



Cyanide Management

For more than 20 years, Earth Systems has been assisting gold mining operations with all aspects of cyanide management, from the establishment of safe transport and handling practices, to optimisation of cyanide destruction processes, auditing against the International Cyanide Management Code, rinsing and decontamination, forensic investigation and management and prediction of impacts.

Earth Systems' Environmental Geochemistry and Water division includes cyanide and audit specialists with extensive experience in the management and investigation of all aspects of cyanide use at gold mining operations. Our geochemical, environmental engineering and cyanide specialists have worked on-site at gold mines throughout Australia, Africa and Southeast Asia, and have a deep understanding of cyanide-based processing and associated management issues.

At Earth Systems we bring together a strong scientific understanding of cyanide process chemistry with on-the-ground practical engineering and International Cyanide Management Code (ICMI) expertise to deliver cost-effective, compliant and low-risk solutions for all cyanide-related issues.

Whether you are a signatory to the Cyanide Code or not, Earth Systems is able to provide targeted, site-specific solutions based on international best practice to minimise environmental, social and economic risks to your operation and avoid the creation of potential long-term liability and legacy issues.

SERVICES PROVIDED

- Pre-operation cyanide management planning.
- Operational cyanide management.
- Cyanide destruction process optimisation (e.g. INCO, Caro's acid processes).
- ICMI implementation, compliance and auditing.
- Development and implementation of practical standard operating procedures for cyanide handling, use and analysis in compliance with ICMI signatory requirements.
- Engineering and design of cyanide controls.
- Regulatory environmental impact assessment.
- Health and safety risk assessment and procedure optimisation.
- Closure planning and implementation, including cyanide rinsing and decontamination procedures.
- Risk assessment and decontamination auditing.
- Supervision and monitoring of cyanide management activities.

- Forensic geochemistry for identification of sources, pathways and receptors of cyanide impact.
- Emergency response for cyanide-related issues.
- Monitoring and management of cyanide levels and evolution in process ponds, heap leach pads, cyanide leach circuits, carbon-in-leach circuits, tailings, and groundwater.
- Environmental monitoring and on-site training.
- Optimisation of cyanide stability in tailings in potentially acidic environments associated with sulfide oxidation.
- Laboratory services including adsorption testwork, cyanide destruction testwork, water-rock interactions, cyanide speciation, column leach testwork, kinetic geochemical testwork, process optimisation and auditing of onsite cyanide analysis.

PROJECT EXPERIENCE

- Establishment and oversight of operating procedures, registers and internal audits for implementation of the Cyanide Code for gold mines in Africa.
- Assessment of requirements and optimisation of cyanide destruction processes for gold mines in Africa, Asia and Australia.
- Environmental and social impact assessments for numerous gold projects, involving the development of transport, handling, operational management, and closure plans for ICMI implementation at heap leach and cyanide leach operations for gold projects in Africa, Asia and Australia.
- Cyanide spill audit, forensic investigation and solution development and implementation for a heap leach gold operation.
- Optimisation of management of highly sulfidic tailings in contact with cyanide-bearing process water.
- Investigation of cyanide seepage from tailings storage facilities at gold mines in Africa, Asia and Australia.
- Audits of potential cyanide and metal contamination at gold mines in Africa, Asia and Australia.



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