sales offices worldwide.

Worldwide Distribution Network

Let's work together to simplify water!



Get in Touch

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