



CYANIDE

Northern Star's KCGM Operations has a responsibility to manage all chemicals it uses in the extraction of gold. This includes providing a safe work environment for its employees and contractors and protection of both the environment and community. This information sheet is part of our commitment to ensuring our community is aware of how we responsibly manage cyanide.

WHAT IS CYANIDE?

The term 'cyanide' refers to a range of industrial chemicals which may contain cyanide in many different forms. It can be a colourless liquid or gas, such as hydrogen cyanide (HCN) or a crystal form such as sodium cyanide (NaCN). When present in air, it is usually in the form of HCN gas.

Exposure to cyanide can occur during both natural processes and industrial activities. Cyanide is naturally released from some foods and plants such as almonds, lima beans and cassava. Pits and seeds of common fruits, such as apricots, apples, and peaches, may have substantial amounts of chemicals which are metabolised to cyanide. The edible parts of these plants contain much lower amounts of these chemicals.

Smoking cigarettes and breathing smoke filled air during fires is a major source of cyanide exposure.

WHY DOES NORTHERN STAR'S KCGM OPERATION USE CYANIDE?

Cyanide has been used to separate gold and silver from ore for over 120 years. Mining uses less than 20% of the global production of cyanide chemicals. Mines use as little cyanide as possible for environmental, safety, and economic reasons.

Cyanide is used in the extraction process to dissolve gold which is then collected on activated carbon in the leach tanks. It is also used in the elution process where gold is re-dissolved from the activated carbon into solution as a preparation step for electrowinning to the final gold bullion. Some residual cyanide remains in the slurry discharged to the tailings storage facilities. However cyanide quickly breaks down in sunlight to carbon dioxide and nitrogen.

Cyanide is received at KCGM in liquid form as a 30% NaCN solution. It is used in the process at a diluted concentration in the range of 0.01% to 0.3%.

It is added to the process using specially designed dosing equipment which eliminates human interaction. Dose rates are controlled automatically to ensure that they are optimised for the processing operations and to ensure worker safety. The main storage tanks are fully contained in a lined bund to protect the environment.

Although research continues into alternatives methods of extracting gold, no current environmentally acceptable or economically feasible alternatives to cyanide exist.

WHAT IS THE INTERNATIONAL CYANIDE MANAGEMENT CODE?

The International Cyanide Management Code covers the lifecycle of cyanide management from manufacture to transport and use in gold mining. The Code defines a series of principles and objectives to improve cyanide management and thereby reduce risks to workers, the environment and communities.

How does Northern Star's KCGM Operation demonstrate compliance with the Code?

On October 07, 2021, the International Cyanide Management Institute (ICMI) announced its acceptance of Northern Star's KCGM Operations to become a signatory to the International Cyanide Management Code (Cyanide Code). The Cyanide Code is a voluntary industry program focused on the safe and environmentally responsible management of cyanide by companies producing gold and/or silver and by companies producing and transporting cyanide.

Prior to this announcement, KCGM Operations had previously been certified in 2008, 2012, 2015 and 2019. As a voluntary signatory to the Code, KCGM Operations commits to undertaking a cyanide code certification audit every 3 years. The certification audits are conducted by a third-party auditor to determine whether KCGM is in full compliance with the Code.

Cyanide audit results are made available to the public

and posted on the International Cyanide Management Code website. More information about responsible cyanide management is available at: www.cyanidecode.org.

WHAT ARE THE RISKS OF USING CYANIDE?

The main risks associated with cyanide use are exposure of workers, leaks into the environment and exposure to the community due to accidental release during transportation.

Cyanide can be lethal as it is a fast-acting poison in the human body. If cyanide is swallowed, inhaled or absorbed through the skin, severe breathing difficulties develop rapidly. Workers at gold mining operations can be exposed to HCN gas during the extraction process if the tank solutions become too acidic (low pH).

Cyanide exposure can also impact on animals if they eat large quantities of plants naturally releasing cyanide, are exposed to HCN gas or drink contaminated water. Northern Star's KCGM Operations primarily uses hypersaline water which is considered too salty for drinking. Strict safety procedures and regulatory limits are in place to ensure workers and animals are not exposed to concentrated levels of HCN gas or cyanide solutions.

WHAT IS KCGM DOING TO REDUCE THE RISKS OF CYANIDE USE?

Operational Controls

The actions taken by Northern Star's KCGM Operations for the management of cyanide include:

- Regular maintenance of plant and equipment used in the handling of cyanide;
- Elevated pH (alkalinity) to protect against HCN gas formation;
- Minimising cyanide use through ongoing testing and optimisation programs;
- Regular inspections and testing; and
- Instrumentation and monitoring.

Worker Safety

Controls in place to ensure workers are not exposed to cyanide include:

- Inductions and procedures to raise awareness of risks and importance of controls;
- Fences, gates or guarding around tanks and



facilities;

- Ventilation of areas where HCN gas may accumulate;
- Manually activated warning light in areas where cyanide is added; and
- Protective equipment such as personal monitors and respirators to enter exposure areas.

Environmental Measures

All cyanide management facilities are designed to protect the environment, including:

- Fences and netting to prevent fauna from accessing open water containing harmful levels of cyanide;
- Double containment for pipes and tanks containing cyanide;
- Excess capture and storage bund capacities in preparation for extreme rainfall events;
- Routine sampling and analysis of water and tailings; and
- Planning and available funds for decontamination of cyanide facilities at the end of mine life.

Transportation Factors

Although the manufacture and transport of cyanide are not in the immediate control of Northern Star's KCGM Operations, we work with our suppliers to maintain standards consistent with the Code and Dangerous Goods legislation by:

- Planning transportation routes;
- Using specially designed transportation equipment which can withstand severe damage without rupturing;
- Conducting regular awareness and training on handling and discharge; and
- Regular tracking during shipment.

Emergency Management

To reduce the risk of a cyanide emergency event at site or during transportation, we have adopted a number of strategies to minimise the risk to the community and environment. These include:

- A comprehensive Emergency Management Plan;
- Nationally accredited and trained Emergency Response personnel;
- Mutual aid agreement with the Fire and Emergency Services Authority (FESA); and
- Being a member of the Local Emergency Management Committee.

In the event of a cyanide emergency occurring in the community contact the CSBP 24 hour emergency number 1800 093 333.

FURTHER INFORMATION

Further information on Northern Star's KCGM Operations is available on our website www.superpit.com.au, via the KCGM Public Interaction Line on 9022 1100 (available 24hrs a day, seven days a week), or contact a member of the KCGM Community Reference Group (CRG).