REPORT

Cyanide Management Plan

Coffee Gold Mine

Prepared for:

Goldcorp Kaminak Ltd.
3260-666 Burrard Street
Vancouver, BC V6C 2X8

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REVISION TRACKING LOG

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1			
2			

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
ADR	adsorption, desorption, and recovery
ANSI	American National Standards Institute
Cyanide Code	International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold
EMR	Yukon Government Department of Energy, Mines and Resources
ERT	Emergency Response Team
GPS	Global Positioning System
H&S	Health and Safety
HCN	Hydrogen cyanide gas
HLF	Heap Leach Facility
HLP	Heap leach pad
ISO	International Standards Organization
ICMI	International Cyanide Management Institute
LOM	Life of mine
MSDS	Material Safety Data Sheet
NAR	Northern Access Route
NaCN	Sodium cyanide
OFA	Occupational First Aid
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
PPM	Parts Per Million
Project	proposed Coffee Gold Mine
PVC	Polyvinyl chloride
ROM	Run-of-mine
SCBA	Self-contained Breathing Apparatus
SER	Sustainability and External Relations
SOP	Standard Operating Procedure
TDG	Transport of Dangerous Goods
WAD	Weak-acid Dissociable
WAD-CN	Weak-acid Dissociable Cyanide
WHMIS	Workplace Hazardous Materials Information System
WRSF	Waste Rock Storage Facility
YESAB	Yukon Environmental and Socio-Economic Assessment Board
YWB	Yukon Water Board

LIST OF SYMBOLS AND UNITS OF MEASURE

Symbol / Unit of Measure	Definition
%	percent
Au	gold
km	kilometre
km2	square kilometres
m	metre
m2	square metres
m3	cubic metre
masl	metres above sea level
mm	millimetre
MPa	megapascal
Mt	million tonnes

INFORMATION REQUIREMENTS FOR QUARTZ MINE LICENSE AND WATER LICENSE

Information Requirement	Location in this Plan
Table of Concordance	Appendix A
Revision Log	Page i
In most cases a single overarching plan is expected to be sufficient for all of the normally expected hazardous materials utilized in a quartz mining undertaking. However, the use of high hazard materials such as cyanide may lead to an additional standalone plan being appropriate for such materials.	This Plan
Identify each hazardous material used at the mine site, by chemical and common names as applicable. Include all Material Safety Data Sheets (MSDS) in Appendix A and ensure these are updated in accordance with all relevant regulations. Identify all locations where copies of the MSDS and this Hazardous Materials Management Plan are available on site.	Waste and Hazardous Materials Management Plan
Describe all training that employees must complete prior to handling hazardous materials, including proper handling techniques, use of personal protective equipment and familiarity with the site layout and emergency stations. • Workplace Hazardous Materials Information System (WHMIS): ▫ Identify the WHMIS training that is available for employees who deal with hazardous materials and the frequency with which the training is updated. • Transport of Dangerous Goods (TDG): ▫ Describe the training available to employees who transport dangerous goods and/or special wastes, and the frequency in which this training is kept up to date. • Personal Protective Equipment: ▫ Provide a description of all personal protective equipment that employees are required to wear when handling hazardous materials.	Section 9.0: Employee Training

Information Requirement	Location in this Plan
Provide a description of how hazardous materials will be segregated on site, where the various types of hazardous materials will be stored, any secondary containment structures that will be in place, how materials will be handled and the disposal methods for each substance.	Waste and Hazardous Materials Management Plan
Provide a description of how the various types of hazardous materials used at the mine site are to be disposed. For each disposal method, identify whether this is done on-site or off-site and the frequency of recycling/disposal. If on-site, identify what equipment is used to recycle or dispose of the hazardous waste material and what testing is performed to verify that proper recycling or disposal has occurred. If off-site, identify how the waste hazardous material is transferred off site, by whom and to where.	Waste and Hazardous Materials Management Plan
Describe the procedures to be used to prevent spills of hazardous materials or special wastes, and the procedures to be followed in the event of a spill. If a separate Spill Response Plan or Emergency Response Plan has been prepared to address these elements, refer to it here.	Heap Leach and Process Facilities Plan Emergency Response Plan Spill Contingency Plan

YWB EMR Plan Requirements Applicable to the Cyanide Management Plan		
Information Requirement	Location in this Plan	Referenced From
Provide designs for processing facilities including flow sheets, sizing, capacities, process controls and containment systems. **Also provide details about how health and safety issues have been addressed, including air quality and air handling.** Describe how spills or releases of process solutions will be contained. Provide details about reagent storage and handling.	Section 7.0: Workers Safety	Heap Leach and Process Facilities Plan
Describe the sediment and erosion control measures that will be implemented to minimize effects to the environment and ensure stabilization of the road. Describe the measures in place to minimize runoff. Describe any design considerations that have been used to ensure peak floods will be managed as well. **Include a description of all dust control measures that will be employed to ensure worker health and safety and minimize effects on the environment.**	Section 7.0: Workers Safety	Cyanide Management Plan

1.0 INTRODUCTION

1.1 Project Summary

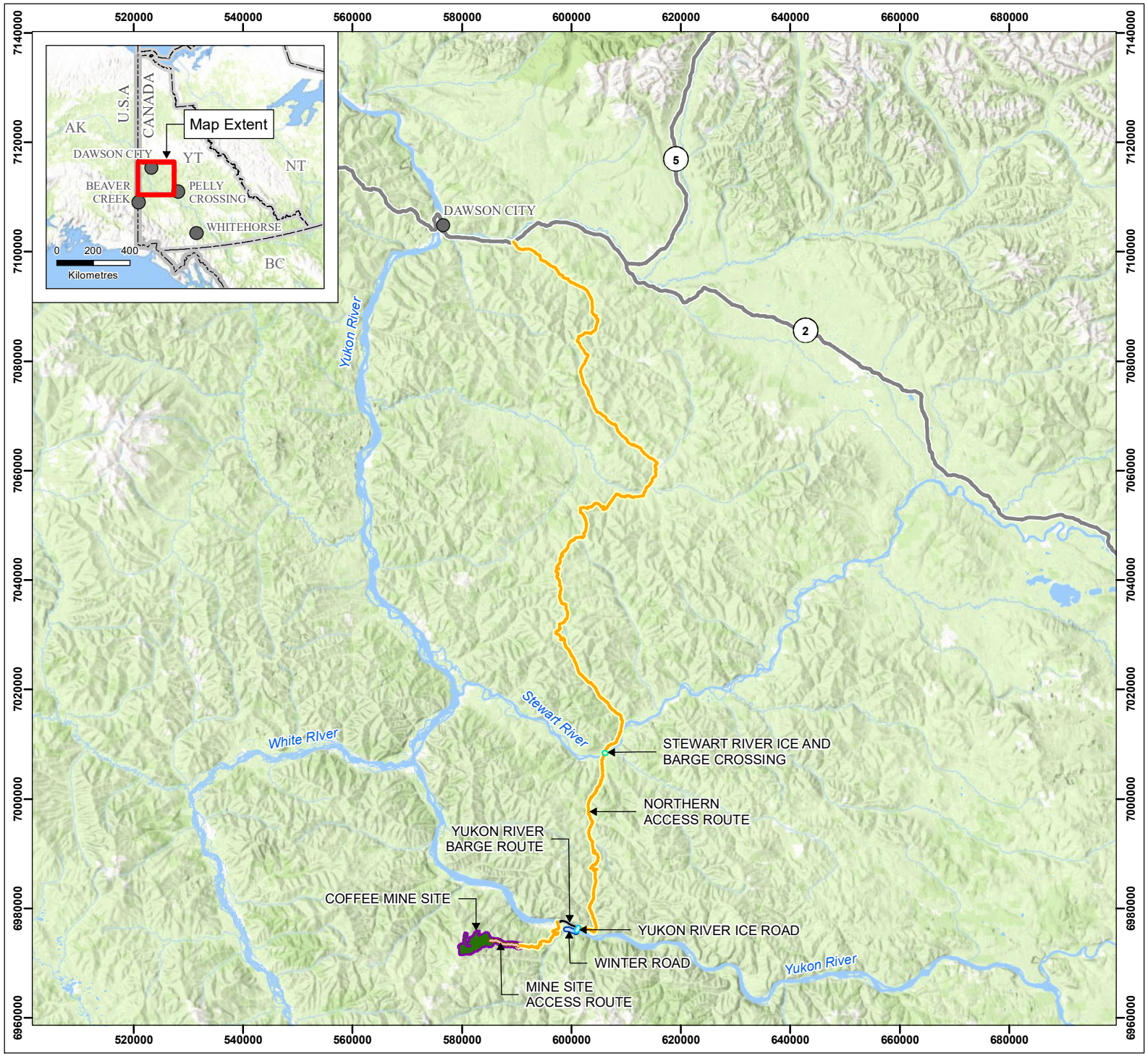
The proposed Coffee Gold Mine (the Project) is an open-pit gold mine owned by Goldcorp Kaminak Ltd., a wholly owned subsidiary of Newmont Corporation (Newmont), located on the south side of the Yukon River in the White Gold District of west-central Yukon. The Project site is approximately 130 km south of the City of Dawson, 140 km west of Pelly Crossing, 95 km north-east of Beaver Creek, and 340 km northwest of Whitehorse. The Project is located wholly within the traditional territory of Tr'ondëk Hwëch'in, partially within the traditional territory of Selkirk First Nation and First Nation of Na-cho Nyäk Dun, and partially within the asserted territory of White River First Nation. The Project contains several gold occurrences within an exploration concession covering an area of more than 600 km^2. The Mine Site will be accessed by road from Dawson via a 16-km stretch of Klondike Highway and 192-km all-season road, referred to as the Northern Access Route (NAR) (Figure 1-1). The NAR includes seasonal barge crossings on both the Stewart and Yukon rivers, with ice bridges and a seasonal winter road in the winter months.

The Project is comprised of four open pits: Supremo, Latte, Double Double, and Kona. Waste rock is proposed to be permanently stored in the Alpha Waste Rock Storage Facility (WRSF) (Figure 1-2). The ore production rate is proposed to be up to approximately 9.0 million tonnes (Mt) per year, producing an estimated total of 67 Mt of heap leach feed over the 10-year Operation Phase. The conceptual-level estimate for waste material to be moved over the life of mine (LOM) is up to approximately 330 Mt based on an average strip ratio of 5.0:1. The ore will be crushed and transported to the Heap Leach Facility (HLF) via overland conveyor or trucks for nine months of the year. During the three coldest months of winter, run-of-mine (ROM) ore will be stockpiled in the ROM stockpile. Gold will be extracted from gold-bearing leach solution by a six tonnes per day (t/d) adsorption, desorption, recovery carbon plant with mercury retorting to produce a final gold doré product. A total of 2.6 million ounces of gold is planned to be recovered over a 10-year mine life.

The Project phases are defined as follows:

- Construction Phase: Q2 Year –3 to end of Year –1 (30 months)
- Operation Phase: Year –1 to end of Year 9 (10 years)
- Reclamation and Closure Phase: Year 10 to end of Year 21, including a 6-year Post-Mining Closure Stage and a 5-year Active Closure Stage (11 years)
- Post-Closure Phase: Year 21 onwards as determined to be required.

These phases broadly describe the activities occurring within a particular time period; however, some activities will continue from one phase to another as mine site development advances with operational activities (e.g., Open Pits, WRSF). When areas that support mine operations are no longer required, they will be progressively reclaimed. The overall Project schedule is the general expected scenario for mine construction and operation; detailed activities are subject to change depending on detailed mine planning and the timing of receipt of authorizations.



COFFEE GOLD MINE

Coffee Project Location and Northern Access Route

Legend

- Stewart River Ice and Barge Crossing
- Yukon River Barge Route
- Yukon River Ice Road
- Winter Road
- Mine Site Access Route
- Northern Access Route
- Project Area
- Project Footprint
- Highway
- Waterbody

Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.
2. Contains information licensed under the Open Government Licence - Yukon Territory
3. Basemap: ESRI World Topographic Map
4. Inset Basemap: ESRI World Topographic Map

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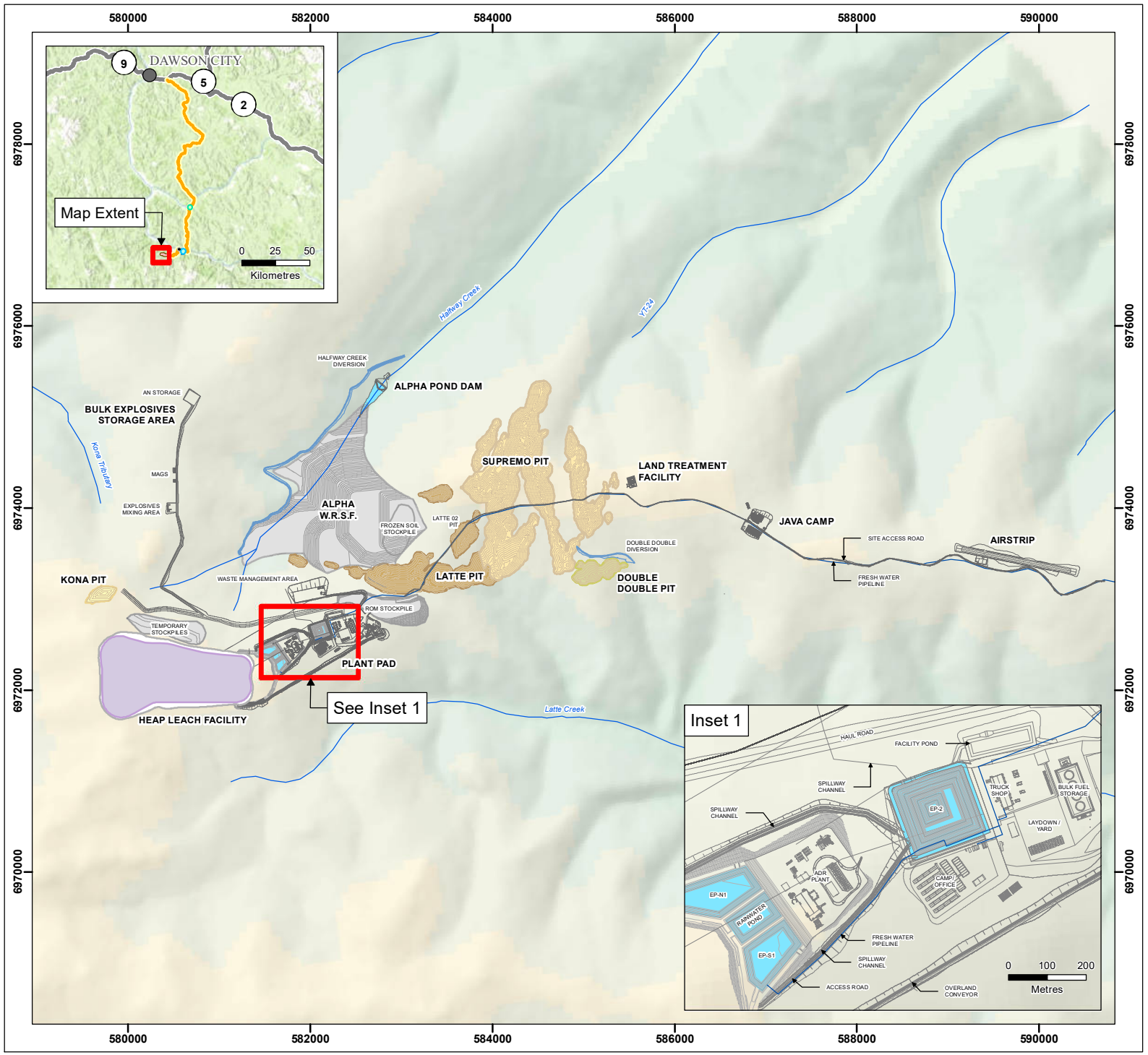
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Figure 1.1	Date: Mar 2, 2023	Drawn by: AS	Reviewed: KP

Newmont COFFEE

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COFFEE GOLD MINE

General Arrangement - Mine Site

Legend

- Double Double Pit
- Kona Pit
- Latte Pit
- Supremo Pit

Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.
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Figure 1.2	Date: Oct 6, 2023	Drawn by: AS	Reviewed: CH

Newmont COFFEE

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1.2 Scope and Objectives

The purpose of the Cyanide Management Plan (the Plan) is to describe the measures Newmont will implement to minimize the risk to the public, employees, contractors, and the environment from the use of cyanide in the recovery of gold from ore. Safety is a top priority for Newmont during the handling, storage, preparation, and use of cyanide throughout all Project phases. This plan focuses on the safe management of cyanide throughout all aspects of the Project's life cycle and includes commitments on the manufacture and transport of cyanide to site, storage on-site, usage in gold extraction, and detoxification of cyanide compounds in processing solutions.

This Plan has been written to meet the guidance provided in the Plan Requirement Guidance for Quartz Mining Projects (YWB and EMR 2013). This Plan is provided in conjunction with several other plans to meet the requirements for quartz mine applications for a Quartz Mining License and a Water Use Licence under the *Quartz Mining Act* and the *Waters Act*, respectively.

Commitments that were made during the YESAB screening process related to the Cyanide Management Plan are incorporated into the plan where possible and are summarized in the Cyanide Management Plan Table of Concordance (Appendix A). The Table of Concordance includes commitments made during the assessment process only, as there were no Decision Document conditions related to cyanide management at the site. This Plan has also been written to address Newmont's commitments as a signatory to the "International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide In the Production of Gold" (Cyanide Code). Other applicable regulations related to cyanide management and monitoring are detailed in Section 2.0.

A diluted alkaline cyanide solution, referred to as the barren solution, will be applied to the Heap Leach Pad (HLP) using drip irrigation. This plan summarizes the use of sodium cyanide (NaCN) in the gold extraction process, including storage, mixing, and processing, and outlines NaCN handling and management in alignment with the Cyanide Code.

Standard operating procedures (SOPs) will be developed for the handling, storage, and use of cyanide, and will be referenced in this plan. This Plan and associated SOPs will be reviewed annually and updated as needed over the life of the Project. Updates may result from:

- Regulatory changes specified in Federal or Territorial Acts or Regulations, including the Metal and Diamond Mining Effluent Regulations (SOR/2002-222)
- Regulatory changes specified in the Quartz Mining Licence or Water Use Licence
- Changes to the International Cyanide Management Code
- Periodic internal and external review of the Plan
- Improved cyanide handling procedures
- Changes to the processing of gold in the HLF
- Change in the company supplying the cyanide or change in the transportation route
- Consultation with government regulators, First Nations, communities and public, leading to requests for inclusions and/or changes to the Plan
- Review of the plan to ensure that the performance of the adsorption, desorption, and recovery (ADR) process plant and heap leach facility practices are accurately reflected.

Updates will be tracked in the Revision Tracking Log.

1.3 Incorporation of Traditional Knowledge and Consultation Feedback

Consultation during preparation of the Project Proposal (2017-0211) placed focus on details around the heap leach pad design and use and transportation of cyanide. This resulted in alleviating priority issues of concern; however, it remains important to ensure that heap leach design and cyanide use and transport are carefully considered, planned for, and managed. Some specific concerns heard during consultation events were:

- Transportation of cyanide on barge crossings
- Heap leach liner system failures
- Worker exposure to cyanide
- Wildlife exposures to cyanide.

Newmont continues to discuss heap leach and cyanide topics in consultation with potentially affected First Nations and communities. Newmont will continue to engage in dialogue with stakeholders by describing cyanide use and management procedures and providing information on the health and environmental effects of cyanide.

As a result of feedback obtained through consultation, Newmont has amended the heap leach pad design from a valley-fill design to a free draining, ridge-top design in response to concerns regarding internal cyanide solution storage within the heap leach pad.

Newmont has also committed to the following additional mitigations:

- Progressive closure and rinsing of the heap leach pad, where practical
- Buried drip emitters
- A double-liner system, including a linear low-density polyethylene liner as well as a geosynthetic clay liner for underneath the heap leach pad, as well as a wick drain system for leak detection
- Performing an electromagnetic scan after placing overliner on top of the heap leach pad liner system to detect leaks as a result of overliner placement.

During initial review of this plan, concerns were head from First Nations regarding cyanide-related incidents that have occurred at Newmont facilities after adoption of the Cyanide Code. The concerns highlighted that reliance on the Cyanide Code alone will not prevent risk to human health or the environment, and that mitigative and preventative actions based on learnings from previous events, including a root cause analysis, should be considered to improve operational processes. Newmont's 2017 and 2021 Sustainability Reports are referenced herein, which describes the investigations and actions that have been carried out following recent cyanide-related incidents, as well as initiatives to eliminate cyanide spill events at Newmont sites.

The details of the construction and operation of the HLF are provided in the Heap Leach and Process Facilities Plan. Details specific to cyanide management are contained within this Cyanide Management Plan. First Nation engagement and consultation is ongoing, and any feedback that is received or concerns that are heard during consultation will be incorporated into this plan, where applicable.

1.4 Synergies with Newmont Standards and Requirements and Other Project Documents

As an important part of Newmont's internal governance process, Newmont has implemented Global Policies and Standards (Global Standards) that are reviewed and preliminarily approved by a Global Policies & Standards Committee. The Global Standards provide the framework and standards for Newmont sustainability management and ensures a consistency of approach for implementing these global policies across the Company.

The Global Standards apply to all directors, officers and employees of Newmont Corporation, its subsidiaries, and any other entities that it controls. A variance request process for existing or future conditions is in place. The process provides an alternative mechanism for those instances where a Newmont site/operation cannot logistically or feasibly conform to a requirement established in a Standard due to special conditions or unique hardships. The Global Standards are intended to be fully integrated into all core business functions, and they emphasize sustainability, responsibility, and accountability at all organizational levels.

The list of Global Standards is provided in Table 1-1.

Table 1-1 Newmont Global Standards

Global Standards	
Air Emissions Management Standard	Land Acquisition and Involuntary Resettlement Standard
Biodiversity Management Standard	Local Procurement and Employment Standard
Closure and Reclamation Management Standard	People Policy
Code of Conduct	Product Stewardship Standard
Community Investment and Development Standard	Social Baseline and Impact Assessment Standard
Cultural Resource and Management Standard	Stakeholder Relationship Management Standard
Drug and Alcohol Policy (Coffee-Specific)	Tailings Storage Facility and Heap Leach Facility Environmental Standard
Hazardous Materials Management Standard	Tailings Storage Facilities Technical and Operations Standard
Health and Safety Policy	Waste Management Standard
Human Resources Standard	Waste Rock and Ore Stockpile Management Standard
Human Rights Standard	Water Management Standard
Indigenous Peoples Standard	

The Tailings Storage Facility & Heap Leach Facility Environmental Management Standard sets the minimum requirements for the management of Tailings Storage Facilities and HLFs to protect human health, wildlife and flora, protect groundwater and/or surface water, prevent uncontrolled releases to the environment, manage process fluids and set requirements for closure and reclamation. The associated guidance document provides examples of minimum expectations to meet the standard. Specifically, the guidance document references adherence to the Cyanide Code where cyanide solutions are present.

During detailed engineering, commissioning, and during construction, the Hazard and Operability Study (HAZOP) process will be used to identify any areas of concern over cyanide transportation, management,

and use, and address potential safety issues that will require mitigation. The outcomes of the HAZOP process will be integrated into future versions of this Plan.

While this Plan can be reviewed in isolation to inform a review of the specific actions for cyanide management, this plan should be viewed in concert with the following additional management plans in order to attain a holistic understanding of the Project:

- Water Management Plan
- Emergency Response Plan
- Waste and Hazardous Materials Management Plan
- Heap Leach and Process Facilities Plan
- General Mine Development Plan
- Mine Operations Plan
- Spill Contingency Plan.

1.5 Roles and Responsibilities of Key Personnel

Newmont has committed to providing the necessary human, material, and financial resources to implement and maintain the Cyanide Management Plan. The Mine General Manager will be responsible for ensuring cyanide management is conducted in accordance with this plan and is in compliance with the Cyanide Code. Key Project personnel responsible for being familiar with the contents of this Plan are shown in Table 1-2.

Table 1-2 Key Project Personnel

Role	Responsibility
Mine General Manager	Overall responsibility for Mine Site management; Compliance with this Plan and Cyanide Code
Operations Manager	Responsible for mine planning and production, mine technical monitoring, and mine regulatory compliance
Process Manager	Cyanide storage and handling
Process Plant Supervisor	Maintain records of inspections and responses to corrective actions
Health and Safety (H&S) Manager	Responsible for conducting regular safety site inspections and implementing the appropriate controls in a timely manner. The H&S Manager shall maintain records of all safety inspections as well as any actions taken because of these inspections throughout the life of the Project. Where safety inspections show the potential for environmental effects, the H&S Manager will work in collaboration with the Environment Department
Cyanide Code Internal auditor	Cyanide Code compliance and reporting
Sustainability and External Relations (SER)	Responsible for recording and addressing any complaints received from nearby land users, or other interested parties regarding cyanide-related impacts off-site. The SER department shall maintain records of all complaints received as well as any actions taken because of these complaints
Environment Manager	Responsible for permitting, environmental monitoring and regulatory compliance

2.0 REGULATORY AND POLICY FRAMEWORK

2.1 Territorial and Federal Acts and Regulations

Sodium cyanide is classified as a hazardous material. Both federal and territorial legislation regulate the management of hazardous materials in Yukon. A number of *Acts*, regulations, and guidelines provide specific requirements for the management of cyanide. These include but are not limited to:

Federal *Acts*:

- Section 36 of the *Fisheries Act* (R.S.C., 1985, c. F-14) and Divisions 1 and 2 of the Metal and Diamond Mining Effluent Regulations (SOR/2002-222)
- *Transportation of Dangerous Goods Act, 1992* (S.C. 1992, c. 34) and Regulations
- *Canadian Environmental Protection Act, 1999 (*S.C. 1999, c. 33) and Regulations.

Yukon *Acts*:

- *Workers' Safety and Compensation Act* (SY 2021, c. 11) and Regulations
- *Dangerous Goods Transportation Act* (RSY 2002, c. 50) and Regulations
- *Environment Act* (RSY 2002, c.76), and Storage Tank Regulations (OIC 1996/194)
- *Quartz Mining Act* (SY 2003 c. 14) and Quartz Mining Land Use Regulation (OIC 2003/64).

The management of cyanide, as outlined in this Plan, will be in accordance with the above, and other applicable Territorial and Federal *Acts* and Regulations, as necessary.

2.2 The Cyanide Code

Newmont Corporation is listed as a signatory to the Cyanide Code and has committed to obtaining certification of the Project under the Cyanide Code, aimed at minimizing risks and preventing harm to the public, workers, visitors, and the environment. As such, Newmont is committed to designing and operating the Project in compliance with the Cyanide Code (International Cyanide Management Institute (ICMI) 2021d). The Cyanide Code is a voluntary certification program for gold and silver mining companies and companies involved in the production and transportation of cyanide used in gold and silver mining. It focuses on the safe management of cyanide and cyanide solutions.

The Cyanide Code objective is to improve management of cyanide by prescribing best practices for the protection of human health and the reduction of environmental impacts. It is intended to be applied in conjunction with an operation's existing regulatory requirements. The Cyanide Code is not meant to replace or contravene the rules, regulations, and laws of the applicable political jurisdiction. The requirements set out in the Cyanide Code are related to various aspects of cyanide handling and use, including accident prevention, training, and public reporting. Mining operations using cyanide are subject to the applicable portions of the Cyanide Code.

The Code consists of two major elements: the Principles and corresponding Standards of Practice. The Principles broadly state commitments to manage cyanide in a responsible manner. The Standards of Practice follow each Principle and identify goals and objectives that must be met to comply with each Principle. The Cyanide Code Principles and Practices for the mining industry are provided in (Table 2-1).

Following these Principles and Standards of Practice will enable the Project to establish the overall cyanide management strategy in advance of initial doré production.

Newmont will adhere to the requirements of the Cyanide Code, including implementing several Project design measures to ensure the safe handling, storage, and use of cyanide at the Mine Site, such as:

- All procedures will be developed and executed in compliance with the Cyanide Code
- Best management processes will be employed in the design, construction, and operation of its cyanide facilities
- Standard Operating Procedures (SOPs) will be developed for the handling, storage, and use of cyanide
- The HLF will be lined with a geosynthetic membrane, and gold processing will be a closed loop system
- All workers involved in storing, handling, and mixing cyanide will be appropriately trained and will wear personal hydrogen cyanide gas monitors and appropriate personal protective equipment (PPE)
- The Mine Site will be inspected by independent third-party auditors for compliance with the criteria established for gold mining by the ICMI, and the auditors will use the Mining Operations Verification Protocol (ICMI 2021d)
- Cyanide levels will be maintained in all open waters below levels that pose a threat.

Table 2-1 International Cyanide Management Code Principles and Standards of Practice

Principle	Standard of Practice	Location
Production and Purchasing	Purchase cyanide from certified manufacturers employing appropriate practices and procedures to limit exposure of their workforce to cyanide and to prevent releases of cyanide to the environment.	Section 3: Production and Transportation
Transportation	Require that cyanide is safely managed through the entire transportation and delivery process from the production facility to the mine by use of certified transport with clear lines of responsibility for safety, security, release prevention, training, and emergency response.	Section 3: Production and Transportation
Handling and Storage	Design and construct unloading, storage and mixing facilities consistent with sound, accepted engineering practices and quality control and quality assurance procedures, spill prevention and spill containment measures.	Section 4: Handling and Storage Section 5: Operational Process Controls Section 5.1: Mixing Facilities Section 5.2: Process Plant
Operations	Operate unloading, storage and mixing facilities using inspections, preventive maintenance, and contingency plans to prevent or contain releases and control and respond to worker exposures.	Section 4: Handling and Storage
	Implement management and operating systems designed to protect human health and the environment including contingency planning and inspection and preventive maintenance procedures.	Section 5: Operational Process Controls
	Introduce management and operating systems to minimize cyanide use, thereby limiting concentrations of cyanide in mill tailings.	Section 5.2: Process Plant
	Implement a comprehensive water management program to protect against unintentional releases.	Section 5: Operational Process Controls
	Implement measures to protect birds, other wildlife, and livestock from adverse effects of cyanide process solutions.	Section 5: Operational Process Controls
	Implement measures to protect fish and wildlife from direct and indirect discharges of cyanide process solutions to surface water.	Section 5: Operational Process Controls Section 11: Cyanide Monitoring Surface Water Quality Monitoring Plan
	Implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of ground water	Section 5: Operational Process Controls Section 11: Cyanide Monitoring Groundwater Monitoring Plan Water Management Plan
	Provide spill prevention or containment measures for process tanks and pipelines.	Section 4: Handling and Storage Section 5.2: Process Plant
	Implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.	Section 5: Operational Process Controls
	Implement monitoring programs to evaluate the effects of cyanide use on wildlife, and surface and groundwater quality.	Section 11: Cyanide Monitoring

Principle	Standard of Practice	Location
Decommissioning	Plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife, livestock, and the environment.	Section 6: Cyanide Facility Decommissioning
	Establish a financial assurance mechanism capable of fully funding cyanide-related decommissioning activities.	Reclamation and Closure Plan
Worker Safety	Identify potential cyanide exposure scenarios and take measures as necessary to eliminate, reduce and control them.	Section 7: Worker Safety
	Operate and monitor cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures	Section 5.1: Mixing Facilities Section 5.2: Process Plant Section 7: Worker Safety
	Develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.	Section 7: Worker Safety Section 8.2: Spill Response Emergency Response Plan
Emergency Response	Prepare detailed emergency response plans for potential cyanide releases.	Section 8.2: Spill Response Emergency Response Plan
	Involve site personnel and stakeholders in the planning process.	Section 8.2: Spill Response Emergency Response Plan
	Designate appropriate personnel and commit necessary equipment and resources for emergency response.	Emergency Response Plan
	Develop procedures for internal and external emergency notification and reporting.	Section 8.2: Spill Response Emergency Response Plan
	Incorporate remediation measures and monitoring elements into response plans and account for the additional hazards of using cyanide treatment chemicals.	Section 8.2: Spill Response
	Periodically evaluate response procedures and capabilities and revise them as needed	Section 9: Employee Training Emergency Response Plan
Training	Train workers to understand the hazards associated with cyanide use.	Section 9: Employee Training
	Train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community, and the environment.	Section 9: Employee Training
	Train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.	Section 9: Employee Training Emergency Response Plan
Dialogue and Disclosure	Promote dialogue with stakeholders regarding cyanide management and responsibly address identified concerns.	Section 10: Dialogue and Disclosure
	Make appropriate operational and environmental information regarding cyanide available to stakeholders	Section 10: Dialogue and Disclosure

From ICMI 2021d

2.2.1 Cyanide Code Audits

The Cyanide Code requires independent third-party audits by professional auditors and technical experts for initial certification then recertification audits to verify that operations meet the Standards of Practice. Cyanide audits will be conducted during detailed engineering and years –2 and –1 of the Project, as outlined in the Guidance for Use of the Mining Operations Verification Protocol document (ICMI 2021a), which requests that the Project's operation's plans, proposed operating procedures, and systems be reviewed for conformance with the Cyanide Code's Principles and Standards of Practice. The pre-operational audits will determine if the Project's plans, procedures, and management systems, when implemented, may reasonably be expected to meet the performance goals of the Cyanide Code's Standards of Practice.

Upon Project start-up, the mine will be subject to an on-site cyanide audit to confirm that the operation has been constructed and is being operated in compliance with the Cyanide Code. This on-site audit will be conducted within one year of the mine's first receipt of cyanide at site, and it will address each of the Code's Standards of Practice (ICMI 2021c). The audit will document compliance with the Cyanide Code.

During the Operation and Closure and Reclamation Phases, the Mining Operations Verification Protocol (ICMI 2021b) will be used, and audits will be performed on a three-year cycle to confirm continuous compliance with the Code. A Detailed Audit Findings Report and a Summary Audit Report will be submitted by the auditor to the ICMI for official Code certification. Outcomes of the third-party audits will be shared with First Nations upon finalization of the Detailed Audit Findings Report, as well as actions for addressing any deficiencies that may have been identified through the audit.

3.0 PRODUCTION AND TRANSPORTATION

Newmont will select a North American producer to provide management of the entire supply chain for cyanide production and transport. In addition to supplying the cyanide required by the Project, the producer will assume responsibility for the transport of the NaCN to the mine site. The transporter will also assume responsibility for the return of the empty containers to the supplier's operations. The exact transport route from the cyanide supplier to the NAR will be determined once the supplier has been chosen.

The selected cyanide producer will be a signatory to the Cyanide Code and must supply Newmont with documentation showing how its manufacturing process, H&S protocols, and environmental practices meet the principles and standards of the Cyanide Code. As a signatory, the producer will adhere to the Cyanide Code and complementary protocols in its operations, including commitments to worker safety, workplace monitoring, training, transport, and emergency response. A third-party auditor from the IMCI List of Approved Auditors will conduct certification assessments of the producer to verify Newmont will meet the principles and standards of the Cyanide Code.

Sodium cyanide (NaCN) will be produced as dry briquettes (Photo 3-1) and transported in 20 tonne airtight ISO containers complete with trailer (Photo 3-2), or in one tonne bags/boxes that are lined and sealed to prevent the ingress of moisture. The boxes will be transported in containers that will provide additional protection of the product during transport and storage. The trucks delivering and returning with ISO containers or boxes will be placarded as specified in the *Transportation of Dangerous Goods Act,* and associated Regulations. The ISO containers are designed to meet the T13 portable container classification requirements which include 6 bar minimum test pressure, 6mm shell thickness, normal pressure relief, and no bottom outlets. ISO tank containers do not allow water to enter into the container when subjected to rain,

washing, etc. The ISO containers and/or boxes will be stored in the designated cyanide laydown area near the process plant. Drivers who are transporting cyanide must hold a training certificate and carry an Emergency Response Assistance Plan, in accordance with the Regulations.



Photo 3-1 Example of Sodium Cyanide Briquettes



Photo 3-2 Example of an ISO Container holding Sodium Cyanide Briquettes

Newmont will require that the producer and its transportation department comply with and commit to the following:

- Certification in compliance under the Cyanide Code
- Inspect the truck and trailer prior to each departure/shipment
- Carry out regular preventive maintenance on the truck and trailer
- Employ drivers who are trained, qualified, and licensed to operate the transport truck
- Train drivers in emergency response for incidents that could occur during transport (e.g., a traffic accident)
- Set limits on driver's hours
- Transport the NaCN briquettes in containers used exclusively for that purpose. The ISO containers will be robust enough to withstand transport incidents to minimize the risk of spills
- Equip all trucks with satellite phones and Global Positioning System (GPS) tracking
- Develop contingency measures for the suspension of transport if conditions such as severe weather occur
- Carry emergency winter supplies including chains, which can be installed on the wheels should road conditions or weather dictate
- Prepare and submit a trip report to their headquarters and Newmont highlighting transportation hazards and/or unsafe road or driving conditions
- Maintain clear lines of responsibility for safety, security, release prevention, training and emergency response
- Maintain a record of all the above activities.

A written Emergency Response Assistance Plan will be developed by the producer/transporter. The Emergency Response Assistance Plan will outline strategies in the event of an emergency and is to include procedures and current contact information for notifying the transporter's home base, the Mine Site, regulatory agencies, medical facilities and potentially affected communities. The truck will carry H&S equipment, and spill response supplies to be used in the event of an accident or loss of product. Safety is a paramount issue, and the driver will have training in responding to spills while wearing appropriate PPE. The Emergency Response Assistance Plan will be provided to Newmont and will be reviewed by the H&S and Environment departments. The transporter's Emergency Response Assistance Plan will also be provided to the mine's Emergency Response Team (ERT) for their use, should they need to respond to an incident involving a truck carrying cyanide.

All Newmont employees and contractors using the NAR must be equipped with a radio set to the access road frequency. Line-of-sight radio communication will provide communications between vehicles within close proximity to each other. Employees and contractors will be required to carry a mobile satellite phone or other means of communicating with their home base, and will advise mine personnel of road conditions, including notifying emergency response personnel. In the event of an incident on the NAR (e.g., an accident, hazard, or presence of wildlife), employees and contractors will notify security or the Environment Department.

Cyanide trucks parked at the river crossings will be manned at all times. Where cyanide trucks are going to be delayed for long periods of time prior to crossing the rivers, the truck operator or another employee

will remain with the truck at all times. The barge will only carry the cyanide truck. No other items will be transported at the same time.

During transport over the ice bridge in the winter, the mine will utilize an ice engineer to provide regular updates on the ice bridges' load capacities to confirm the ice crossings have the required capacity for cyanide trucks to cross. The ice engineer will provide load chats for each crossing depending on the ice quantity and quality. The Site Services Supervisor will be responsible for assessing if the crossing is safe for travel and will have control over the cyanide trucks on the river crossings, including loading and unloading.

Upon arrival at the Mine Site, the truck carrying the NaCN ISO container or the NaCN boxes will proceed to the cyanide laydown area where the ISO container or the boxes will be offloaded. Custody of the NaCN will pass to Newmont at the cyanide laydown area (Figure 4-1). Chains of custody records will be completed to provide clear lines of responsibility for transportation of cyanide from the producer to the mine, including security, release prevention, training and emergency response.

All cyanide brought on-site will be recorded in an Inventory Register to confirm all containers were safely delivered and are accounted for. Material Safety Data Sheets (MSDS; Appendix B) for solid NaCN, solution NaCN, and hydrogen cyanide gas (HCN) will also be included in the Inventory Register. The purpose of the Inventory Register is to facilitate efficient audit functions, as well as conform to good practices for environmental and safety management.

If a transportation incident were to occur, the driver will contact their home office and the mine, even if NaCN was not spilled. The information to be provided includes the name of the driver, location and nature of the accident, proximity to surface water, the nature of any injuries, amount of material released, if any, weather conditions, and proximity to a populated area. In the event of a spill, the driver will follow proper spill response procedures, and the mine Environment Manager (or delegate) will report the spill to the 24-hour Yukon Spill Report Center line (envprot@gov.yk.ca) at:

867-667-7244

4.0 HANDLING AND STORAGE

Facilities for unloading, storing, and mixing cyanide have been designed and constructed in accordance with applicable regulations and guidelines. Precautions will be in place for the handling, mixing and storage of cyanide to minimize the chance of releases to surface water and/or human exposure, and contingencies are in place in the event of such occurrence. The Project will establish and maintain cyanide management and operating systems designed to protect the work force and surrounding environment. SOPs will be developed for the handling, storage, and use of NaCN in order to prevent cyanide releases in the workplace or to the environment, prevent exposure of workers and contractors, and minimize any impacts to the extent possible. These SOPs will be provided as Appendices in further revisions to this Plan, and they will cover:

- Operation and Maintenance of hoses, valves, and couplings
- Handling cyanide containers, including stacking
- Cleanup of cyanide spills that occur during mixing and transfer of cyanide from tanker trucks ISO containers or boxes

- Safe unloading and manual mixing of cyanide
- Addition of colourant dye to cyanide
- Safe cyanide solution sampling.

Current commitments for the safe storage, handling, and use of cyanide at the Project are detailed below. Details on the management of the gold bearing and barren solutions, heap leach pad and event ponds are provided in the Heap Leach and Process Facilities Plan.

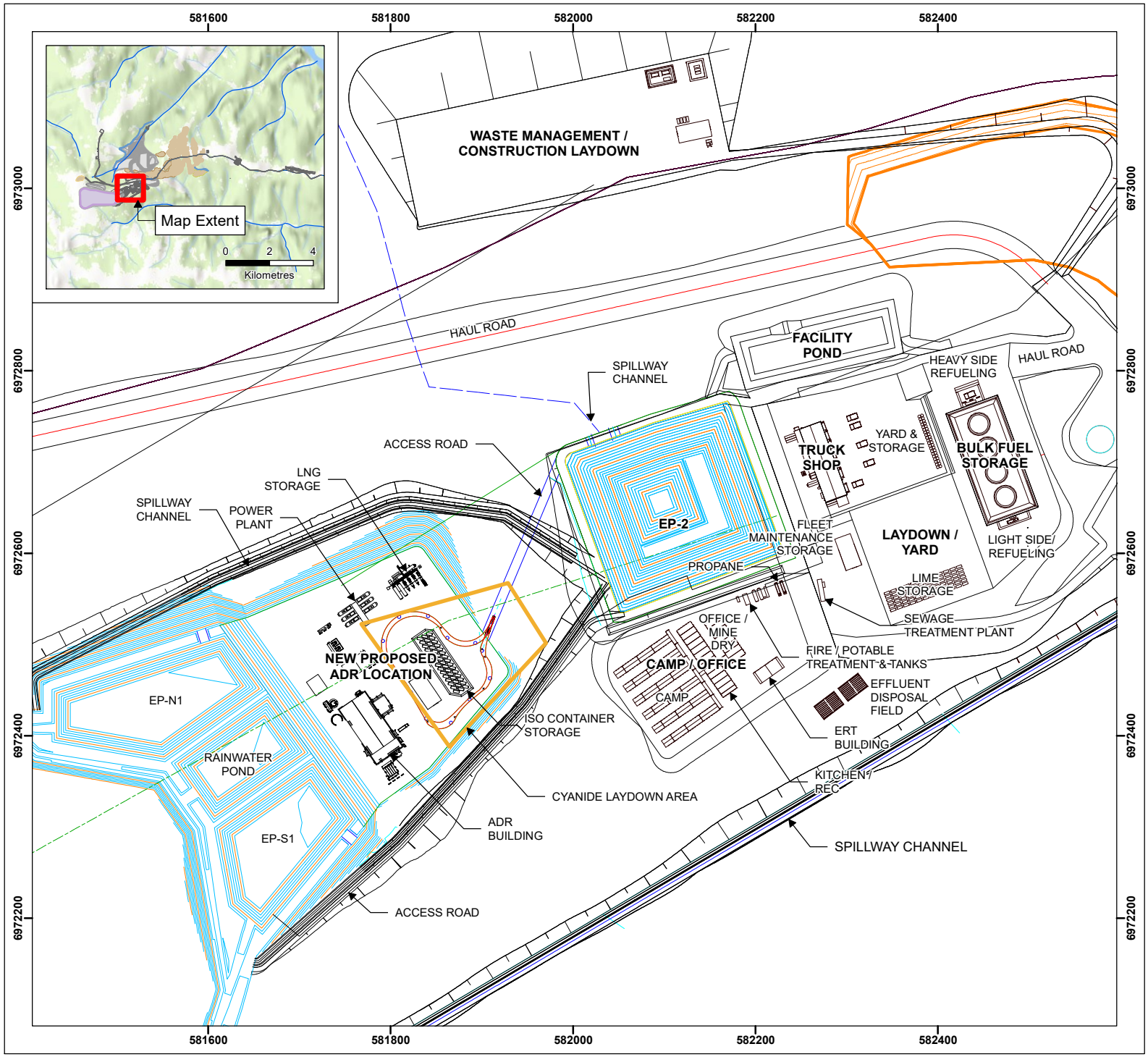
The ISO containers carrying the NaCN briquettes will be delivered and stored on tandem axle trailers in a designated cyanide laydown area near the process plant (Figure 4-1). The ISO containers are attached to their own dedicated trailer, and they will not be removed from the trailers. When cyanide is required for use in the Process Plant, the trailers will be moved from the storage area to the cyanide unloading station in the plant building using a tandem axle truck. In the case of one tonne NaCN boxes, the boxes will be removed from the container and stored in a dedicated cyanide box storage warehouse within the cyanide laydown area. The NaCN boxes will remain stored in the warehouse until required for use in the Process Plant.

Empty ISO containers will be stored in the cyanide laydown area and then returned to their point of origin for reuse. Cyanide residue will be cleaned from the outside of the container and all hose connections and couplings will be secured prior to returning to the vendor. Empty ISO containers or other containers that previously held cyanide will not be used for any other purpose than holding cyanide and will be clearly indicated with placards and labels.

The ISO containers will be inspected weekly for safety, environmental, and maintenance compliance. The inspections will also focus on the integrity of the stored ISO containers and general condition of the laydown area. If deficiencies are found, follow-up corrective actions will be initiated and tracked. Records of the inspections and responses to corrective actions will be retained by mine management.

The unloading/mixing station, cyanide mixing tanks, and cyanide storage tanks are situated on concrete, and the area is designed and constructed to contain, recover, and allow remediation of leakage during the unloading process. In the case that the cyanide process tanks do not have secondary containment, any contaminated soil will be remediated for the prevention of adverse environmental impacts in accordance with applicable SOPs.

Cyanide will be stored on site in the cyanide laydown area during the shoulder season when there is no NAR access. The quantity of cyanide storage estimated during the peak year of production is approximately 80 tons of cyanide. During the peak years, approximately 8-10 loads of cyanide are expected to be delivered to the site per month.



COFFEE GOLD MINE

Plant Site General Arrangement

Legend

Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.
2. Inset Basemap: ESRI World Topographic Map

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Figure 4.1	Date: Nov 7, 2023	Drawn by: AS	Reviewed: KP

Newmont COFFEE

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5.0 OPERATIONAL PROCESS CONTROLS

Newmont will develop and maintain SOPs for the safe operation of cyanide management facilities at the Mine Site, including contingency planning, inspection and preventative maintenance. The cyanide management facilities at the Mine Site include the following:

- ISO container unloading and storage in the cyanide laydown area
- Warehouse for cyanide box storage in the cyanide laydown area
- Cyanide mixing and holding tank located in the barren solution tank containment area
- Process plant as shown in Figure 5-1 including the six carbon elution columns, strip solution tank, dilute acid tank, acid wash vessel, carbon attrition tank, regenerated carbon holdings, and carbon fine filters
- Gold bearing and barren solution tanks
- Gold bearing and barren solution pipelines to and from the HLF
- The HLF
- Event ponds
- Other ancillary facilities in contact with NaCN briquettes or other cyanide products.

In accordance with the Cyanide Code (ICMI 2021b), the SOPs that will be developed for cyanide operation processes will include procedures for process plants, heap leach operations, as well as cyanide treatment, regeneration and disposal systems. Cyanide facility management details are provided in the Heap Leach and Process Facilities Plan. The SOPs will be developed based on the design parameters of the cyanide facilities and will outline spill preventative and/or control measures that align with applicable requirements. The SOPs will outline safe and environmentally sound cyanide management practices including measures that meet Cyanide Code compliance, such as water management, inspections, and preventative maintenance activities. Any proposed changes to operating practices and facilities will be subject to review, in accordance with applicable SOPs, for the continued protection of human health and the environment (ICMI 2021b). Annual review of this plan and associated SOPs will be carried out, and updates to this plan and/or SOPs will be shared with regulatory agencies as well as with First Nations.

In accordance with the Cyanide Code (ICMI 2021b), procedures for upset conditions that may arise during operations will follow SOPs that will be developed for non-standard operating situations, including:

- Water balance upset, presenting a risk of holding capacity exceedance
- Concerns identified during facility inspections
- Temporary closure or work cessation.

Process facilities will be subject to routine, frequent and documented inspections for the safe management of cyanide to ensure that the facilities are operating within design parameters, as well as to confirm structural integrity of specific components. Onsite items that will be subject to inspection include:

- Cyanide solution holding tanks
- Secondary containments
- Cyanide bag system (including when not in use)
- Leak detection and collection systems
- Pipelines, pumps, and valves
- Ponds and impoundments.

In accordance with the Cyanide Code (ICMI 2021b), quality assurance and quality control programs will be implemented during construction and substantial modification of the facilities. The quality assurance and quality control programs will examine the suitability of materials and adequacy of soil compaction for earthworks for the construction of cyanide storage and process tanks. Cyanide facility construction engineering details will be reviewed by a qualified professional and documentation will be provided to confirm that the facility has been built as proposed and has been approved. Quality assurance and quality control records for cyanide facilities will be retained.

Preventative maintenance programs will be implemented, and activities will be documented for safe cyanide management (e.g., the cyanide bag system will be tested at least twice per year if the system has not been in use). A back-up power supply will be provided for key equipment to prevent unintentional releases and exposures should the main power supply be interrupted. In addition, SOPs will be developed to describe the process for the deployment and removal of raincoats over the HLF should this be required. The SOP will provide cautions and measures to reduce the potential risks of cyanide distribution system damage during raincoat placement and removal.

During design of the event ponds and impoundments, water balance calculations were carried out to ensure adequate freeboard above the maximum design storage capacity. Inspections and monitoring activities will be carried out to prevent overtopping of event ponds and impoundments as well as unplanned discharge of cyanide solutions. Precipitation will be measured and used to optimize operating practices, as necessary. Water balance models have been developed in accordance with the Cyanide Code for the operational processes at the Mine Site, which include the following considerations:

- The solution application rates
- Storm event analyses
- Representative precipitation and evaporation data, including data for runoff entering the ponds, infiltration rates, and freeze-thaw evaluations
- Solution losses in addition to evaporation
- The effects of potential power outages or equipment failures on drain down or emergency removal of water
- The capacity and availability of cyanide treatment, destruction, or regeneration systems
- Other aspects of facility design that can affect water balance.

Newmont's commitment to the Cyanide Code requires implementing measures to protect birds and other wildlife from adverse effects of cyanide process solutions. Open water in locations outside of the HLF will be <50 mg/l weak acid dissociable (WAD) cyanide or lower as determined by legal compliance criteria and/or effluent standards. Where concentrations are likely to exceed 50mg/L (i.e., the HLF event ponds), measures will be implemented to restrict access to wildlife (fences and gates) and/or deter wildlife (water surface features).

Routine monitoring and inspections will be conducted to confirm that maintaining a WAD cyanide concentration of <50 mg/l in open water outside of the HLF is effective in preventing significant wildlife mortality. The water management strategy for the protection of water beneath and/or immediately downgradient of the site is described in the Water Management Plan.

The application of heap leach solution will be carried out in a manner that avoids ponding on the heap surface and limits overspray of solution on the heap leach pad liner. Additional information on the heap leach application process is provided in the Heap Leach and Process Facilities Plan.

5.1 Mixing Facilities

The NaCN mixing area will include the mixing tank, holding tank and ISO container. The location of the storage tank and mix tank in the process plant are show on Figure 5-1. Water and NaOH needed to make the desired concentrate of NaCN solution will be added to the cyanide holding tank. Controls/SOPs will be installed to ensure water pH is adequate in the mixing area before adding the cyanide. If required, the water will be heated to aid in dissolving the NaCN briquettes.

For the process of NaCN mixing directly from the ISO container, the ISO container will be connected to the closed-loop piping between the ISO container and the mixing tank, and the mixing/cyanide transfer process will begin. The solution will be pumped into the ISO container, mixed with the briquettes, and pumped back to the cyanide storage tank. The solution will circulate until all the briquettes have been dissolved. The process takes between 1.5 to 4 hours depending on the temperature of the briquettes and the desired concentration. NaOH will be added to the solution to maintain a pH above 12 to prevent the formation of HCN gas. At no time will employees need to physically handle the solid NaCN when this mixing process is employed.

NaCN mixing from one tonne bags/boxes will follow applicable SOPs that will be developed for the Project and will be carried out in accordance with H&S protocols. The process plant will be equipped with appropriate facilities for lifting and positioning the NaCN bags from the boxes to the mixing tank for addition to the mixing process, as well as bag cutting and rinsing devices. The bag will be emptied into the mixing tank, and NaOH will be added to the solution to maintain a pH above 12 to prevent the formation of HCN gas. Empty bags/boxes will be triple rinsed, with the rinse water reporting directly to the mixing tank and crushed prior to being transported to the incinerator for disposal.

The operation will be conducted by a team of two employees who will be equipped with appropriate PPE, including personal HCN gas monitors to confirm that employees are not exposed to HCN gas in excess of 10 ppm and in excess of 4.7 ppm continuously over an 8-hour period. The mixing area will be well ventilated and will also have a stationary audible and visual HCN gas monitor set to alarm at 10 ppm, as well as a video monitoring system that will be connected to the process plant control room.

The cyanide mixing area will have secondary containment greater than 110% of the largest tank plus any flow back from piping. The secondary containment will be sealed and sloped to drain to a sump. Visual inspections of the process plant and cyanide tanks for signs of corrosion and leakage will be performed weekly.

Level sensors will be installed on the cyanide mixing and holding tank to prevent overfilling of the tanks. The levels will be monitored in the control room and an alarm will sound if the level is too high in the control room as well as locally at the tanks. The storage tank will also have overflow and tank level indicators monitored in the control room and will be set to produce an alarm should the solution level become too high. The overflow prevention system will be tested and maintained on a routine basis.

Cyanide antidote and other first aid equipment will be located at the mixing area. A carmoisine dye, which is non-hazardous, will be added to the storage tank to give the solution a highly visible red colour. From the storage tank, the NaCN solution will be distributed to the barren solution pump discharge end, carbon columns and elution circuits within a cyanide reagent solution loop. A back-up power supply will be provided for key equipment related to the cyanide make-up and cyanide addition.

5.2 Process Plant

The diluted solution of alkaline cyanide will be applied from the holding tank to the stacked ore on the heap leach pad using drip irrigation. As the barren solution percolates through the heap leach, gold will react with the cyanide and dissolve into the solution. To ensure the cyanide remains in barren solution and to prevent the formation of HCN gas, NaOH is also added to maintain a pH above 12.

Barren solution will be applied to the heap using drip emitters, which will be buried in winter. The solution will be pumped at a nominal rate of 1,100 cubic metres per hour (m^3/hr) (design capacity of 1,400 m^3/hr) from the process plant via buried, double-contained pipes. The solution application rate will be evaluated and adjusted to optimize cyanide usage. The pipeline will be constructed of materials compatible with cyanide and high pH conditions. Cyanide will be used in the carbon strip circuit at a concentration of 0.1%.

Gold extraction via carbon adsorption is based on the principle that gold is not water soluble. During the heap leach process, oxygen and cyanide dissolve and stabilize the gold in solution. This gold-bearing solution will be collected into the buried piping network at the base of the heap leach pad above the liner system and will flow for approximately 1 km from the northern and southern sides of the HLF to the process plant by gravity for gold recovery or, in the case of an upset, the event ponds. The gold bearing solution piping network includes buried, double-contained HDPE carrier pipes. The gold bearing solution will be transported to the process facility where it will be processed via conventional gold recovery methods at an on-site adsorption, desorption, and recovery (ADR) carbon plant. Figure 5-1shows the layout of the process plant. Additional details on the process plant are provided in the Heap Leach and Process Facilities Plan.

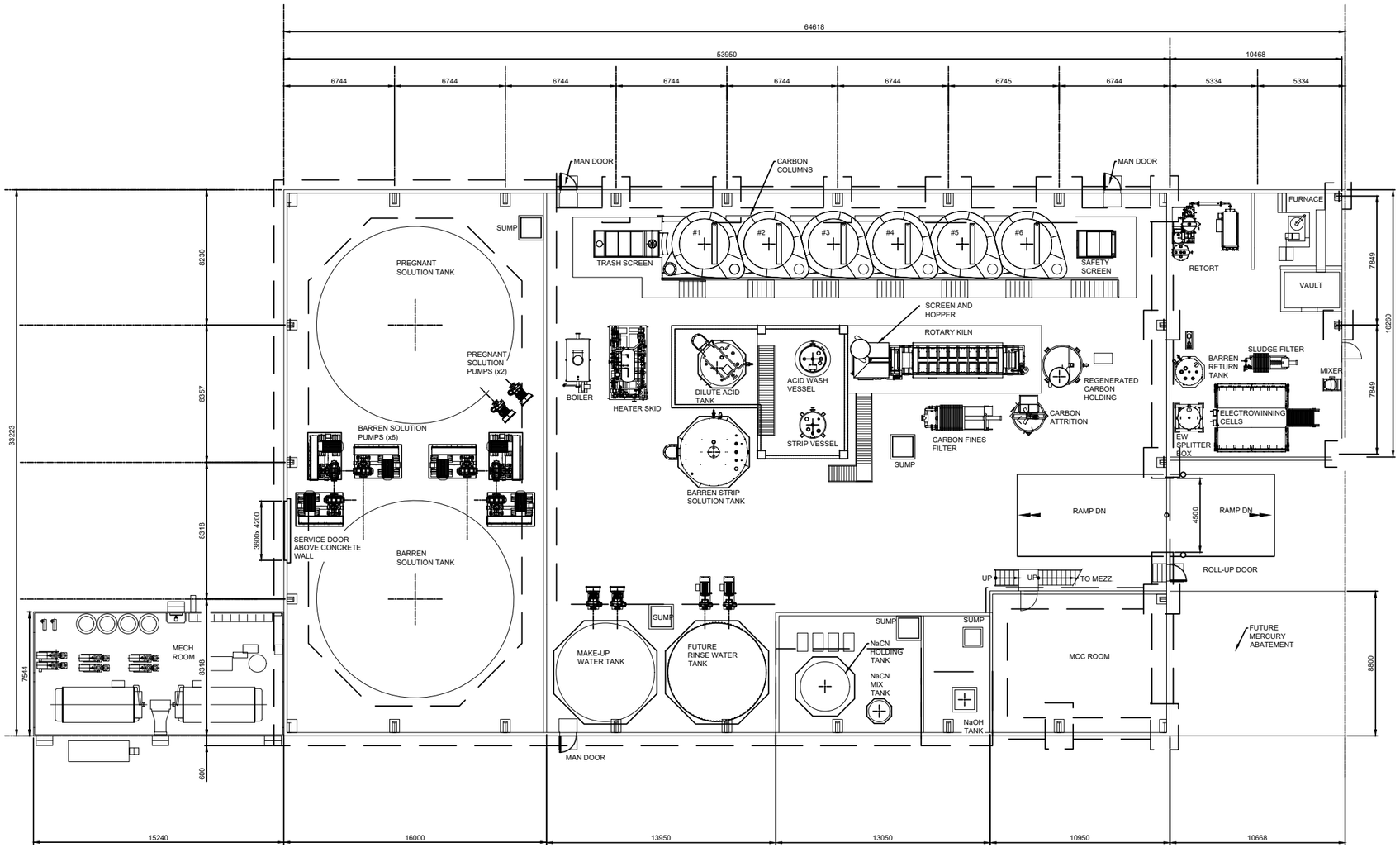
The containment pipes will have leak detection and provide secondary containment to the carrier pipes. The detection of cyanide solution in a containment pipe would indicate a leak in a carrier pipe. The cyanide solution would then be directed to the event ponds, drain back to the process plant, or be redirected into the rinse pipeline. The use of liners and containment pipes minimizes the risk of unintentional releases of cyanide solutions or contact water as much as possible. In cases where cyanide carrier pipes present a risk to the surface water, these areas will be evaluated for special protection needs.

The process plant and cyanide mixing area will be curbed and include sumps for recovering spilled reagents. The process plant will be concrete pad on grade with concrete walls around all tanks containing cyanide and other reagents. The containment will accommodate 110% of the largest tank volume. There will also be additional containment around the acid wash, strip, and reagent mixing areas. Tank and column loads will be supported on pads and pedestals. The plant will be roofed, with adequate ventilation to prevent the build-up of HCN gas, and equipped with an overhead crane for equipment maintenance, as well as dust control and fume extraction systems.

Public access will be prohibited in the cyanide storage areas. The cyanide will be stored separately from incompatible materials, and will not come into contact, food, animal feed, or tobacco products. All cyanide containing tanks, and piping will be clearly labeled indicating their contents, as well as the direction of flow

on the carrier pipes. Any cyanide solution or cyanide-contaminated water that is collected in a secondary containment area will be handled according to the applicable SOPs to prevent discharge to the environment.

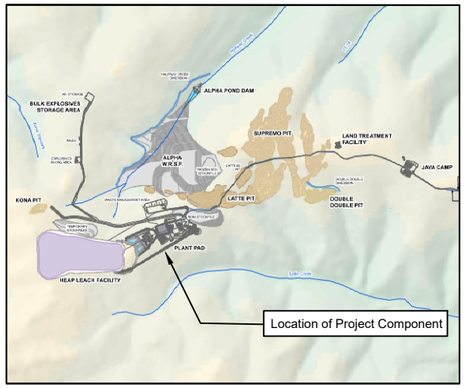
All tanks, piping, valves, and secondary containment structures will be subject to regular documented inspections. Standard operating procedures for preventive maintenance will be developed for all aspects of the process plant, as well as contingency plans to prevent or contain releases. Tanks and pipeline inspections will center on signs of corrosion or leakage, and legibility of labels, colour-coding or other markings indicating pipeline contents and direction of flow. Secondary containment and associated piping will be inspected for signs of cracks or leakage, and presence of fluids. If deficiencies are found or the presence of fluids noted, follow-up corrective actions will be initiated and tracked. Records of the inspections, including specific items observed, name of inspector, observed deficiencies, and corrective actions will be retained.



PLAN
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COFFEE GOLD MINE

Process Plant Layout



Legend

Notes

1. This figure is not intended to be a stand-alone document, but a visual aid to the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations descriped therein.
2. This is a re-creation of JDS drawing number 15VA0067-100-1400-005, project number 15VA0067.

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Page Size: 11" x 17"

Figure 5.1	Date: Nov 7, 2023	Drawn by: AS	Reviewed: KP

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6.0 CYANIDE FACILITY DECOMMISSIONING

Cyanide facilities will be decommissioned during mine reclamation and closure following SOPs that will be developed for cyanide facility decommissioning, which will be revised as needed during operations. Facility decommissioning will occur during the Active Closure Phase (Year 16 to 21) and will include dismantling the process plant and reagent storage area once HLF recirculation for rinsing and final gold recovery are complete. Facility decommissioning details are provided in Section 7.5 of the Reclamation and Closure Plan.

7.0 WORKER SAFETY

Cyanide related tasks, including unloading, mixing, plant operations, confined space entry, and equipment decontamination, will be carried out following SOPs that will be developed by qualified professionals specific for these tasks. Newmont will design its facilities and develop SOPs that strictly limit worker exposure to HCN gas and NaCN. Workers will be required to comply with all applicable precautions and handling procedures for cyanide products and will be expected to report any concerns to their supervisors, the H&S Committee, or senior management. Suggestions by the work force for improvements will be reviewed and incorporated into SOPs as appropriate.

Newmont will provide PPE to its employees, and contractors will be required to supply PPE to their on-site employees. At a minimum, all employees and contractors will be required to wear a hard hat, reflective vest or markings, safety glasses, and steel toed boots when on-site, with the exception of the offices, dining, room and accommodation complex as outlined in the SOPs. Depending on the work location, protective gloves, hearing protection, and coveralls may also be required.

These represent the basic starting point in supplying workers with the protective gear required for work on the Project site. Pre-work inspections will be carried out as necessary and as outlined in the SOPs. Open lines of communication for employee feedback regarding safe cyanide handling procedures will be established, and H&S procedures related to cyanide management will be reviewed and updated accordingly. Inspections will be carried out following any cyanide exposure occurrences to determine the efficacy of Newmont's H&S SOPs and to revise them, if necessary.

Employees involved in the storage, handling and mixing of cyanide should be equipped with, and wear PPE specific to cyanide management as follows:

- **Eyes**: Impact resistant chemical protective goggles, face-shield with brow
- **Skin**: Natural Rubber, Nitrile, Polychrolorprene with natural latex rubber, PVC. Wear chemical protective suit
- **Respiration**:
  - A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2
  - A HCN gas detector equipped with short-term exposure limits as well as time weighted average alarm sensors.

Warning signs will be placed in cyanide mixing areas indicating the presence of cyanide, as well as all required PPE. The signs will also indicate the area as designated no smoking, no open flames, no drinking and no eating areas. MSDS sheets, eyewash stations, emergency showers, cyanide antidote kits, non-acidic dry fire extinguishers, a resuscitator, and oxygen will be located in the cyanide mixing area as well as strategic locations throughout the mine. These safety facilities will be clearly marked with signs and will be inspected and tested on a regular basis. Communication devices, such as radios, telephones or alarm systems will also be readily available. Labels with clearly visible symbols will be placed on cyanide distribution piping for easy recognition of the cyanide pipelines, including temporary and replacement cyanide pipelines. Labels will follow cyanide pipeline SOPs.

The mixing area, in most instances, will require two workers who will wear the appropriate PPE and carry portable HCN gas monitors that will sound an alarm at 10 ppm. If any alarms are triggered, all workers will immediately evacuate the cyanide mixing area and process plant. The alarm will sound in the mixing area and process plant. The source of the HCN gas detection will be indicated on a screen in the process plant control room. Video surveillance will confirm that all workers have left the area. If the alarm sounds in the process plant, the building will be evacuated, including the control room, and personnel will report to the muster station. HCN monitoring equipment will be tested, calibrated, and maintained as directed by the manufacturer, and records of inspections will be retained for a minimum of three years.

Example MSDSs for solid NaCN, solution NaCN, and HCN for products to be used on-site are provided in Appendix B, which will be updated once suppliers and specific hazardous materials have been selected. Paper copies of the MSDS for cyanide will be kept in the process plant control room, with the first aid equipment near the discharge end of the barren solution pumps, near the control room, gold room, in the cyanide mixing area, and in other areas where employees could be exposed to cyanide. The ERT and the First-aid room will have paper copies as well.

The operational personnel will inspect all first aid equipment regularly to ensure that it is in good working order and available if required. Cyanide first aid equipment such as oxygen will be inspected prior to cyanide mixing. Plant operator will review the first aid kits and oxygen bottles on every shift. Medical services will inspect the oxygen bottles and Cyanokit every 14 days. Inspection records will be kept to log the inspections. Each work location will be surveyed by the H&S Department and by departmental safety committees made up of management and worker representatives to flag safety concerns that need to be corrected.

The ERT will conduct emergency practice drills for response to cyanide exposures and/or releases. Where the evaluation of a practice drill identifies deficiencies in the methods and effectiveness of the response the adequacy of emergency response training will be reviewed, and additional or revised training may be recommended to improve the knowledge and skills of the ERT.

8.0 EMERGENCY RESPONSE

8.1 Corporate Commitment

All Newmont gold processing facilities that use cyanide are certified under the Cyanide Code (Newmont 2018) which provides direction for the appropriate management and response of cyanide and cyanide-related events. As such, any cyanide-related incidents that occur would be tracked, investigated, and analyzed to identify root causes, and improve operational controls. Actions are then implemented to prevent recurrences and to mitigate the consequences of future incidents.

Lessons learned from previous cyanide-related incidents that have occurred at Newmont facilities following implementation of the Cyanide Code have been incorporated into continuous improvement processes. Such events were evaluated for root causes, and preventative actions were identified. For instance, following a cyanide-related incident in 2017 at a Newmont facility that involved a breach in the tailings pond liner, Newmont conducted a root cause analysis and implemented additional training and processes to avoid similar events in the future (Newmont 2018). Further, additional actions were implemented in 2017 to improve cyanide management effectiveness at mine sites in support of the Cyanide Code, including (Newmont 2018, 2021):

- Testing methodologies for the presence of cyanide in process solutions and treated water according to the ISO standard 17690 and adapted for mining applications.
- Improved ability to track cyanide related events and trends that may required action through continued integrated reporting.
- Establishment of a “Path to Zero Cyanide Spills” initiative in 2021 to identify and address control failures and eliminate cyanide spill events. These are defined as any spill offsite containing cyanide and spill out of secondary containment that has a concentration greater than 50 parts per million (ppm) weak-acid dissociable cyanide (WAD-CN).

All incidents are classified into five categories in ascending order of severity from Category I (insignificant) to Category V (severe) as described in Table 8-1. Incidents are assessed based on their actual and potential impact. Incidents in Category III and above are reported to the corporate level and thus are classified at Newmont as “reportable incidents”.

Internal and external emergency communication of cyanide incidents will be sent to Newmont’s corporate offices and regulatory agencies to communicate the cyanide incident and what was done to manage and rectify it. Reportable incidents would be reported as described in Section 10.0.

Table 8-1 Newmont Cyanide Incident Categorization Examples

Category	Example of event
I Insignificant	Near miss event or contact with very low levels of process solution containing cyanide.
	Spill within containment or low levels and low quantity of process solution containing cyanide released to soils immediately adjacent to facilities.
II Minor	Contact with low grade cyanide solutions, presence of cyanide gas identified with detectors.
	Release of cyanide containing solutions outside of secondary containment but within existing disturbance. Wildlife mortality non-critical species, single or low mortalities per event.
III Moderate	Presence of cyanide gas in work areas as identified by detectors, potential for low level employee exposures, facilities evacuated per Emergency Response Plans. Moderate risk for personnel – no recorded exposures.
	Release of process solution containing moderate cyanide content and moderate quantities of solution. Repeat mortalities or spills, multiple mortalities per event.
IV Major	Potential exposures to reagent grade cyanide. Personnel decontamination and monitoring.
	Wildlife mortality of a critical species, repeat mortalities.
V Severe	Personnel exposure to reagent grade cyanide or HCN gas. Personnel provided with medical aid and antidote as a precautionary measure.
	Multiple mortalities; wide-ranging spill.

8.2 Spill Response

If a cyanide spill occurs, the emergency response procedures will be put into effect, as described in the Heap Leach Facility Emergency Response Plan. The expectation is that the ISO containers and one tonne boxes will maintain their structural and functional integrity. If the cyanide briquettes are shipped in the ISO container, they will remain within the container with no exposure/release of cyanide to the environment if an unanticipated incident occurs during shipment. A crane will be employed to remove the container to a safe location.

Stakeholders and potentially affected communities will be informed of the nature of the risks associated with accidental cyanide releases. ICMI will be notified of any significant cyanide incidents as well as regulatory agencies and potentially affected communities as outlined in the Emergency Response Plan. Cyanide emergency response procedures for cyanide exposures, including available medical personnel and transportation, is provided in the Heap Leach Facility Emergency Response Plan.

In the event of a cyanide release, specific remediation measures will be carried out as outlined in the Emergency Response Plan. In the event of a cyanide release to surface water or that has the potential to reach surface water, sodium hypochlorite, ferrous sulfate and hydrogen peroxide will not be used to treat the spill. Monitoring will be carried out to identify the extent and effect of a cyanide release following SOPs that will define sampling methods, parameters, and sampling locations, were possible.

9.0 EMPLOYEE TRAINING

Newmont is responsible for ensuring that employees and contractors are properly trained to carry out normal production tasks while minimizing the risk of cyanide releases and risks to H&S. All employees and contractors will be accountable for their own safety and for the safety of their fellow workers. Every employee and contractor must understand the standard operating procedures directly relevant to their position and must:

- Know what their responsibilities are
- Have sufficient authority to carry them out
- Have the required ability and competence (training or certification)
- Have training in the use of PPE required for the work being undertaken
- Clearly recognize that health and safety is an integral, full-time component of every job.

No employee will start a new job until training has been completed and documented, and the responsible supervisor or manager is satisfied that the employee is adequately trained for the tasks to be performed. Employee training will be ongoing as the project progresses. Work-specific training is to include:

- Instructions on the use, access, and understanding of MSDS under a worker right-to-know program. This will include informing workers of properties and hazards associated with hazardous materials, safety requirements, and first aid and emergency response information. The training is to occur before a worker handles any hazardous material.
- Use of PPE appropriate for hazardous materials being used or stored, and for hazardous waste. This will include the proper care of PPE, and where replacement parts (e.g., filters) can be sourced on-site.
- The type of fire extinguisher appropriate for specific hazardous materials, where they are located, and how to operate them.
- Use and location of spill kits specific to hazardous materials.
- Use and location of first aid kits.

Cyanide mixing area, process plant and heap leach workers, ERT, technical staff, and contractors will be trained in cyanide management, safety, handling, spill response, and emergency response protocols, and will receive information on its potential health effects, how to recognize symptoms of cyanide exposure, and procedures to follow in the event of exposure (e.g., use of the emergency shower). The effectiveness of the training programs will be evaluated through observations and/or testing. Open pit mine operations personnel, mine warehouse staff, camp and kitchen workers, and visitors will be provided with site wide training on cyanide safety and emergency response procedure. Cyanide truck drivers will receive special training on cyanide transport from the supplier, as well as for driving on the NAR and complying with emergency and spill response protocols.

Specialized training will be provided for workers mixing cyanide from the ISO containers or boxes/bags into the cyanide mixing tank. Personnel will also be trained on the hazards cyanide poses to the environment, and which situations require response from the ERT. Annual refresher training will be provided for all cyanide handling procedures, including the cyanide bag system regardless of operation frequency, as well as cyanide hazard recognition. Specialized training as well as refresher training will also be provided to

employees specifically responsible for cyanide sampling, which will include sampling/handling risks, safe sampling procedures and equipment, and sample labelling protocols.

All visitors to the Project will be required to complete site induction training prior to being permitted to enter the operating area of the site. This training will include a briefing on potential hazards at the site, required PPE, general health and safety precautions, and emergency response procedures. Refresher training for response to cyanide exposures will be regularly conducted.

All full-time employees and contractors working in areas where there is a potential for encountering cyanide will also be required to complete Cyanide Hazard Recognition training, as well as annual refresher training. This training will include a general introduction to this Cyanide Management Plan and the Emergency Response Plan. Training topics will also include recognizing cyanide reagent and solution, and where such materials will be encountered within the operation, discussion of the health effects of cyanide, precautions to prevent cyanide exposure, symptoms of cyanide exposure, and specific procedures to follow in the event of exposure.

Training records will be retained by H&S Department, who will alert individuals and their departments when and what training is required for employees, including any refresher training for courses previously completed. The training records, including Emergency Response training, will include the names of the employee and trainer, date of training, topics covered, and employee understanding of the material, and will be retained throughout an individual's employment. Contractors will be responsible for keeping records for their employees working on-site.

9.1 Workplace Hazardous Materials Information System

Employees and contractors who transport and use cyanide will be required to complete Workplace Hazardous Materials Information System (WHMIS) training. Training will be provided by the H&S Department. Re-certification is required every three years.

Requirements by WHMIS for employers and contractors include the following:

- Ensure that employees are trained in handling hazardous materials
- Establish communications between the supplier and the Project prior to hazardous materials being transported to the site
- Provide proper safe and secure storage for hazardous materials, and have WHMIS and MSDS placards prominently displayed on storage areas
- Keep incompatible hazardous materials in separate storage locations
- Ensure that storage areas have adequate ventilation and, if available, automatic monitoring equipment specific to the materials being stored (e.g., automatic hydrogen cyanide gas monitoring devices in areas where sodium cyanide is used in the workplace)
- Ensure that storage areas are regularly inspected with any deficiencies being immediately rectified
- Provide appropriate spill kits and PPEs required for responses to spills of hazardous materials
- Provide emergency response equipment such as fire extinguishers, first aid kits, eye wash stations, and emergency showers.

9.2 Transportation of Dangerous Goods

Employees responsible for receiving the cyanide shipment from the transporter will be trained in the transportation of dangerous goods following recommended guidance provided by Transport Canada:

- Definition of the nine classes of dangerous goods and their associated hazards
- Shipping names, classes, UN numbers, and packing groups for the dangerous goods that are normally encountered on the job
- Safety marks such as labels and placards that are used to identify the different classes of dangerous goods normally encountered on the job
- Knowledge of the information that must be on a shipping document, including types of placards, labels, signs, numbers, and other safety marks, what they mean, and when and where to display them
- The requirements regarding mixed loads and the need for segregation of incompatible dangerous goods
- The proper selection and means of hazardous materials containment including safe practices on their loading and stowage, e.g., containers secured for transport will be upright, in good condition and not overfilled
- What to do if the shipping documents, placards, labels, other safety marks, or means of containment seem inadequate or incorrect
- What constitutes an accidental release and the reporting requirements if an accident happens
- Proper use of all equipment used in the handling, offering for transport, and transportation of dangerous goods
- Loading, unloading, packing, or unpacking hazardous materials at the Mine Site.

The H&S Department will issue a Training Certificate to employees who are adequately trained to undertake their responsibilities in receiving cyanide from the transporter. Refresher training will be held annually for all trained employees and contractors.

10.0 DIALOGUE AND DISCLOSURE

Newmont will participate in regular engagement with stakeholders and local communities to provide Project updates and to disseminate information through written, visual, or verbal means on the general use of cyanide in the mining process, as well as on the practices implemented to protect human health and the environment. These engagement opportunities provide a forum to discuss cyanide management at the Project and identify any areas of concern or questions that may arise regarding cyanide management practices.

Cyanide incidents that are classified as Category I (insignificant) or Category II (minor) as described in Table 8-1 would be included in annual regulatory reporting. Any cyanide incidents that are classified as Category III (moderate) or higher would be communicated to the mining inspector and First Nations as soon as possible once the initial assessment of the incident is complete. These incidents may include the following:

- Cyanide releases on or off the Mine Site resulting in significant adverse effects to health or the environment
- Cyanide releases off the Mine Site requiring response or remediation
- Cyanide exposures resulting in personnel hospitalization or fatality
- Cyanide releases on or off the Mne Site requiring reporting under applicable regulations
- Releases cause applicable limits for cyanide to be exceeded.

In addition, a sodium cyanide spill equal to or greater than 5 kg or 5 L, as described in the Spill Contingency Plan, would be considered a reportable spill and would be communicated to stakeholders and First Nations as soon as possible once the initial assessment of the incident is complete.

11.0 CYANIDE MONITORING

Mine solutions and mine effluent will be monitored for WAD cyanide concentrations and compared to effluent quality standards. Samplers will be installed in the process plant to monitor cyanide in the various streams that flow in closed loop to and from the HLF. Monitoring and sampling will be conducted as outlined in the applicable SOPs that will be developed by qualified professionals and based on lessons learned from legacy sites. The SOPs will specify sampling methods, locations, frequencies, chains of custody, shipping, and quality assurance and quality control requirements. Ambient conditions (i.e., weather, wildlife activity, anthropogenic influences) during sampling events will be recorded. Additional monitoring and procedures for the use of cyanide are provided in the Heap Leach and Process Facilities Plan.

Water samples will be collected from surface water and groundwater downgradient of the site and analyzed for the presence of cyanide. Should concentrations in the surface water or groundwater downgradient of the site exceed applicable standards as a result of project activities, remedial activities will be carried out as described within the Surface Water Quality and Aquatic Life Adaptive Management Plan. Details on the surface water quality monitoring program, including timing, frequency, and duration, are included in the Surface Water Quality Monitoring Plan. Details on the groundwater monitoring program are including in the Groundwater Monitoring Plan.

Results of cyanide water/solution quality testing during operations will be reviewed on an annual basis and compared to derived nitrogen species in the water quality model. Cyanide management procedures or other mitigations will be considered based on those evaluations.

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APPENDIX A

Cyanide Management Plan
Table of Concordance

Proponent Commitment Table of Concordance - Cyanide Management Plan

FSR Plan	Mitigation Name	Reference	Proponent Committed Mitigation	Management Plan	Commitment Incorporated	Section Location	Notes
Cyanide Management Plan (Cn MP)	Cn MP	SIR1-9.4.1-R208 (YOR 2017-0211-325-1)	During detailed engineering, commissioning, and during construction, the Hazard and Operability Study (HAZOP) process will be used to identify any areas of concern over cyanide transportation, management, and use, and address potential safety issues that will require mitigation. The outcomes of the HAZOP process will be integrated into the Cyanide Management Plan (CMP), and employee training will be ongoing as the project progresses. The CMP will follow International Cyanide Management Code (ICMC) protocols, which will help to ensure that the overall cyanide management strategy is implemented in advance of initial dorè production.	Cn MP	Yes	**Cn Management Plan** Section 1.4: Synergies with Newmont Standards and Requirements and Other Project Documents; Section 2.2: The Cyanide Code; Section 9: Employee Training	
Cyanide Management Plan (Cn MP)	Cn MP	SIR1-9.4.1-R209 (YOR 2017-0211-325-1)	Cyanide audits will be conducted during detailed engineering and years –2 and –1 the Project as outlined in the International Cyanide Management Code's (ICMC's) Gold Mining Pre-Operational Verification Protocol, which requests that the Project's site plans and proposed operating procedures be reviewed for conformance with the ICMC's Principles and Standards of Practice. The Pre-operational audit will determine if the Project's plans, procedures, and management systems, when implemented, may reasonably be expected to meet the performance goals of the ICMC's Standards of Practice. Upon Project start-up, the facility will be subject to an on-site cyanide audit to confirm that the operation has been constructed and is being operated in compliance with the ICMC. This on-site audit must be conducted within one year of the mine's first receipt of cyanide at site, and it will address each of the Code's standards of practice and document the compliance to the ICMC. During the Operation and Closure and Reclamation Phases, the Code's Gold Mining Verification Protocol will be used, and audits will be performed on a three-year cycle to confirm continuous compliance with the Code. A Summary Audit Report will be submitted by the auditor to the International Cyanide Management Institute's for official Code certification.	Cn MP	Yes	**Cn Management Plan** Section 2.2.1:Cyanide Code Audits	
Cyanide Management Plan (Cn MP)	Cn MP	SIR1-9.4.1-R210 (YOR 2017-0211-325-1)	The exact transport route from the cyanide supplier to the NAR will be determined once the supplier has been chosen. Only those suppliers and transporters that are certified with the ICMC will be selected as preferred partners.	Cn MP	Yes	**Cn Management Plan** Section 3: Production and Transportation	
Cyanide Management Plan (Cn MP)	Cn MP	SIR1-9.4.1-R211 (YOR 2017-0211-325-1)	Cyanide will be transported in International Standards Organization (ISO) containers as dry briquettes.	Cn MP	Yes	**Cn Management Plan** Section 3: Production and Transportation	Or in one tonne bags/boxes that are lined and sealed to prevent the ingress of moisture.
Cyanide Management Plan (Cn MP)	Cn MP	SIR1-9.4.1-R212 (YOR 2017-0211-325-1)	Cyanide trucks parked at the river crossings will be manned at all times. Where cyanide trucks are going to be delayed for long periods of time prior to crossing the rivers, then the truck operator or another employee will remain with the truck at all times. Goldcorp will require that transportation along the NAR, including at the river crossings, is compliant with all ICMC requirements.	Cn MP	Yes	**Cn Management Plan** Section 3: Production and Transportation	There will be sufficient area at the barge landing areas on the north side of the Yukon and Stewart rivers for tractor/trailer parking.
Cyanide Management Plan (Cn MP)	Cn MP	SIR1-9.4.1-R213 (YOR 2017-0211-325-1)	The Site Services Supervisor will have control over the cyanide trucks on the river ice crossings, including loading and unloading. The barge will only carry the cyanide truck. No other items will be transported at the same time.	Cn MP	Yes	**Cn Management Plan** Section 3: Production and Transportation	
Cyanide Management Plan (Cn MP)	Cn MP	SIR1-9.4.1-R214 (YOR 2017-0211-325-1)	The mine will utilize an ice engineer to provide regular updates on the ice crossings' load capacities to confirm the ice crossings have the required capacity for cyanide trucks to cross. The ice engineer will provide load chats for each crossing depending on the ice quantity and quality. The Site Services Supervisor will be responsible for assessing if the crossing is safe for travel.	Cn MP	Yes	**Cn Management Plan** Section 3: Production and Transportation	
Cyanide Management Plan (Cn MP)	Cn MP	SIR1-9.4.1-R215 (YOR 2017-0211325-1)	Cyanide will be stored in ISO containers on tandem axle trailers. The ISO containers are attached to their own dedicated trailer, and they will not be removed from the trailers. The trailers will be moved from the storage area to the cyanide unloading station in the plant building using a tandem axle truck. At the cyanide unloading station, the ISO container will be connected to the closed-loop piping between the ISO container and the mixing tank, and the mixing/cyanide transfer process will begin.	Cn MP	Yes	**Cn Management Plan** Section 4: Handling and Storage; Section 5.1: Mixing Facilities	
Cyanide Management Plan (Cn MP)	Cn MP	SIR1-9.4.1-R216 (YOR 2017-0211-325-1)	The scope of the Cyanide Management Plan and site monitoring plans (Surface Water Quality and Groundwater) will include weak acid dissociable (WAD) cyanide concentrations in the final effluent: any solution that is discharged will be analyzed for WAD cyanide, and an effluent quality standard is expected to be set for WAD Cyanide. Samplers will be installed in the plant to monitor cyanide in the various streams that flow in closed loop to and from the HLF.	Cn MP	Yes	**Cn Management Plan** Section 11: Cyanide Monitoring	
Cyanide Management Plan (Cn MP)	Cn MP	SIR1-9.4.1-R217 (YOR 2017-0211-325-1)	Cyanide truck drivers will receive special training on cyanide transport from the supplier, as well as for driving the NAR and complying with Emergency and Spill response protocols. Goldcorp's in-house first responders, HLF and processing plant personnel, Technical Staff, and contractors will be trained in cyanide management, safety, handling, and emergency response protocols. Open pit mine operations personnel, mine warehouse staff, camp and kitchen workers, and visitors will be provided with site wide training on cyanide safety and emergency response procedure.	Cn MP	Yes	**Cn Management Plan** Section 9: Employee Training	

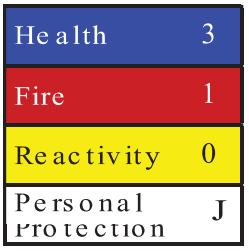
Proponent Commitment Table of Concordance - Cyanide Management Plan							
FSR Plan	**Mitigation Name**	**Reference**	**Proponent Committed Mitigation**	**Management Plan**	**Commitment Incorporated**	**Section Location**	**Notes**
Cyanide Management Plan (Cn MP)	Cn MP	SIR1-9.4.1-R219 (YOR 2017-0211-325-1)	If a cyanide spill occurs, the emergency response procedures will be put into effect, as described in Section 28.4.3 of the Project Proposal. The expectation is that the ISO containers will maintain their structural and functional integrity, and that the cyanide briquettes will remain in the ISO container with no exposure/release of cyanide to the environment if an unanticipated incident occurs during crossing. A crane will be employed to remove the container to a safe location.	Cn MP	Yes	**Cn Management Plan** Section 8.2: Spill Response	If a cyanide spill occurs, the emergency response procedures will be put into effect, as described in the Heap Leach Facility Emergency Response Plan.
Cyanide Management Plan (Cn MP)	Cn MP	SIR3-R3-30 (YOR 2017-0211-501-1)	The cyanide concentrations and chemical speciation will be monitored rigorously and routinely in leach solutions at the Coffee gold mine, based on lessons learned from such legacy sites.	Cn MP	Yes	**Cn Management Plan** Section 11: Cyanide Monitoring	Monitoring and sampling will be conducted as outlined in the applicable SOPs that will be developed by qualified professionals and based on lessons learned from legacy sites.

APPENDIX B

Hazardous Material Safety Data Sheets (solid NaCN, solution NaCN, and HCN)







Material Safety Data Sheet
Sodium Cyanide MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium Cyanide

Catalog Codes: SLS2314, SLS3736

CAS#: 143-33-9

RTECS: VZ7525000

TSCA: TSCA 8(b) inventory: Sodium Cyanide

CI#: Not available.

Synonym:

Chemical Name: Sodium Cyanide

Chemical Formula: NaCN

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium Cyanide	143-33-9	100

Toxicological Data on Ingredients: Sodium Cyanide: ORAL (LD50): Acute: 6.44 mg/kg [Rat]. DERMAL (LD50): Acute: 10.4 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (permeator). Corrosive to eyes and skin. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to skin, eyes, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of acids, of moisture.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
Dangerous on contact with acids, acid fumes, water or stream. It will produce toxic and flammable vapors of CN-H and sodium oxide. Contact with acids and acid salts causes immediate formation of toxic and flammable hydrogen cyanide gas. When heated to decomposition it emits toxic fumes hydgrogen cyanide and oxides of nitrogen

Special Remarks on Explosion Hazards: Fusion mixtures of metal cyanides with metal chlorates, perchlorated or nitrates causes a violent explosion

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Corrosive solid. Poisonous solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 24°C (75.2°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
STEL: 5 (mg/m3) from ACGIH (TLV) [United States] SKIN CEIL: 4.7 from NIOSH CEIL: 5 (mg/m3) from NIOSHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Granular solid. Flakes solid.)

Odor:
Faint almond-like odor. Odorless when perfectly dry. Emits odor of hydrogen cyanide when damp.

Taste: Not available.

Molecular Weight: 49.01 g/mole

Color: White.

pH (1% soln/water): Not available.

Boiling Point: 1496°C (2724.8°F)

Melting Point: 563°C (1045.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.595 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Vapor Density of Hydrogen Cyanide gas: 0.941

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:
Soluble in cold water. Slightly soluble in Ethanol

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, moisture, incompatibles.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity:
Corrosive in presence of aluminum. Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Violent reaction with fluorine gas, magnesium, nitrates, nitric acid. Dangerous on contact with acids, acid fumes, water or stream. It wil produce toxic and flammable vapors of CN-H and sodium oxide. Cyanide may react with CO2 in ordinary air to form toxic hydrogen cyanide gas. Strong oxidizers such as acids, acid salts, chlorates, and nitrates. Contact with acids and acid salts causes immediate formation of toxic and flammable hydrogen cyanide gas.

Special Remarks on Corrosivity: Corrosive to aluminum

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
Acute oral toxicity (LD50): 6.44 mg/kg [Rat]. Acute dermal toxicity (LD50): 10.4 mg/kg [Rabbit].

Chronic Effects on Humans: May cause damage to the following organs: skin, eyes, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May cause adverse reproductive effects (maternal and paternal fertility) based on animal data.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health effects: Skin: May cause itching and irritation. May be fatal if absorbed through injured skin with symtpoms similar to those noted for inhalation and ingestion. Eyes: May cause eye irritation and eye damage. Inhalation: May cause respiratory tract irritation. May be fatal if inhaled. The substance inhibits cellular respiration causing metabolic asphyxiation. May cause headache, weakness, dizziness, labored breathing, nausea, vomiting. May be followed by cardiovascular effects, unconciousness, convulsions, coma, and death Ingestion: May be fatal if swallowed. May cause

gastrointestinal tract irritation with nausea, vomiting. May affect behavior and nervous systems(seizures, convulsions, change in motor activity, headache, dizziness, confusion, weakness stupor, aniexity, agitation, tremors), cardiovascular system, respiration (hyperventilation, pulmonary edema, breathing difficulty, respiratory failure), cardiovascular system (palpitations, rapid heart beat, hypertension, hypotension). Massive doses by produce sudden loss of conciousness and prompt death from respiratory arrest. Smaller but still lethal doses on the breath or vomitus. Chronic Potential Health Effects: Central Nervous system effects (headaches, vertigo, insomnia, memory loss, tremors, fatigue), fatigue, metabolic effects (poor appetite), cardiovascular effects (chest discomfort, palpitations), nerve damage to the eyes, or dermatitis, respiratory tract irritation, eye irritation, or death can occur. may prolong the illness for 1 or more hours. A bitter almond odor may be noted

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Sodium cyanide UNNA: 1689 PG: I

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut carcinogen reporting list.: Sodium Cyanide Illinois chemical safety act: Sodium Cyanide New York release reporting list: Sodium Cyanide Rhode Island RTK hazardous substances: Sodium Cyanide Pennsylvania RTK: Sodium Cyanide Minnesota: Sodium Cyanide Massachusetts RTK: Sodium Cyanide Massachusetts spill list: Sodium Cyanide New Jersey: Sodium Cyanide New Jersey spill list: Sodium Cyanide Louisiana RTK reporting list: Sodium Cyanide Louisiana spill reporting: Sodium Cyanide California Director's List of Hazardous Substances: Sodium Cyanide TSCA 8(b) inventory: Sodium Cyanide TSCA 4(a) final test rules: Sodium Cyanide TSCA 8(a) PAIR: Sodium Cyanide TSCA 8(d) H and S data reporting: Sodium Cyanide TSCA 12(b) one time export: Sodium Cyanide SARA 302/304/311/312 extremely hazardous substances: Sodium Cyanide CERCLA: Hazardous substances.: Sodium Cyanide: 10 lbs. (4.536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-6: Reactive and very flammable material. CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS E: Corrosive solid.

DSCL (EEC):
R27/28- Very toxic in contact with skin and if swallowed. R41- Risk of serious damage to eyes. S1/2- Keep locked up and out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28- After contact with skin, wash immediately with plenty of water S36/37- Wear suitable protective clothing and gloves. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 01:58 PM

Last Updated: 06/09/2012 12:00 PM

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Sodium Cyanide, 2.5% w/v

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 11/22/1998 Revision date: 03/28/2018 Supersedes: 03/28/2018 Version: 1.1

SECTION 1: Identification

1.1. Identification

Product form : Mixtures

Product name : Sodium Cyanide, 2.5% w/v

Product code : LC23700

1.2. Recommended use and restrictions on use

Use of the substance/mixture : For laboratory and manufacturing use only.

Recommended use : Laboratory chemicals

Restrictions on use : Not for food, drug or household use

1.3. Supplier

LabChem Inc
Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
Zelienople, PA 16063 - USA
T 412-826-5230 - F 724-473-0647
info@labchem.com - www.labchem.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 or +1-703-741-5970

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Acute toxicity (oral) Category 3	H301	Toxic if swallowed
Acute toxicity (dermal) Category 3	H311	Toxic in contact with skin
Acute toxicity (inhalation:dust,mist) Category 4	H332	Harmful if inhaled
Skin corrosion/irritation Category 2	H315	Causes skin irritation
Serious eye damage/eye irritation Category 2A	H319	Causes serious eye irritation
Hazardous to the aquatic environment - Acute Hazard Category 3	H402	Harmful to aquatic life

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-US labeling

Hazard pictograms (GHS-US) :



GHS06 GHS07

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H301+H311 - Toxic if swallowed or in contact with skin
H315 - Causes skin irritation
H319 - Causes serious eye irritation
H332 - Harmful if inhaled
H402 - Harmful to aquatic life

Precautionary statements (GHS-US) : P261 - Avoid breathing mist, vapors, spray.
P264 - Wash exposed skin thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P273 - Avoid release to the environment.
P280 - Wear protective gloves, protective clothing, eye protection, face protection.
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated

clothing. Rinse skin with water/shower.
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P312 - Call a POISON CENTER or doctor/physician if you feel unwell.
P332+P313 - If skin irritation occurs: Get medical advice/attention.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P363 - Wash contaminated clothing before reuse.
P405 - Store locked up.
P501 - Dispose of contents/container to comply with local, state and federal regulations
If inhaled: Remove person to fresh air and keep comfortable for breathing
P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

2.3. Other hazards which do not result in classification

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	GHS-US classification
Water	(CAS-No.) 7732-18-5	97.1	Not classified
Sodium Cyanide	(CAS-No.) 143-33-9	2.5	Acute Tox. 2 (Oral), H300 Acute Tox. 1 (Dermal), H310 Skin Corr. 1A, H314 Eye Dam. 1, H318 Aquatic Acute 1, H400
Sodium Hydroxide	(CAS-No.) 1310-73-2	0.4	Skin Corr. 1A, H314 Eye Dam. 1, H318 Aquatic Acute 3, H402

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : Allow victim to breathe fresh air. Allow the victim to rest. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

First-aid measures after skin contact : Immediately call a poison center or doctor/physician. Remove/Take off immediately all contaminated clothing. Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation occurs: Get medical advice/attention. Specific treatment (see Antidote on this label).

First-aid measures after eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention. Immediately call a poison center or doctor/physician. Specific treatment (see Antidote on this label).

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation : Danger of serious damage to health by prolonged exposure through inhalation. Harmful if inhaled.

Symptoms/effects after skin contact : Repeated exposure to this material can result in absorption through skin causing significant health hazard. Toxic in contact with skin. Causes skin irritation.

Symptoms/effects after eye contact : Causes serious eye irritation.

Symptoms/effects after ingestion : Toxic if swallowed. Swallowing a small quantity of this material will result in serious health hazard.

4.3. Immediate medical attention and special treatment, if necessary

Hospitalize at once. Specific treatment is necessary.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Specific hazards arising from the chemical

Reactivity : On heating: release of toxic/combustible gases/vapours (hydrogen cyanide). Reacts with (some) acids: release of toxic/combustible gases/vapours (hydrogen cyanide).

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.

6.1.1. For non-emergency personnel

Protective equipment : Gloves. Safety glasses. Protective clothing. Combined gas/dust mask with filter type B/P3.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : Ventilate area. If a major spill occurs, all personnel should be immediately evacuated and the area ventilated. Stop leak if safe to do so.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Contact with acids (i.e. battery) liberates very toxic gas.

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. Use only outdoors or in a well-ventilated area. Avoid breathing mist, vapors, spray.

Hygiene measures : Do not eat, drink or smoke when using this product. Wash exposed skin thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep only in the original container in a cool, well ventilated place away from : Heat sources, incompatible materials. Keep container closed when not in use.

Incompatible products : Strong bases. Strong oxidizers.

Incompatible materials : Heat sources.

Maximum storage period : 24 months

Prohibitions on mixed storage : KEEP SUBSTANCE AWAY FROM: strong acids. oxidizing agents.

Storage area : Meet the legal requirements.

Special rules on packaging : Store in a closed container.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Sodium Cyanide (143-33-9)		
ACGIH	ACGIH Ceiling (mg/m³)	5 mg/m³
OSHA	OSHA PEL (TWA) (mg/m³)	5 mg/m³ as CN; Skin
IDLH	US IDLH (mg/m³)	25 mg/m³ as CN
NIOSH	NIOSH REL (ceiling) (mg/m³)	5 mg/m³ 10 min., as CN
NIOSH	NIOSH REL (ceiling) (ppm)	4.7 ppm 10 min., as CN

Sodium Hydroxide (1310-73-2)		
ACGIH	ACGIH Ceiling (mg/m³)	2 mg/m³
OSHA	OSHA PEL (TWA) (mg/m³)	2 mg/m³
IDLH	US IDLH (mg/m³)	10 mg/m³
NIOSH	NIOSH REL (ceiling) (mg/m³)	2 mg/m³

Water (7732-18-5)
Not applicable

8.2. Appropriate engineering controls

Appropriate engineering controls : Gas detectors should be used when toxic gases may be released. Emergency eye wash fountains should be available in the immediate vicinity of any potential exposure. Provide adequate general and local exhaust ventilation.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Gloves. Combined gas/dust mask with filter type B/P3. Safety glasses. Protective clothing.



Hand protection:

Wear protective gloves.

Eye protection:

Chemical goggles or safety glasses

Skin and body protection:

Wear suitable protective clothing

Respiratory protection:

Gas mask

Other information:

Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid
Appearance : Clear, colorless liquid.
Color : Colorless
Odor : Bitter almonds
Odor threshold : No data available
pH : No data available
Melting point : No data available
Freezing point : No data available

Boiling point	:	No data available
Flash point	:	No data available
Relative evaporation rate (butyl acetate=1)	:	No data available
Flammability (solid, gas)	:	Non flammable.
Vapor pressure	:	No data available
Relative vapor density at 20 °C	:	No data available
Relative density	:	No data available
Specific gravity / density	:	1
Solubility	:	Miscible with water.
Log Pow	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	No data available
Explosion limits	:	No data available
Explosive properties	:	Not applicable.
Oxidizing properties	:	None.

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

On heating: release of toxic/combustible gases/vapours (hydrogen cyanide). Reacts with (some) acids: release of toxic/combustible gases/vapours (hydrogen cyanide).

10.2. Chemical stability

Not established.

10.3. Possibility of hazardous reactions

Contact with acids liberates very toxic gas.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures. Incompatible materials.

10.5. Incompatible materials

Strong acids. Strong oxidizers.

10.6. Hazardous decomposition products

Hydrogen cyanide. Nitrogen oxides.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure	:	Skin and eye contact
Acute toxicity	:	Oral: Toxic if swallowed. Dermal: Toxic in contact with skin. Inhalation:dust,mist: Harmful if inhaled.

Sodium Cyanide, 2.5% w/v	
LD50 oral rat	192 mg/kg
LD50 dermal rat	416 mg/kg
LC50 inhalation rat (mg/l)	2 mg/l/4h
ATE US (oral)	192 mg/kg body weight
ATE US (dermal)	416 mg/kg body weight
ATE US (vapors)	2 mg/l/4h
ATE US (dust, mist)	2 mg/l/4h

Sodium Cyanide (143-33-9)	
LD50 oral rat	4.26 - 5.83 mg/kg body weight (Other, Rat, Female, Experimental value)
LD50 dermal rabbit	11.28 mg/kg (Other, 6 h, Rabbit, Female, Experimental value)

Sodium Cyanide (143-33-9)	
LC50 inhalation rat (mg/l)	0.068 mg/l air (Other, 6 h, Rat, Read-across)
ATE US (oral)	6 mg/kg body weight
ATE US (dermal)	10 mg/kg body weight

Water (7732-18-5)	
LD50 oral rat	≥ 90000 mg/kg
ATE US (oral)	90000 mg/kg body weight

Skin corrosion/irritation : Causes skin irritation.

Serious eye damage/irritation : Causes serious eye irritation.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity – single exposure : Not classified

Specific target organ toxicity – repeated exposure : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Based on available data, the classification criteria are not met. Harmful if inhaled. Toxic if swallowed. Toxic in contact with skin.

Symptoms/effects after inhalation : Danger of serious damage to health by prolonged exposure through inhalation. Harmful if inhaled.

Symptoms/effects after skin contact : Repeated exposure to this material can result in absorption through skin causing significant health hazard. Toxic in contact with skin. Causes skin irritation.

Symptoms/effects after eye contact : Causes serious eye irritation.

Symptoms/effects after ingestion : Toxic if swallowed. Swallowing a small quantity of this material will result in serious health hazard.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - water : Harmful to aquatic life.

Sodium Cyanide, 2.5% w/v	
LC50 fish 1	2 mg/kg 96H

Sodium Cyanide (143-33-9)	
LC50 fish 1	0.05 - 0.075 mg/l (96 h, Salmo gairdneri, Flow-through system)
EC50 Daphnia 1	1.9 mg/l (Daphnia magna)

Sodium Hydroxide (1310-73-2)	
LC50 fish 1	45.4 mg/l (Other, 96 h, Salmo gairdneri, Static system, Fresh water, Experimental value)
EC50 Daphnia 1	40.4 mg/l (Other, 48 h, Ceriodaphnia sp., Experimental value)

12.2. Persistence and degradability

Sodium Cyanide, 2.5% w/v	
Persistence and degradability	Not established.

Sodium Cyanide (143-33-9)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	0.82 g O_2/g substance

Sodium Hydroxide (1310-73-2)	
Persistence and degradability	Biodegradability: not applicable.
Biochemical oxygen demand (BOD)	Not applicable (inorganic)
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)

Water (7732-18-5)	
Persistence and degradability	Not established.

12.3. Bioaccumulative potential

Sodium Cyanide, 2.5% w/v	
Bioaccumulative potential	Not bioaccumulative. Not established.

Sodium Cyanide (143-33-9)	
Bioaccumulative potential	Not bioaccumulative.

Sodium Hydroxide (1310-73-2)	
Bioaccumulative potential	Not bioaccumulative.

Water (7732-18-5)	
Bioaccumulative potential	Not established.

12.4. Mobility in soil

Sodium Cyanide (143-33-9)	
Ecology - soil	Low potential for adsorption in soil.

Sodium Hydroxide (1310-73-2)	
Ecology - soil	No (test)data on mobility of the substance available.

12.5. Other adverse effects

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods : Toxic and corrosive gases formed during combustion should be scrubbed before discharge to atmosphere.

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to comply with local, state and federal regulations.

Ecology - waste materials : Avoid release to the environment. Hazardous waste due to toxicity.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN3414 Sodium cyanide solution, 6.1, III

UN-No.(DOT) : UN3414

Proper Shipping Name (DOT) : Sodium cyanide solution

Transport hazard class(es) (DOT) : 6.1 - Class 6.1 - Poisonous materials 49 CFR 173.132

Packing group (DOT) : III - Minor Danger

Hazard labels (DOT) : 6.1 - Poison inhalation hazard



DOT Packaging Non Bulk (49 CFR 173.xxx) : 203

DOT Packaging Bulk (49 CFR 173.xxx) : 241

DOT Special Provisions (49 CFR 172.102)	:	B69 - Dry sodium cyanide or potassium cyanide may be shipped in sift-proof weather-resistant metal covered hopper car, covered motor vehicles, portable tanks or non-specification bins. Bins must be approved by the Associate Administrator. B77 - Other packaging are authorized when approved by the Associate Administrator. IB3 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1 and 31HA2, 31HB2, 31HN2, 31HD2 and 31HH2). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized, except for UN2672 (also see Special Provision IP8 in Table 2 for UN2672). N74 - Packages consisting of tightly closed inner containers of glass, earthenware, metal or polyethylene, capacity not over 0.5 kg (1.1 pounds) securely cushioned and packed in outer wooden barrels or wooden or fiberboard boxes, not over 15 kg (33 pounds) net weight, are authorized and need not conform to the requirements of part 178 of this subchapter. N75 - Packages consisting of tightly closed inner packaging of glass, earthenware or metal, securely cushioned and packed in outer wooden barrels or wooden or fiberboard boxes, capacity not over 2.5 kg (5.5 pounds) net weight, are authorized and need not conform to the requirements of part 178 of this subchapter. T7 - 4 178.274(d)(2) Normal..... 178.275(d)(3) TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively. TP13 - Self-contained breathing apparatus must be provided when this hazardous material is transported by sea. TP28 - A portable tank having a minimum test pressure of 2.65 bar (265 kPa) may be used provided the calculated test pressure is 2.65 bar or less based on the MAWP of the hazardous material, as defined in 178.275 of this subchapter, where the test pressure is 1.5 times the MAWP.
DOT Packaging Exceptions (49 CFR 173.xxx)	:	153
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	60 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	220 L
DOT Vessel Stowage Location	:	A - The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel.
DOT Vessel Stowage Other	:	52 - Stow “separated from” acids
Other information	:	No supplementary information available.

SECTION 15: Regulatory information

15.1. US Federal regulations

Sodium Cyanide, 2.5% w/v	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

Chemical(s) subject to the reporting requirements of Section 313 or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.

Sodium Cyanide	CAS-No. 143-33-9	2.5%

Sodium Cyanide (143-33-9)	
Listed on the United States SARA Section 302	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	10 lb
SARA Section 302 Threshold Planning Quantity (TPQ)	100 lb
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard

Sodium Hydroxide (1310-73-2)	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	1000 lb
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard

15.2. International regulations

CANADA

Sodium Cyanide (143-33-9)
Listed on the Canadian DSL (Domestic Substances List)

Sodium Hydroxide (1310-73-2)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

No additional information available

National regulations

Sodium Cyanide (143-33-9)
Listed on the Canadian IDL (Ingredient Disclosure List)

15.3. US State regulations

This product can expose you to Sodium Cyanide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Sodium Cyanide (143-33-9)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significant risk level (NSRL)
No	No	No	Yes	

SECTION 16: Other information

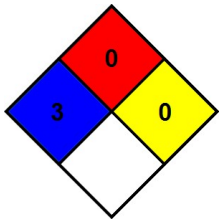
Revision date : 03/28/2018

Other information : None.

Full text of H-phrases: see section 16:

H300	Fatal if swallowed
H301	Toxic if swallowed
H310	Fatal in contact with skin
H311	Toxic in contact with skin
H314	Causes severe skin burns and eye damage
H315	Causes skin irritation
H318	Causes serious eye damage
H319	Causes serious eye irritation
H332	Harmful if inhaled
H400	Very toxic to aquatic life
H402	Harmful to aquatic life

NFPA health hazard	:	3 - Materials that, under emergency conditions, can cause serious or permanent injury.
NFPA fire hazard	:	0 - Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.
NFPA reactivity	:	0 - Material that in themselves are normally stable, even under fire conditions.



Hazard Rating

Health	:	3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability	:	0 Minimal Hazard - Materials that will not burn
Physical	:	0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.
Personal protection	:	J J - Splash goggles, Gloves, Synthetic apron, Dust & vapor respirator

SDS US LabChem

Information in this SDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc assumes no liability resulting from the use of this SDS. The user must determine suitability of this information for his application.

ELECTRONIC
FLUOROCARBONS, LLC

Safety Data Sheet

Material Name: Hydrogen Cyanide

* * *Section 1 - IDENTIFICATION* * *

Product Name: **HYDROGEN CYANIDE GAS**

Other name(s): Hydrogen cyanide gas (decomposition product of sodium cyanide); Hydrocyanic acid gas.

Recommended Use of the Chemical and Restrictions on Use Decomposition product of sodium cyanide.

Manufacturer Information
Electronic Fluorocarbons
3266 Bergey Road
Hatfield PA 19440

General Information 1-215-443-9600
Emergency # 1-800-535-5053
Outside the US 1-352-323-3500 (Call collect

* * *Section 2 - HAZARDS IDENTIFICATION* * *

DANGEROUS GOODS.

HAZARDOUS SUBSTANCE.

Classification of the substance or mixture:
Flammable liquids - Category 1
Acute Oral Toxicity - Category 1
Acute Dermal Toxicity - Category 1
Acute Inhalation Toxicity - Category 1
Specific target organ toxicity (single exposure) - Category 1

The following health/environmental hazard categories fall outside the scope of the Workplace Health and Safety Regulations: Acute Aquatic Toxicity - Category 1
Chronic Aquatic Toxicity - Category 1

SIGNAL WORD: DANGER



Hazard Statement(s):
H224 Extremely flammable liquid and vapour.
H300+H310+H330 Fatal if swallowed, in contact with skin or if inhaled.
H370 Causes damage to organs.

Precautionary Statement(s):

Prevention:
P210 Keep away from heat / sparks / open flames / hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground / bond container and receiving equipment.
P241 Use explosion-proof electrical / ventilating / lighting equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P260 Do not breathe mist / vapours / spray.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves / protective clothing / eye protection / face protection.
P284 Wear respiratory protection.

Response:
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P330 Rinse mouth.
P302+P350 IF ON SKIN: Gently wash with plenty of soap and water.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P310 Immediately call a POISON CENTER or doctor/physician.
P320 Specific treatment is urgent (see First Aid Measures on this Safety Data Sheet).
P322 Specific measures (see First Aid Measures on Safety Data Sheet).
P361 Take off immediately all contaminated clothing.
P363 Wash contaminated clothing before re-use.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P307+P311 IF exposed: Call a POISON CENTER or doctor/physician.
P314 Get medical advice/attention if you feel unwell.
P370+P378 In case of fire: Use extinguishing media as outlined in Section 5 of this Safety Data Sheet to extinguish.

Storage:
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P403+P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

Disposal:
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Poisons Schedule (SUSMP): S7 Dangerous Poison.

* * *Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS* * *

Components	CAS Number	Proportion	Hazard Codes
Hydrogen cyanide	74-90-8	>99.9%	H224 H300 H310 H330 H370 H372 H410
Stabiliser	-	<0.1%	-

* * *Section 4 - FIRST AID MEASURES* * *

May be fatal if inhaled, swallowed or absorbed through skin. At all places where there is a risk of cyanide poisoning, items to facilitate the prompt and effective treatment of cyanide poisoning (as determined by the treatment protocol to be employed) should be kept in an accessible and convenient location.

Recommended items include:

- An oxygen resuscitator and a source of oxygen and a clearly marked CYANIDE ANTIDOTE box containing:
- An approved airway, elasticised tourniquet, 5 mL sterile disposable syringe and needles for blood samples, fluoride heparinised blood sample tubes, skin prep swabs, dressing and adhesive tape
-Either:
- 2 Cyanokits containing hydroxocobalamin 5g x 2 amps and the prescribing information outlining side effects and precautions OR
- 2 Ampoules of Kelocyanor (Dicobalt edetate), including the prescribing information outlining side effects and precautions
- Intravenous injection equipment
- A copy of the appropriate Safety Data Sheet and
- A written copy of the relevant treatment protocol

Protect the rescuer

Prior to any attempt at rescue, an assessment of the dangers must be undertaken and measures including the use of appropriate personal protective equipment must be applied to protect the rescuer. Personal protective equipment may include:

- Protective gloves to avoid contact with contaminated skin, clothing and equipment
- Chemical goggles to protect the eyes
- Suitable respiratory protective equipment to prevent inhalation of sodium cyanide dust.

Inhalation:
Shout and send for help.
Remove the person from the source of exposure and ideally to a source of fresh air.
Look for verbal and physical responses from the person suffering from poisoning. Check that they are breathing.
If Patient is Breathing: Oxygen, preferably 100% oxygen if available, should be administered by a qualified person. If the person has collapsed or is unconscious, lie on their side, ensuring airway is clear and open.
If Patient is not Breathing: Ensure airway is clear and open and commence resuscitation using a resuscitation bag or mask connected to an oxygen source (or 100% oxygen via a non rebreathing facemask). Do not use mouth-to-mouth resuscitation. Oxygen, preferably 100% oxygen if available, should be administered by a qualified person. Check for pulse. If pulse is absent start external cardiac massage.

Transport promptly to hospital or medical centre.

Skin Contact:
If skin or hair contact occurs, immediately remove any contaminated clothing and place in a sealed bag for decontamination or disposal. Wash skin and hair thoroughly with running water. Transport promptly to hospital or medical centre. Treat as for 'Inhaled'.

Eye Contact:
Immediately wash in and around the eye area with large amounts of water for at least 15 minutes. Eyelids to be held apart. Remove clothing if contaminated and wash skin. Urgently seek medical assistance. Transport promptly to hospital or medical centre. Treat as for 'Inhaled'.

Ingestion:
Do not give anything by mouth. Treat as for 'Inhaled'.

Indication of immediate medical attention and special treatment needed:
Be certain that victims have been decontaminated properly. Victims who have undergone decontamination pose no serious risks of secondary contamination to rescuers or medical staff treating the victim. In such cases, Support Zone personnel require no specialized protective gear.

Upon presentation, immediately assess the need or otherwise for assisted ventilation, administer 100% oxygen, insert intravenous lines and institute cardiac and blood pressure monitoring if available.

Assess and monitor level of consciousness.

Obtain arterial/venous blood gas as metabolic acidosis, often severe, combined with a small difference between the arterial and venous oxygen saturation levels (<10 mmHg) suggests cyanide poisoning: Correct any severe metabolic acidosis (pH below 7.20) and concurrent electrolyte imbalances (for example, hyperkalaemia, hypercalcaemia).

Take a blood sample in a fluoride heparinised tube for analysis of blood cyanide levels to confirm poisoning, but do not delay treatment while awaiting results. Treatment decisions must be made on clinical grounds.

Symptoms of fear and anxiety about possible cyanide poisoning may mimic those of mild, or the early stages, of cyanide poisoning. It is therefore important to establish cyanide poisoning has actually occurred before administering an antidote as some cyanide antidotes have severe side effects if administered in the absence of cyanide poisoning or if the dose is too great.

If a history of exposure to cyanide has been confirmed and the patient presents with, or develops, severe symptoms of cyanide poisoning (particularly if the patient has lost consciousness, is lapsing into unconsciousness or enters cardiac arrest) then antidote administration may be required.

Antidotes

There are two main antidotes for severe cyanide poisoning

- Hydroxocobalamin (preferred) OR
- Dicobalt edetate (Kelocyanor)

Hydroxocobalamin

Reconstitute the hydroxocobalamin by diluting one flask (5g) of the freeze-dried with 200mL of 0.9% saline and shake rigorously. Administer 5 grams of reconstituted solution via a fast intravenous drip over 15 minutes (approximately 15mL/ min). A further (5g) dose may be given if necessary at a slower rate of infusion - 30 min - 2 hours (or alternatively I.V. sodium thiosulphate 12.5g (50mL) may be given by slow intravenous injection) through a separate IV line . Hydroxocobalamin should not be administered if person has known hypersensitivity to Vitamin B12.

Dicobalt edetate (Kelocyanor)

Note: Overzealous administration of the antidote is contraindicated and may result in serious adverse reactions of an anaphylactic (allergic) nature. Adverse reactions reported include gross oedema of the face and neck, urticaria, palpitations, hypotension, convulsions, vomiting, chest pains, difficulty in breathing, and collapse.

Administer one ampoule containing 300mg Dicobalt edetate in 20mL glucose solution (Kelocyanor) intravenously by slow injection. The initial effect is a fall in blood pressure, rise in pulse rate, and sometimes retching. Immediately after this phase, lasting about one minute, the patient should recover. The injection should be discontinued if allergic adverse effects are noted. A second dose may be given if the response is inadequate and allergic adverse effects have not been observed (or alternatively I.V. sodium thiosulphate 12.5g (50mL) may be given by slow intravenous injection through a separate IV line.

If cyanide has been swallowed, gastric lavage, charcoal and cathartics may be used after antidote treatment if less than two hours have elapsed since ingestion if recommended by an appropriately qualified specialist physician in a specific case although the effectiveness of this measure is not strongly supported by evidence.

Cases of proven and symptomatic cyanide poisoning should be monitored for at least 24 hours and longer if antidote administration had been required for severe poisoning. Eye splashes should be assessed by an ophthalmologist within 24 hours (as cyanide is a severe eye irritant). Persons without symptoms but with significant areas of skin contact should be observed for at least 6 hours to ensure there are no delayed effects.

* * *Section 5 - FIRE FIGHTING MEASURES* * *

Suitable Extinguishing Media:
Dry agent (dry chemical powder).

Unsuitable Extinguishing Media:
Carbon dioxide.

Hazchem or Emergency Action Code: 2WE

Specific hazards arising from the substance or mixture:
Extremely flammable. Toxic substance.

Special protective equipment and precautions for fire-fighters:
Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure to vapour or products of combustion.

* * *Section 6 - ACCIDENTAL RELEASE MEASURES* *

Emergency procedures/Environmental precautions:
Clear area of all unprotected personnel. Shut off all possible sources of ignition. If contamination of sewers or waterways has occurred advise local emergency services. For large spills notify the Emergency Services.

Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:
Clear area of all unprotected personnel. Wear protective equipment to prevent skin and eye contact and breathing in vapours/dust.

* * *Section 7 - HANDLING AND STORAGE* * *

This material is a Scheduled Poison S7 and must be stored, maintained and used in accordance with the relevant regulations.

Precautions for safe handling:
Extremely flammable - eliminate all potential ignition sources. Keep out of reach of children.

Conditions for safe storage, including any incompatibilities:
Not applicable.

* * *Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION* * *

Hydrogen cyanide: Peak Limitation = 11 mg/m^3 (10 ppm), Sk
Cyanides (as CN): 8hr TWA = 5 mg/m^3, Sk

TWA - The time-weighted average airborne concentration of a particular substance when calculated over an eight-hour working day, for a five-day working week.

`Sk' (skin) Notice - absorption through the skin may be a significant source of exposure. The exposure standard is invalidated if such contact should occur.

Peak Limitation - a maximum or peak airborne concentration of a particular substance determined over the shortest analytically practicable period of time which does not exceed 15 minutes.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Appropriate engineering controls:
Ensure ventilation is adequate to maintain air concentrations below Workplace Exposure Standards.

If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented risk assessment using the relevant Orica Personal Protection Guide information (refer to PPE section below) as a basis must be carried out to determine the minimum PPE requirements.

Individual protection measures, such as Personal Protective Equipment (PPE):
The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

OVERALLS, CHEMICAL GOGGLES, RUBBER BOOTS, AIR MASK , GLOVES (Long), APRON.
* Not required if wearing air supplied mask.



Wear overalls, chemical goggles, full face shield, elbow-length impervious gloves, splash apron or equivalent chemical impervious outer garment, and rubber boots. Use with adequate ventilation. If determined by a risk assessment an inhalation risk exists, wear an air-supplied mask meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

* * *Section 9 - PHYSICAL AND CHEMICAL PROPERTIES* * *

Physical state:	Gas
Colour:	Colourless
Odour:	Distinctive 'Bitter almonds'
Molecular Formula:	HCN
Solubility:	Soluble in water.
Specific Gravity:	0.938 g/L
Relative Vapour Density (air=1):	0.93 @26°C

Vapour Pressure (20 °C):	62 kPa
Flash Point (°C):	-17.8 (CC)
Flammability Limits (%):	6-41
Autoignition Temperature (°C):	538
% Volatile by Volume:	100
Boiling Point/Range (°C):	Not applicable
pH:	Not applicable

* * *Section 10 - STABILITY AND REACTIVITY* * *

Reactivity:	Reacts with oxidising agents.
Chemical stability:	No information available.
Possibility of hazardous reactions:	If not stabilised, can polymerise violently.
Conditions to avoid:	Avoid exposure to heat, sources of ignition, and open flame.
Incompatible materials:	Incompatible with oxidising agents .
Hazardous decomposition products:	Cyanides.

* * *Section 11 - TOXICOLOGICAL INFORMATION* * *

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion:	Swallowing can result in nausea, vomiting, diarrhoea, abdominal pain, convulsions and loss of consciousness. Collapse and possible death may occur.
Eye contact:	May be an eye irritant.
Skin contact:	Contact with skin may result in irritation. Can be absorbed through the skin. Effects can include those described for 'INGESTION'.
Inhalation:	Breathing in high concentrations may result in the same symptoms described for 'INGESTION'. High inhaled concentrations may lead to a feeling of suffocation and cause difficulty in breathing, headaches, dizziness and loss of consciousness. Can cause suffocation.

Acute toxicity:
Oral LD50 (mice): 3700 ug/kg

Chronic effects: Repeated or prolonged skin contact may lead to irritant contact dermatitis - 'cyanide rash' - characterised by itching and skin eruptions. Chronic and subchronic exposure to cyanide is known to induce thyroid effects due to the cyanide metabolite, thiocyanate. Thiocyanate adversely affects the thyroid gland via competitive inhibition of iodide uptake and perturbation of the homeostatic feedback mechanisms that regulate the synthesis and secretion of essential thyroid hormones.

* * *Section 12 - ECOLOGICAL INFORMATION* * *

Ecotoxicity	Avoid contaminating waterways.

Aquatic toxicity: Very toxic to aquatic organisms. May cause long term adverse effects in the aquatic environment.

* * *Section 13 - DISPOSAL CONSIDERATIONS* * *

Disposal methods:
Refer to Waste Management Authority. Waste treatment is essential.

* * *Section 14 - TRANSPORT INFORMATION* * *

Road and Rail Transport
DANGEROUS GOODS.



UN No:	1051
Transport Hazard Class:	6.1 Toxic
Subrisk 1:	3 Flammable Liquid
Packing Group:	I
Proper Shipping Name or Technical Name:	HYDROGEN CYANIDE, STABILIZED
Hazchem or Emergency Action Code:	2WE

Marine Transport
DANGEROUS GOODS.

UN No:	1051
Transport Hazard Class:	6.1 Toxic
Subrisk 1:	3 Flammable liquid
Packing Group:	I
Proper Shipping Name or Technical Name:	HYDROGEN CYANIDE, STABILIZED
IMDG EMS Fire:	F-E
IMDG EMS Spill:	S-D
Marine Pollutant	Yes

Air Transport
DANGEROUS GOODS.
TRANSPORT PROHIBITED under the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air in Passenger and Cargo Aircraft, and Cargo Aircraft Only.

UN No:	1051
Transport Hazard Class:	6.1 Toxic
Subrisk 1:	3 Flammable Liquid
Packing Group:	I
Proper Shipping Name or Technical Name:	HYDROGEN CYANIDE, STABILIZED

Special precautions for user: Hydrogen cyanide (HCN) gas is a decomposition product of sodium cyanide. The above dangerous goods classification indicates that HCN is a compressed gas and could be present as a liquid. HCN liquid nor HCN compressed gas are sold or used by Ixom Operations Pty Ltd.

* * *Section 15 - REGULATORY INFORMATION* * *

Classification:
HAZARDOUS SUBSTANCE.

Classification of the substance or mixture:
Flammable liquids - Category 1
Acute Oral Toxicity - Category 1
Acute Dermal Toxicity - Category 1
Acute Inhalation Toxicity - Category 1
Specific target organ toxicity (single exposure) - Category 1

The following health/environmental hazard categories fall outside the scope of the Workplace Health and Safety Regulations:
Acute Aquatic Toxicity - Category 1
Chronic Aquatic Toxicity - Category 1

Hazard Statement(s):
H224 Extremely flammable liquid and vapour.
H300+H310+H330 Fatal if swallowed, in contact with skin or if inhaled.
H370 Causes damage to organs.

Poisons Schedule (SUSMP): S7 Dangerous Poison.

16. OTHER INFORMATION

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of LIsts™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Other Information

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