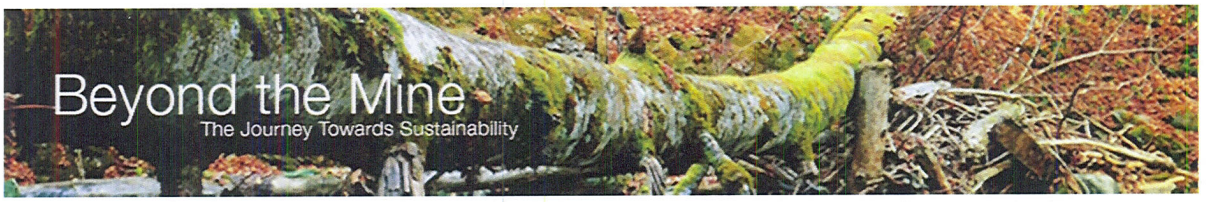


Cyanide Management

Sodium cyanide is the most effective chemical known for the extraction of gold and silver from rock. The use and management of cyanide is an important part of our operational success. However, at high concentrations, sodium cyanide can be dangerous to human and animal health.

We are committed to the safe and responsible management of all chemicals used at our operations, including cyanide. This means that we have a responsibility to provide a safe work environment for our employees and contractors, and to protect the environment and surrounding communities.

How is Cyanide Used?

Heap Leach

In heap leach operations, the cyanide solution is filtered through heaps of gold-bearing ore to extract the gold. The heaps have high-density polyethylene (HDPE) liners underneath them to capture the cyanide solution as it percolates through the ore. Underneath the liners are leak detection and collection systems to alert personnel to any leaks and to capture any cyanide solution and direct it to a central collection area. The cyanide solution containing the gold is collected in HDPE-lined drains and directed to centralized HDPE-lined ponds. The ponds also have leak detection and collection systems.

Carbon in Pulp (CIP) / Carbon in Leach (CIL)

With this type of gold extraction, the crushed gold-bearing ore, water, cyanide solution and fine-grained activated carbon are added to large extraction tanks. The tanks are within a secondary containment area designed to capture any spills or leaks, which, if they occur, are collected in a central area and pumped back to the process tanks. The tanks also have overfill alarms. The gold and the cyanide form a very strong bond and are attracted to the carbon in the tanks, which is removed from the tanks and washed to separate the gold and cyanide into a concentrated gold/cyanide solution.

Gold Refining

Gold from the concentrated gold-bearing solution, from both the heap leach and CIP/CIL processes, is removed by either electrowinning or by using the zinc precipitation process. The resulting gold sludge is then placed into a small furnace where liquid gold/silver is formed and poured into ingots.

All solutions that have had gold extracted from them are recycled back into the process.

Disposal of 'Spent' Ore after the Extraction of Gold

In the heap leach process, the 'spent' ore is left on the pad and more gold-bearing ore is placed on top of it, and the filtration and leaching processes are repeated.

In the CIP/CIL processes, the gold-depleted ore slurry (a mixture of finely crushed ore, water and cyanide) is pumped to a tailings storage facility (TSF). These facilities are designed taking into consideration local seismic conditions, climate and groundwater regimes. Controls are implemented to manage any potential seepage from these facilities. As the crushed ore settles out in the tailings impoundment, the solution on top of the facility is recycled back to the process.

All of our operations have in place environmental monitoring programs for surface and groundwater.

Safe Cyanide Management

We are a signatory to the International Cyanide Management Code (the Code) and we use the Code as the framework for responsibly managing cyanide at our operations.

Our approach to safe cyanide management at all operations includes:

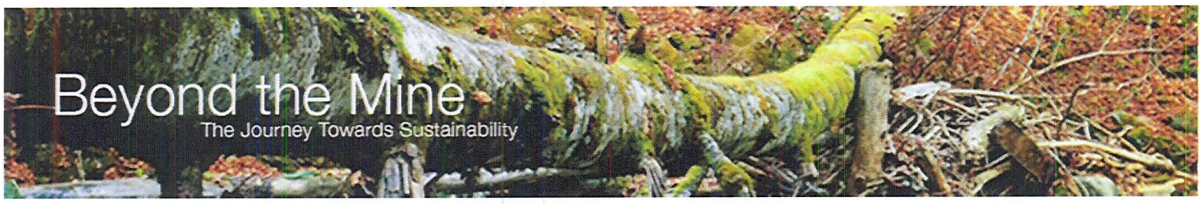
- Requiring that our suppliers of cyanide become signatories to the Code or demonstrate compliance with the Code via supply chain certification audits
- Requiring that our transporters are in compliance with the Code and through contractual agreements become signatories to the Code or demonstrate compliance with the Code through supply chain certification audits

- Implementing handling and storage control procedures for containment of both liquid and solid forms of cyanide
- Implementing control procedures for use of cyanide in leaching and refining processes
- Including cyanide-related components in our emergency response, worker safety, and training procedures
- Including financial assurance and provisions within site closure plans for the decommissioning of all cyanide-related infrastructure
- Engaging with local communities to provide information about our management of cyanide and providing opportunities for community members to raise questions or concerns

Steps We Took to Maintain Certification

Each year, we undertake various activities to drive improvements to our cyanide management practices to ensure safe and environmentally responsible cyanide management. In 2012, we:

1. Continued work in establishing and sustaining Regional Cyanide Code Compliance teams to support ongoing continued best practice sharing and recertification in all regions
2. Cyanide Code Plus Working Group continued to track and report all cyanide incident lessons learned to the operations in 2012 to support design of continual improvements to prevent these incidents from reoccurring
3. All certified operations have multi-department Cyanide Code Compliance teams that meet regularly
4. All certified operations are looking to map the Cyanide Code requirements to the ISO 14001 Environmental Management System requirements
5. Regions are developing internal and outside auditing teams to review site compliance with the Cyanide Code between the three-year audit cycles
6. Cyanide Code training programs are regularly evaluated at the certified operations to support consistency and to develop the resources to sustain compliance
7. Certified operations are having regular meetings with our cyanide suppliers to ensure compliance throughout the supply chain



Annual Cyanide Management Reviews

As a signatory of the International Cyanide Management Code, we commit to reporting historical information on our Cyanide management programs. Please see the links below for our reports from 2011 and 2010.

Beyond the Mine 2011: Cyanide Management PDF

Beyond the Mine 2010: Cyanide Management PDF

Key Data

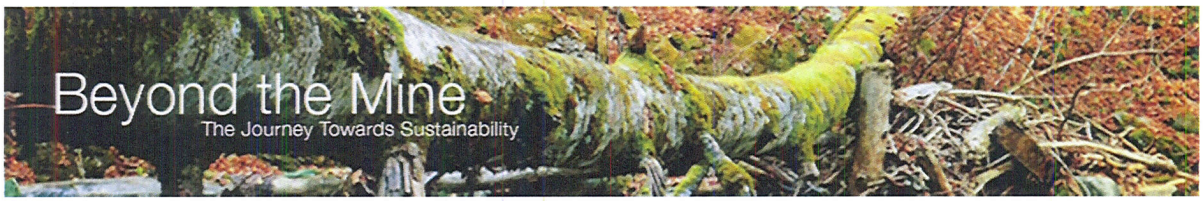
2012: 52.3 thousand tonnes NaCN (57.6 thousand tons) used
2011: 51.0 thousand tonnes NaCN (56.2 thousand tons) used
2010: 47.8 thousand tonnes NaCN (52.7 thousand tons) used
2009: 42.9 thousand tonnes NaCN (47.3 thousand tons) used

We rate environmental incidents on a severity scale of 1-5, and consider incident levels 1 and 2 to be relatively minor and levels 3-5 to be more significant. In 2012, we recorded two significant cyanide-related environmental incidents that have been designated as level 3 within our incident significance hierarchy criteria. There were no level 4 and 5 incidents reported.

One Level 3 incident occurred at our Carlin operation in Nevada and one level 3 incident occurred at our Boddington operation in Australia. Both incidents were related to process spills of water containing cyanide. In both incidents, the spills were contained on site and did not affect a water body, wildlife, or impact human health. Only the incident in Nevada required reporting to the appropriate regulatory authority. Both incidents were cleaned up and remediated. A summary of the Cyanide Code Reporting data is provided below.

Cyanide Code Reporting

SITE	INCIDENT OF CYANIDE EXPOSURE RESULTING IN HOSPITALIZATION	INCIDENT WHERE RELEASE OFF THE MINE SITE REQUIRED RESPONSE OR REMEDIATION	INCIDENT WHERE RELEASE ON OR OFF THE MINE SITE RESULTED IN SIGNIFICANT ADVERSE EFFECTS TO HEALTH
Ahafo	0	0	0
Boddington	0	0	0
Carlin	0	0	0
Tanami	0	0	0
Jundee	0	0	0
KCGM	0	0	0
Lone Tree	0	0	0
Midas	0	0	0
Phoenix	0	0	0
Twin Creek	0	0	0
Waihi	0	0	0
Yanacocha	0	0	0
Total	0	0	0



SITE	INCIDENT WHERE RELEASE ON OR OFF THE MINE SITE RESULTED IN SIGNIFICANT ADVERSE EFFECTS TO THE ENVIRONMENT	INCIDENT WHERE RELEASE ON OR OFF THE MINE SITE REQUIRED REPORTING UNDER APPLICABLE REGULATIONS	INCIDENT WHERE RELEASE CAUSED EXCEEDENCES OF APPLICABLE LIMITS FOR CYANIDE
Ahafo	0	0	0
Boddington	0	0	0
Carlin	0	1	0
Tanami	0	0	0
Jundee	0	0	0
KCGM	0	0	0
Lone Tree	0	0	0
Midas	0	0	0
Phoenix	0	0	0
Twin Creek	0	0	0
Waihi	0	0	0
Yanacocha	0	0	0
Total	0	1	0

Cyanide Code Summary Data

CYANIDE CODE SUMMARY DATA	TOTAL
Incident of cyanide exposure resulting in hospitalization	0
Incident where release off the mine site required response or remediation	0
Incident where release on or off the mine site resulted in significant adverse effects to health	0
Incident where release on or off the mine site resulted in significant adverse effects to the environment	0
Incident where release on or off the mine site required reporting under applicable regulations	1
Incident where release caused exceedences of applicable limits for cyanide	0