



March 2013

INTERNATIONAL CYANIDE MANAGEMENT
CODE TRANSPORT CERTIFICATION AUDIT

**ICMC Transport Certification
Audit of the Lihir Gold Limited
Papua New Guinea Supply
Chain - Summary**

Submitted to:

International Cyanide
Management Institute (ICMI)
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REPORT



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APPENDIX A

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1.0 INTRODUCTION

1.1 Operational Information

Name of Transportation Facility:	Lihir Gold Operation
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Name of Facility Operator:	Lihir Gold Limited
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1.2 Description of Lihir Gold Operation

In 2010, Lihir Gold Operation (LGO) became part of Newcrest Mining Ltd (Newcrest) when Newcrest acquired Lihir Gold Limited (LGL). LGO's operation is located on Niolam Island, 900 kilometres (km) north of Port Moresby in the New Ireland Province of Papua New Guinea. As Niolam Island is the principal island of the Lihir Group, it is generally referred to as Lihir Island.

Lihir Island is a volcanic sea mount that rises steeply from sea level to approximately 600 metres (m) above sea level. At its widest points, the island measures 22 km from north to south and 14.5 km from east to west. The Luise Caldera, in which all of the known ore deposits are located, is on the east coast of the island.

1.3 LGL PNG Supply Chain Transportation

1.3.1 Summary

LGL coordinates the transport of cyanide from Tongsoh Petrochemical Corporation (Tongsoh) in South Korea, to LGO on Lihir Island in PNG.

The cyanide product is manufactured and packed by Tongsoh in Ulsan. The product is packed firstly into wooden intermediate bulk containers (IBC's) and then into shipping containers for transport to Tongsoh customers in PNG.

The shipping containers are transported by SAM IK Logistics, to the Port of Busan's Korail Interim Storage Facility and stored in a dedicated Dangerous Goods storage facility on the port pending shipment to Put Put Wharf by Kyowa Limited.

The shipping route is from the Port of Ulsan to the Port of Luise. International freight delivered to Port of Luise is unloaded at Put Put Wharf and then loaded on trucks which transport the cyanide to LGO's NCA 2 Storage Yard. The cyanide is trucked between Put Put Wharf and NCA 2 Storage Yard by Noram Port Services, a subcontractor of LGO.

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1.3.2 Marine Transportation

1.3.2.1 Port of Busan

The Port of Busan lies on the south-eastern shores of South Korea, facing the Sea of Japan. The Port of Busan is about 50 kilometres south-west of the Port of Ulsan.

1.3.2.2 Put Put Wharf

The Put Put Wharf, located within Luise harbour, is owned and managed by LGL to service LGO. The Port is capable of handling medium ships and landing craft transporters. Containers are unloaded directly from the landing craft onto the trucks. The Port is approximately 500 metres (m) from the process plant storage yard (NCA 2 Storage Yard). Storage facilities are available at the Wharf, however, it is only used in case of emergencies.

Put Put Wharf is the responsibility of LGO's Purchasing Department and it is managed by Noram.

1.3.2.3 Kyowa Shipping Lines

Kyowa was founded in 1974 in Japan and is engaged in international shipping services with nine multi-purpose ships throughout the Asia-Pacific region. Two ships are used to transport cyanide to Put Put Wharf at Lihir. Kyowa's ships are managed according to the International Safety Management Standards (ISM Code) in order to ensure the safe and sure transport of valuable cargo.

1.3.3 Road Transportation

1.3.3.1 Noram Port Services

Noram commenced operation in its current form in July 2009. The majority of the employees were from the previous port services contractor and formed the nucleus of Noram Port Services. Noram is a Landowner company backed by the traditional owners of the Plant site and surrounding areas. The management rests on expatriates responsible for the supply of qualified labour that supports the LGO Port operations. Noram Ltd provides the labour whilst the daily coordination and assignment is under LGO for the Port Operations. Noram employees fill the following positions in the operations of the Put Put Wharf:

- Stevedore/Riggers
- Ships Crane operators
- Road Transport drivers
- Logistics Clerks
- Forklift operators
- Field Mechanics
- Auto elects
- Administration
- Supervisors
- Mobile Crane operators

Newcrest provides supervision and all the necessary training in accordance with company policies and procedures. All Noram employees are required to abide by LGO rules that include drug and alcohol testing every day and attend a Cyanide Awareness training for all people likely to come in contact with cyanide prior to commencing work at the wharf.

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1.3.4 Storage

1.3.4.1 NCA 2 Storage Yard

The NCA2 Storage Yard is used to store cyanide containers prior to their use within the processing plant. The cyanide containers are not opened until they are transported from the NCA 2 Storage Yard to NCA 2 Mixing Storage Area and NCA 1 Mixing Storage Area for destuffing, mixing and storage.

The NCA2 Storage Yard is a secured (fenced) facility with a locked gate. The NCA2 Storage Yard is located within the LGO operations area which is also a secured area with a perimeter fence and manned security gate. Access to this area is limited to authorised LGO and subcontractor personnel.

The NCA2 Storage Yard has signs on the security fence noting that cyanide is present, that smoking, open flames, eating and drinking are not allowed, and what personal protective equipment must be worn.

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1.4 Auditors Findings and Attestation

in full compliance with
Newcrest Lihir Gold Limited **The International**
Supply Chain is: in substantial compliance with **Cyanide Management**
 not in compliance with **Code**

Audit Company: Golder Associates
Audit Team Leader: Edward Clerk, CEnvP (112), RABQSA (020778)
Email: eclerk@golder.com.au

1.5 Name and Signatures of Other Auditors:

Name	Position	Signature	Date
Edward Clerk	Lead Auditor and Technical Specialist		08 March 2013

1.6 Dates of Audit

The Certification Transport Audit of Lihir Gold Limited was undertaken over two days (four person-days) between 24 and 25 October 2012.

I attest that I meet the criteria for knowledge, experience and conflict of interest for Code Verification Audit Team Leader, established by the International Cyanide Management Institute and that all members of the audit team meet the applicable criteria established by the International Cyanide Management Institute for Code Verification Auditors.

I attest that this Summary Audit Report accurately describes the findings of the verification audit. I further attest that the verification audit was conducted in a professional manner in accordance with the *International Cyanide Management Code Verification Protocol for Cyanide Transportation Operations* and using standard and accepted practices for health, safety and environmental audits.

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2.0 CONSIGNOR SUMMARY

2.1 Principle 1 – Transport

Transport Cyanide in a manner that minimises the potential for accidents and releases.

2.1.1 Transport Practice 1.1

Purchase cyanide from manufacturers employing appropriate practices and procedures to limit exposure of their workforce to cyanide, and to prevent releases of cyanide to the environment.

in full compliance with

The operation is

in substantial compliance with

Transport Practice 1.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The LGL PNG Supply Chain is in FULL COMPLIANCE with Standard of Practice 1.1 requiring LGO to select cyanide transport routes to minimise the potential for accidents and releases.

Lihir Gold Operations

LGO has developed procedures to guide the selection of the transport route to minimise the potential for accidents and releases, or the potential impacts of accidents and releases. The procedures provide information on the transport route and route selection process and are used as a reference by all Supply Department and LGO personnel involved in the transportation of cyanide to site. The procedures do not directly consider the factors detailed within this question as they are largely not applicable.

In addition to the procedures, LGO initiated a detailed hazard identification and risk assessment process for the entire route, to identify activities and assess the key risk areas with respect to cyanide, facilitated by an external risk specialist. The risk assessment process identified four risk activities:

- Unplanned/uncontrolled release of cyanide slurry during operations.
- Loss of cyanide containment during transportation, handling and storage.
- Elevated cyanide concentration at discharge.
- Toxic exposure to cyanide slurry, HCN gas in the process plant.

The controls to the risks are detailed within relevant procedures.

LGO has implemented a process to periodically re-evaluate routes used for cyanide deliveries. The outcomes of the assessment were used to guide the selection of the current route from the Port of Busan to the Put Put Wharf and the road transportation route from the Put Put Wharf to the NCA 2 Storage Yard. LGO conducts a morning toolbox with Supply Department and Noram employees. Road conditions and other topics/hazards related to cyanide transportation are discussed during the morning toolbox meeting.

Road transportation along the Supply Chain is restricted to 500 m between the Put Put Wharf and the NCA 2 Storage Yard within the LGO processing plant operations area. Access to this area is through a manned security gate and it is limited to authorised LGO and subcontractor personnel. Although the community are LGO stakeholders they are not situated along the cyanide transport route. Consultation with the community is undertaken as part of the mine site Code responsibilities.

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The risk assessment and management process did not identify the need for convoys, escorts or other additional safety or security measures.

A due diligence assessment was undertaken for all subcontracted links within the supply chain, including ports. The delivery route was selected to minimise the potential for accidents and releases.

Procedures require the development and implementation of a traffic management plan for each shipment of cyanide to be unloaded from the Wharf and transported to the NCA 2 Storage Yard. The implementation of a traffic management plan requires an inspection of the route and briefing of the equipment operators and drivers.

The transport route does not present a special security concern in its own right that would warrant safety or security measures in addition to those already in place for the LGO processing plant operations area.

LGO is not reliant on external responders, external medical facilities and communities during an emergency response. In the event of an emergency, the operation would utilise its own emergency response team and on-site Medical Clinic (staffed by ISOS).

LGO subcontracts Noram to manage Put Put Wharf and the transportation of cyanide from Put Put Wharf to NCA 2 Storage Yard. LGO satisfies itself that Noram meets the requirements of the ICMC by managing Noram's employees as it does LGO employees. By doing so Noram employees are expected to comply with LGO's standards and procedures, including ICMC requirements.

Noram Port Services

Noram is contracted by LGO to manage the Put Put Wharf, including:

- Stevedoring.
- Operating container lifters (Omega 48E) to load and unload cyanide containers from trucks.
- Driving trucks (Hino 700 Series Model E13C) between the Wharf and NCA 2 Storage Yard.

All equipment used in the handling and transportation of cyanide at LGO is owned and maintained by LGO and operated by Noram under the direction of LGO's Supply Department in accordance with LGO's established procedures and processes. Noram drivers and equipment operators attend the morning tool box meeting and are issued with safety notifications.

Put Put Wharf

Put Put Wharf is owned by LGL and operated by Noram using LGO processes and procedures.

The Put Put Wharf was purpose designed by LGO for the operation's requirements. The Wharf was not designed for interim storage of cyanide. Cyanide containers are not unloaded during rough conditions. Once unloaded, containers are placed onto the hardstand briefly before being loaded directly onto trucks for transportation to the NCA 2 Storage Yard.

In addition to the security provided for the LGO processing operations area, access to the Put Put Wharf is further restricted to authorised persons. Access is controlled through a manned security boom gate.

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Kyowa Shipping

LGO does not have control of the routes taken by the shipping lines contracted to transport sodium cyanide.

LGL engaged a consultant to conduct a Due Diligence Review of Kyowa Shipping on 21 and 25 May 2012. The Review found that Kyowa has systems in place to ensure compliance with all the requirements of the IMDG Code and other relevant parts of the International Convention for the Safety of Life at Sea (SOLAS Convention).

The Due Diligence Review assessed Kyowa Shipping against the ICMC requirements and concluded that its operations were in compliance with the ICMC.

The due diligence assessment was found to sufficiently evaluate the shipping operations, and additional management measures by the consigner were not considered necessary.

Port of Busan

The Due Diligence noted that Pier Two of North Port Busan does not have interim storage facilities for dangerous goods and consequently cyanide is loaded from Pier Two of North Port Busan directly onto the ship.

The cyanide shipped from the Port of Busan is transhipped through the ports Chofu, Kobe, Nagoya and Yokohama. There is no cargo reconstitution during the stopover in any of the above Japanese ports.

The Due Diligence Review assessed the Port of Busan facilities against the ICMC requirements and concluded that its operations were in compliance with the ICMC and additional management measures by the consigner were not considered necessary.

2.1.2 Transport Practice 1.2

Ensure that personnel operating cyanide handling and transport equipment can perform their jobs with minimum risk to communities and the environment.

The operation is **in full compliance with** **Transport Practice 1.2**
 in substantial compliance with
 not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The LGL PNG Supply Chain is in FULL COMPLIANCE with Standard of Practice 1.2 requiring personnel operating cyanide handling and transport equipment can perform their jobs with minimum risk to communities and the environment.

Lihir Gold Operations

LGO owns, but does not directly operate equipment for the transportation and handline of cyanide along its PNG Supply Chain as this is undertaken by its contractor Noram. LGO requires that Noram use only trained, qualified and licensed operators to operate its equipment.

LGO have developed a Training Needs Analysis that identifies and tracks job training requirements for specific roles in the Supply Department and for its contractor, Noram. The core training requirements required by LGO are further detailed in procedures.

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All personnel operating cyanide handling and transport equipment have been trained to perform their jobs in a manner that minimises the potential for cyanide releases and exposures. LGO maintains a spreadsheet of all operators and their licence details, as well as a register of all training and qualifications that employees possess, including licences. The expiry dates are tracked within the register and audited on a six monthly basis by the LGO Port Services Coordinator. LGO also keeps a training schedule for the following year.

Noram Port Services

All equipment used in the handling and transportation of cyanide at LGO is owned and maintained by LGO and operated by Noram under the direction of LGO’s Supply Department in accordance with LGO’s established procedures and processes.

In addition to LGO’s procedures, Noram has established its own Licence review procedure that requires the Noram Training/OHS Coordinator to review the Noram Licence Detail spread sheet to confirm all operator licences are current every quarter. A summary report is forwarded to the Noram General Manager.

2.1.3 Transport Practice 1.3

Ensure that transport equipment is suitable for the cyanide shipment.

The operation is in full compliance with **Transport Practice 1.3**
 in substantial compliance with
 not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The LGL PNG Supply Chain is in FULL COMPLIANCE with Standard of Practice 1.3 requiring that transport equipment is suitable for the cyanide shipment.

Lihir Gold Operations

LGO only uses equipment designed and maintained to operate within the cyanide loads it will be handling at the Put Put Wharf and along the road transport route. All equipment used has design ratings appropriate to handle a fully loaded cyanide container (approximately 22 tonnes).

Procedures require all equipment used in the loading and unloading of cyanide be operated within their design limits. Procedures prevent overloading of set equipment and vehicles design limits by prohibiting the movement and transportation of more than one container at a time. This is the responsibility of the Port Supervisor.

Inspections are completed on all equipment used in the handling and transportation of cyanide by operators while maintenance is managed through a preventative maintenance system and is conducted by LGO Maintenance Department in accordance with equipment requirements.

The adequacy of equipment is verified through the daily prestart checks and scheduled service preventative programmes. These include the structural integrity of the equipment to identify signs of stress or overloading.

Noram Port Services

All equipment used in the handling and transportation of cyanide at LGO is owned and maintained by LGO and operated by Noram under the direction of LGO’s Supply Department in accordance with LGO’s established procedures and processes.

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2.1.4 Transport Practice 1.4

Develop and implement a safety program for transport of cyanide.

in full compliance with

The operation is

in substantial compliance with

Transport Practice 1.4

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The LGL PNG Supply Chain is in FULL COMPLIANCE with Standard of Practice 1.4 requiring an implemented safety program for transport of cyanide.

Lihir Gold Operations

The cyanide product is manufactured and packed by Tongsoh, an ICMC certified producer. The product is packed firstly into wooden intermediate bulk containers (IBC's) and then into shipping containers for transport to LGO.

Upon arrival at Put Put Wharf, cyanide containers are not unloaded during rough conditions. LGO procedures require sea containers to be checked for damage. If a container is suspected of damage, the Port Services Coordinator is contacted and the damage is assessed. Once unloaded, containers are placed onto the hardstand briefly before being loaded directly onto trucks for transportation to the NCA 2 Storage Yard.

Twist locks are used to secure the containers to the trucks for transport to the NCA2 Storage Yard. The cyanide containers are not opened prior to being sent to the LGO cyanide mixing and storage facilities.

Tongsoh have systems in place to ensure their containers are labelled in accordance with the IMDG Code and as required by local regulations or international standards. Currently there are no regulations or regulatory authority within PNG for the transport of dangerous and hazardous goods and no placarding of trucks or containers is required.

LGO take custody of the Tongsoh containers once they clear customs at the Port of Busan. The containers are not opened nor have their signage augmented until they arrive at the final destination. The placards used on the containers, include:

- UN Numbers.
- Dangerous Goods Class labels, both of which are prescribed in the United Nations Model Regulations and the IMDG Code.

The Port Supervisor has the responsibility of ensuring the correct hazchem signage is attached to the front of each truck prior to delivery to the NCA2 Storage Yard.

LGO implements a safety programme for cyanide transport that includes the following:

- The adequacy of equipment is verified through the daily prestart checks and scheduled service preventative programmes.
- All equipment used in the loading and unloading of cyanide is operated within its design limits as according LGO procedures. Procedures prevent overloading of set equipment and vehicles design limits by prohibiting the movement and transportation of more than one container at a time. This is the responsibility of the Port Supervisor.

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- Inspections are completed on all equipment used in the handling and transportation of cyanide by operators while maintenance is managed through a preventative maintenance system and is conducted by LGO Maintenance Department in accordance with equipment requirements.
- Limitations on driver's hours by only allowing loads to be transported periodically and travel only during daylight hours. The route is 500 m long, and therefore, the need for driver breaks is not required. Drivers and equipment operators work a standard LGO 12 hour shift. LGO procedures state that under no circumstance will any cargo be discharged during night time hours and no cyanide deliveries will take place after 1800 hours. Records of attendance and hours worked are maintained.
- Procedures to prevent loads from shifting. Solid cyanide is packed into UN-approved composite IBCs that are stowed by the manufacturer to minimise movement in transport. The containers are not unloaded at the Put Put Wharf during rough conditions and they are secured using twist locks when being transported by road to the NCA 2 Storage Yard.
- Procedures for the modification or suspension of transport. Procedures state that in very poor conditions, all operations are to cease as stated in until the conditions improve.
- An alcohol and drug procedure. Procedures note that LGO has a zero tolerance for alcohol and buai in accordance with LGO's *Drug and Alcohol Policy*. Any employees or business partner who returns a Blood Alcohol Content (BAC) reading of:
 - 0.00 and 0.05 receives a first official warning and the loss of one day's pay.
 - >0.05 is instantly dismissed.

Any employee or business partner found in possession of buai on company property faces similar disciplinary action.

LGO requires all employees and business partners to be subject to daily alcohol testing before commencing work and random drug testing. Records are maintained.

- Records are maintained for all relevant parts of this element.

Noram Port Services

All equipment used in the handling and transportation of cyanide at LGO is owned and maintained by LGO and operated by Noram under the direction of LGO's Supply Department in accordance with LGO's established procedures and processes.

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2.1.5 Transport Practice 1.5

Follow international standards for transportation of cyanide by sea and air.

The operation is **in full compliance with** **Transport Practice 1.5**
 in substantial compliance with
 not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The LGL PNG Supply Chain is in FULL COMPLIANCE with Standard of Practice 1.5 requiring the operation follow international standards for transportation of cyanide by sea and air.

Lihir Gold Operations

LGO does transport consignments of cyanide by sea or air within the scope of this audit. Transport by sea occurs from the Port of Busan in South Korea to the Port of Luise, by Kyowa Shipping.

All containers transported by LGL are placarded at the Tongsoh Petrochemical Corporation in South Korea in accordance with the requirements of the IMDG Code, with UN numbers, the Class 6 dangerous goods class label and the severe marine pollutant label (i.e. fish with St Andrews Cross). This level of placarding is consistent with the requirements of the Australian Dangerous Goods Code (ADG Code).

Noram Port Services

All equipment used in the handling and transportation of cyanide at LGO is owned and maintained by LGO and operated by Noram under the direction of LGO's Supply Department in accordance with LGO's established procedures and processes.

Kyowa Shipping

A Due Diligence Review of Kyowa Shipping was conducted for LGO by Collin Kasisi of Key Process Improvements in May 2012. This Due Diligence Review indicated that Kyowa Shipping transported cyanide in compliance with the IMDG Code. The Due Diligence Review noted that containers of cyanide are received at the Port of Busan are already sealed for transport. Consequently, the Due Diligence Review was limited to the ICMI Transport Practices that specifically referenced provisions of the IMDG Code, namely 1.5.1 d-I, with all provisions complied with.

Port of Busan

LGL engaged Key Process Improvements Pty Ltd to conduct a Due Diligence Review of the Port of Busan. The Due Diligence Review assessed the Port of Busan facilities against the ICMC requirements and concluded that its operations were in compliance with the ICMC and additional management measures by the consigner were not considered necessary.

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2.1.6 Transport Practice 1.6

Track cyanide shipments to prevent losses during transport.

in full compliance with

The operation is

in substantial compliance with

Transport Practice 1.6

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The LGL PNG Supply Chain is in FULL COMPLIANCE with Standard of Practice 1.6 requiring Tracking of cyanide shipments to prevent losses during transport.

Lihir Gold Operations

A “Magic List” is maintained by the LGO Supply Department that details information on each cyanide voyage, including voyage number, vessel, departure date, container number, Bill of Lading No, contents, Dangerous Goods class and weight.

The LGO Supply Department maintains regular contact with the cyanide supplier and shipping agent to ascertain the progress of the ship and its estimated arrival date.

The port Operations are advised of the arrival date for planning purposes and the Wharf Clerk reconciles the offloaded containers against those detailed on the Magic List.

The Supply Department maintain regular contact (daily to weekly) with the Metallurgical Department via email and meetings advising them of cyanide stock levels and impending shipments.

Once landed, trucks transport the cyanide to the NCA2 Storage Yard. Drivers carry hand held radios to maintain contact with crane and container handler operators. This area has complete radio and mobile phone coverage. LGO communication equipment (mobile phones, email, radio, etc) is tested through continuous use to ensure it functions properly rather than a procedural requirement to check the equipment on an established frequency. Drivers are trained to use all communication devices including trunk radios and fixed equipment radios as part of their on the job induction training.

There are no blackout areas along the transport route.

LGO implements inventory controls and custody documentation to prevent the loss of cyanide during shipment. The operation has chain of custody records identifying all elements of the supply chain that handle the cyanide brought to its site.

Procedures state that the Port Services “Container Logger” is used to document cyanide containers coming off the ship. During unloading from the ship, the containers are inspected for any damage.

Shipping records indicating the amount of cyanide in transit and Material Safety Data Sheets (SDS) are available at Put Put Wharf.

Shipping records include:

- Invoice
- Commercial invoice, Bill of Lading and packing list – information on:
- Certificate of Analysis.
- Packing Declaration.

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- Certificate of Origin.
- Dangerous Goods Packing Inspection Certificate.
- Dangerous Goods Declaration and Container Packing Certificate.
- Container Manifest

As outlined under Compliance 1.1, LGO satisfies itself that sub-contractor Noram meets the requirements of the ICMC by managing Noram's employees as it does LGO employees. By doing so Noram employees are expected to comply with LGO's standards and procedures, including ICMC requirements.

Noram Port Services

All equipment used in the handling and transportation of cyanide at LGO is owned and maintained by LGO and operated by Noram under the direction of LGO's Supply Department in accordance with LGO's established procedures and processes.

Put Put Wharf

The Put Put Wharf is owned by LGL and managed using LGO communication processes and procedures described above.

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2.2 Principle 2 – Interim Storage

Design, construct and operate cyanide trans-shipping depots and interim storage sites to prevent release and exposures.

2.2.1 Transport Practice 2.1

Store cyanide in a manner that minimises the potential for accidental releases.

The operation is in full compliance with **Transport Practice 2.1**
 in substantial compliance with
 not in compliance with
 not applicable

Summarise the basis for this Finding/Deficiencies Identified:

The LGL PNG Supply Chain is in FULL COMPLIANCE with Standard of Practice 2.1 requiring cyanide to be stored in a manner that minimises the potential for accidental releases.

Put Put Wharf

The Put Put Wharf is a transshipping depot used to transfer cyanide containers from ships onto trucks for transportation to the NCA 2 Storage Yard. The Wharf is not used for the interim storage of cyanide.

The Wharf is a secure gated facility that is manned by a 24 hour security presence and monitored through closed circuit television. Persons may only access the area with an access card that is checked on entry.

Signs are present on the entry gate to the Wharf advising that cyanide and other dangerous goods are present in the area, that smoking, open flames, eating and drinking are not allowed, and the required personal protective equipment.

The containers are also locked and sealed with placards indicating UN Numbers and Dangerous Goods Class labels. The shipping container acts as a secondary containment to the IBCs contained within.

NCA 2 Storage Yard

The NCA2 Storage Yard is dedicated solely to the storage of cyanide containers prior to their use within the processing plant. The cyanide containers are not opened until they are transported from the NCA 2 Storage Yard to NCA 2 Mixing Storage Area and NCA 1 Mixing Storage Area.

At the NCA2 Storage Yard, cyanide is stored within locked and sealed shipping containers. Shipping containers are designed to minimise the potential for contact of solid cyanide with water. The 20 IBCs stacked within the container occupy the majority of available space limiting the build-up of hydrogen cyanide gas. The base of the NCA 2 Storage Yard is compacted earth that is graded to minimise ponding of water around the stored containers.

The NCA2 Storage Yard is a secured (fenced) facility with a locked gate and is located within the LGO operations area which is also a secured area with a perimeter fence and manned security gate. Access to this area is limited to authorised LGO and subcontractor personnel.

The NCA2 Storage Yard has signs on the security fence noting that cyanide is present, that smoking, open flames, eating and drinking are not allowed, and what personal protective equipment must be worn.

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LGO has established a comprehensive emergency response system for its operation, including the Wharf and NCA 2 Storage Yard. The operation has developed a CERP that forms part of the emergency response system. The CERP regulates the response to cyanide related emergencies at LGO. The document is subordinate to the Lihir Emergency Management Plan, which is the primary document for the management of emergencies at LGO.

Port of Busan

The Port of Busan is a transshipping depot used to transfer cyanide containers from trucks to ships. The Port of Busan is not used for the interim storage of cyanide. LGL engaged Key Process Improvements Pty Ltd to conduct a Due Diligence Review of the Port of Busan.

The Due Diligence Review assessed the Port of Busan facilities against the ICMC requirements and concluded that its operations were in compliance with the ICMC and additional management measures by the consigner were not considered necessary.

2.3 Principle 3 – Emergency Response

Protect communities and the environment through the development of emergency response strategies and capabilities.

2.3.1 Transport Practice 3.1

Prepare detailed Emergency Response Plans for potential cyanide releases.

The operation is in full compliance with **Transport Practice 3.1**
 in substantial compliance with
 not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The LGL PNG Supply Chain is in FULL COMPLIANCE with Standard of Practice 3.1 requiring a detailed emergency response plan for potential cyanide releases.

Lihir Gold Operations

LGO has established a comprehensive emergency response system. The operation has developed a CERP that forms part of the emergency response system. The CERP regulates the response to cyanide related emergencies at LGO and includes procedures for cyanide emergencies at the mine (including the NCA 2 Storage Area), along the transport route and at the Port. The document is subordinate to the Lihir Emergency Management Plan, which is the primary document for the management of emergencies at LGO. The CERP describes response actions, as appropriate for the following anticipated emergency situations:

- General response procedure
 - PPE and Testing for HCN Gas
 - Cyanide Poisoning Procedure
 - Decontamination
 - Solid Sodium Cyanide Spill to Water
 - Uncontained Spills
 - Contained Spills

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- Release scenarios
 - Catastrophic Hydrogen Cyanide Release
 - On-Site Transport Emergency
 - Escalation
 - Releases during Unloading and Mixing
 - Fires
 - Pipe, Valve and Tank Ruptures
 - Power Outages and Pump Failures
 - Uncontrolled Seepage

The CERP considers the physical and chemical form of cyanide (solid cyanide). It details the hazards and controls of both solid and liquid cyanide. The emergency response actions detailed in the CERP are relevant to solid cyanide and its packaging in IBCs within freight containers.

Due to the lack of facilities and equipment on the island external to LGO, LGO has not designated any role for outside responders or communities in the event of an emergency during transport.

Although the community are not involved in cyanide emergency response, LGO has developed community notification procedures.

Noram Port Services

All equipment used in the handling and transportation of cyanide at LGO is owned and maintained by LGO and operated by Noram under the direction of LGO's Supply Department in accordance with LGO's established procedures and processes.

Put Put Wharf

Put Put Wharf is owned by LGL and operated by Noram using LGO emergency response processes and procedures.

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2.3.2 Transport Practice 3.2

Designate appropriate response personnel and commit necessary resources for emergency response.

in full compliance with

The operation is

in substantial compliance with

Transport Practice 3.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The LGL PNG Supply Chain is in FULL COMPLIANCE with Standard of Practice 3.2 requiring LGO designate appropriate response personnel and committed resources for emergency response.

Lihir Gold Operations

LGO provides emergency response training for appropriate personnel.

LGO have developed a Training Needs Analysis that identifies and tracks job training requirements for specific roles in the Supply Department and for its contractor, Noram.

Cyanide Awareness Training in turn covers the following modules relating to emergency response:

- Cyanide poisoning.
- Symptoms of cyanide poisoning.
- First aid and emergency procedures to cyanide poisoning/spills.

The CERP details the training requirements for the following dedicated emergency response personnel:

- EMT Members
- ERT Members
- Medical Personnel
- Environmental Department

The CERP identifies the key roles and responsibilities in the event of an emergency during transport.

In addition, actions to be undertaken per type of incident are described in the specific response procedures contained within the CERP.

Cyanide mock drills and desktop scenarios are the responsibility of the ERT Coordinator and will be nominated within this framework as a minimum of once per calendar year.

The CERP lists the equipment that is available for cyanide emergency response for the following categories:

- PPE
- Containment equipment
- Treatment chemicals
- Communication equipment

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■ **Monitoring equipment**

LGO does have the necessary emergency response and health and safety equipment available during transport. Truck drivers are not first responders in emergencies, therefore are not required to carry specialist PPE.

Transport vehicle and equipment operators receive initial and periodic refresher training in emergency response procedures including implementation of the CERP.

LGO does have procedures to inspect emergency response equipment and assure its availability when required. The Auditor inspected a selection of equipment and found it to be present and serviceable.

Noram Port Services

As outlined under 1.1, LGO satisfies itself that sub-contractor Noram meets the requirements of the ICMC by managing Noram’s employees as it does LGO employees. By doing so Noram employees are expected to comply with LGO’s standards and procedures, including ICMC requirements.

All equipment used in the handling and transportation of cyanide at LGO is owned and maintained by LGO and operated by Noram under the direction of LGO’s Supply Department in accordance with LGO’s established procedures and processes.

2.3.3 Transport Practice 3.3

Develop procedures for internal and external emergency notification and reporting.

in full compliance with

The operation is

in substantial compliance with

Transport Practice 3.3

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The LGL PNG Supply Chain is in FULL COMPLIANCE with Standard of Practice 3.3 requiring procedures for internal and external emergency notification and reporting.

Lihir Gold Operations

LGO’s emergency documentation includes procedures and contact information for notifying management, regulatory agencies, and medical facilities of the cyanide emergency during transport.

In the event of an emergency, personnel are instructed to raise the alarm via the emergency radio channel or the emergency phone number. These contact points are manned 24 hours a day by ERT members, who assess what facets of emergency response are required. Key internal and external contact information is contained within the CERP.

Systems are in place to ensure that internal and external emergency notification and reporting procedures relevant to transport are kept current.

The OHS Superintendent/ OHS-ERT Coordinator are responsible for maintaining and up-dating the CERP. This includes the emergency contact lists.

Noram Port Services

Transport of cyanide from Put Put Wharf to NCA 2 Storage Yard is conducted under the direction of LGO using their processes and procedures.

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2.3.4 Transport Practice 3.4

Develop procedures for remediation of releases that recognise the additional hazards of cyanide treatment.

in full compliance with

The operation is

in substantial compliance with

Transport Practice 3.4

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The LGL PNG Supply Chain is in FULL COMPLIANCE with Standard of Practice 3.4 requiring procedures for remediation of releases that recognise the additional hazards of cyanide treatment.

Lihir Gold Operations

The CERP contains procedures during transport and handling for remediation, such as recovery or neutralisation of solutions or solids, decontamination of soils or other contaminated media and management and/or disposal of spill clean-up debris. The CERP prohibits the treatment of sodium cyanide spills in natural water sources. The CERP allows the use of sodium hypochlorite to neutralise spills to soil.

Noram Port Services

Noram’s employees will be managed as LGO employees and are expected to comply with LGO’s standards and procedures, including CERP requirements.

2.3.5 Transport Practice 3.5

Periodically evaluate response procedures and capabilities and revise them as needed.

in full compliance with

The operation is

in substantial compliance with

Transport Practice 3.5

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The LGL PNG Supply Chain is in FULL COMPLIANCE with Standard of Practice 3.5 requiring periodically evaluating response procedures and capabilities and revising them as needed.

Lihir Gold Operations

LGO has established a process to periodically review and evaluate the CERP’s adequacy. The CERP is to be reviewed every 12 months or following an event or incident that requires a review. The CERP notes that the OHS Superintendent/ OHS-ERT Coordinator are responsible for maintaining and up-dating the CERP. This includes training applicable site personnel in various emergency response roles.

LGO has established a procedure to evaluate the CERP’s performance after its implementation and revise it as needed, including a requirement to conduct mock drills and desktop scenarios for cyanide at a minimum of once a year. To date there have been no transportation incidents requiring the activation of the CERP and its revision.

Noram Port Services

Transport of cyanide from Put Put Wharf to NCA 2 Storage Yard is conducted under the direction of LGO using their processes and procedures.

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3.0 DUE DILIGENCE

3.1 Shipping

3.1.1 Shipping – Kyowa Shipping

Collin Kasisi of Key Process Improvements Pty Ltd and Leo Marsh of LGO conducted a Due Diligence Review of Kyowa Shipping between 20 and 25 May 2012. Leo Marsh meets the ICMI requirements for a Transport Expert.

The following items were addressed within the due diligences:

- Executive summary
- Introduction
 - ICMC
 - Structure of report
 - LGL due diligence schedule
 - Lihir supply chain due diligence audit team
- Background
 - LGO
 - LGL Supply Chain
- Lihir sodium supply chain description
 - International shipping liners
 - International cyanide code certified transporters
 - Interim storage facilities
- Cyanide transportation verification protocol audit findings
 - Transport Practice 1.1
 - Transport Practice 1.5
 - Transport Practice 2.1
 - Transport Practice 3.0 (addressed within 1.5).

The due diligence assessments were compiled through physical visits, interviews and discussions with appropriate personnel and review of applicable documentation.

The due diligence assessments were found to sufficiently evaluate the shipping operations, and additional management measures by the consigner were not considered necessary.

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LIHIR GOLD ICMC TRANSPORT CERTIFICATION AUDIT, SUMMARY AUDIT REPORT

The Due Diligence Review found:

■ *“Route Selection:*

- *Kyowa Shipping Service Paradise route includes the Ports of Busan, Chofu, Kobe, Nagoya, Yokohama, Lihir, Rabaul, Lae, Port Moresby, Townsville, Keelung, Shanghai and then back to Busan. The route was chosen as the most direct, shortest and most economically viable. It takes 10 days to travel from Yokohama to Lihir compared to 12 days from Busan to Lihir*
- *The delivery route selected will minimize the potential for accidents and releases; the Port of Busan and Japanese Ports are authorised to handle 1000t of Dangerous Goods class 6.1 which is well above any shipment to Lihir Island at any given time.*

■ *Compliance to international Standards for transportation of cyanide by Sea*

- *Kyowa shipping Co., Ltd Operates two ships to transport sodium cyanide to Lihir Gold Operation; Kyowa Orchid and Kyowa Rose both whose safety systems comply with International Convention for Safety of Life at Sea 1974 (SOLAS) convention and International Code for the Security of Ships and of Port Facilities (IPS Code)*
- *Kyowa under its operations company TORITEC COMPANY LIMITED; 16 – 4, Shinbashi 1 – chome, Minato – ku, Tokyo, Japan is in compliance with all the requirements of the IMDG Code (Company ID: IMO 1881905) and the International Safety Management (ISM) Code.*
- *Kyowa is audited by IMO approved auditors and required to meet all requirements of IMO to allow its shipping lines to operate through US territory of Guam.*
- *LGO is preparing contractual agreements to ensure that it does not consign any product on a vessel that is not a container vessel operated by Kyowa;*
- *Part of LGO’s contracts will also prescribe that product may only be exported through the Port of Busan, thereby ensuring that it is always delivered to the same port of embarkation by the shortest most direct route with the least public exposure;*
- *The Port of Busan stipulates that dangerous goods class 6.1 cannot be stored on-site for more than 24 hours and according to the Code hence cannot be considered as a trans-shipping depot as described below*

■ *LGL Supply Chain*

- *In our opinion, the cyanide supply chain for Lihir Gold Operation from ...Busan to Lihir Island via Yokohama is in compliance with the principles of the ICMI Cyanide Transportation Verification Protocol for the International Cyanide Management Code....*

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3.2 Ports

3.2.1 Port of Busan

Collin Kasisi of Key Process Improvements Pty Ltd and Leo Marsh of LGO conducted a Due Diligence Review of Kyowa Shipping between 20 and 25 May 2012. Leo Marsh meets the ICMI requirements for a Transport Expert.

The following items were addressed within the due diligences:

- Executive summary
- Introduction
 - ICMC
 - Structure of report
 - LGL due diligence schedule
 - Lihir supply chain due diligence audit team
- Background
 - LGO
 - LGL Supply Chain
- Lihir sodium supply chain description
 - International shipping liners
 - International cyanide code certified transporters
 - Interim storage facilities
- Cyanide transportation verification protocol audit findings
 - Transport Practice 1.1
 - Transport Practice 1.5
 - Transport Practice 2.1
 - Transport Practice 3.0 (addressed within 1.5).

The due diligence assessments were compiled through physical visits, interviews and discussions with appropriate personnel and review of applicable documentation.

The Due Diligence noted that cyanide is transported by SAM IK Logistics by road to Korail Interim Storage Facility in Busan and from here it is transported a short distance to Pier Two of North Port Busan. Pier Two does not have interim storage facilities for dangerous goods and consequently cyanide is transported from the Korail Interim Storage facility to Pier Two of North Port Busan and loaded directly onto the ship.

The cyanide shipped from the Port of Busan is transhipped through the ports Chofu, Kobe, Nagoya and Yokohama. There is no cargo reconstitution during the stopover in any of the above Japanese ports.

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The Due Diligence noted that access to the pier was very restricted and it was not possible to verify whether emergency response procedures were in place.

The Due Diligence Review noted that the Port of Busan is authorised to handle 1000 t of Dangerous Goods class 6.1 which is well above any shipment to Lihir Island at any given time. The Due Diligence Review assessed the Port of Busan facilities against the ICMC requirements and concluded that its operations were in compliance with the ICMC.

4.0 LIMITATIONS

Your attention is drawn to the document - "Limitations", which is included as Appendix A to this report. This document is intended to assist you in ensuring that your expectations of this report are realistic, and that you understand the inherent limitations of a report of this nature. If you are uncertain as to whether this report is appropriate for any particular purpose please discuss this issue with us.

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Report Signature Page

GOLDER ASSOCIATES PTY LTD

A handwritten signature in black ink, appearing to read 'E. Clerk'.

Ed Clerk
Associate

RKW/EWC/eh

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APPENDIX A

Limitations



LIMITATIONS

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