



February 2011

INTERNATIONAL CYANIDE MANAGEMENT CODE

Orica Australia Pty Ltd, Cyanide Production Audit (Box to Sparge Facility), Ghana, West Africa, Summary Audit Report

Submitted to:

International Cyanide Management Institute
(ICMI)
888 16th Street, NW-Suite 303
Washington, DC
UNITED STATES OF AMERICA

Orica Australia Pty Ltd
GPO Box 4311
Melbourne, Victoria,
AUSTRALIA 3000

REPORT

Report Number. 107643313-004-R-Rev1

Distribution:

1 Copy - Orica Australia Pty Ltd (Electronic)
1 Copy – ICMI (+1 Electronic)



A world of
capabilities
delivered locally





Record of Issue

Company	Client Contact	Version	Date Issued	Method of Delivery
ICMI	Norm Greenwald	107643313 004 R Rev1	28 February 2011	Electronic and Hard Copies
Orica	David Ellison	107643313 004 R Rev1	28 February 2011	Electronic



Table of Contents

1.0 INTRODUCTION.....	1
1.1 Operational Information	1
1.2 Orica Australia Pty Ltd	1
1.3 Yarwun Production Facility	1
1.4 Ghana Box to Sparge Transfer Facility	1
1.5 Auditors Findings and Attestation	2
2.0 PRINCIPLE 1 – OPERATIONS	3
2.1.1 Production Practice 1.1	3
2.1.2 Production Practice 1.2	4
2.1.3 Production Practice 1.3	5
PRINCIPLE 2 – WORKER SAFETY.....	6
2.1.4 Production Practice 2.1	6
2.1.5 Production Practice 2.2	7
PRINCIPLE 3 – MONITORING.....	8
2.1.6 Production Practice 3.1	8
PRINCIPLE 4 – TRAINING.....	9
2.1.7 Production Practice 4.1	9
2.1.8 Production Practice 4.2	10
PRINCIPLE 5 – EMERGENCY RESPONSE	11
2.1.9 Production Practice 5.1	11
2.1.10 Production Practice 5.2	11
2.1.11 Production Practice 5.3	12
2.1.12 Production Practice 5.4	13
2.1.13 Production Practice 5.5	13
2.1.14 Production Practice 5.6	14

APPENDICES

APPENDIX A

Limitations



1.0 INTRODUCTION

1.1 Operational Information

Name of Transportation Facility:	Orica West Africa Supply Chain
Name of Facility Owner:	Not Applicable
Name of Facility Operator:	Orica Australia Pty Ltd
Name of Responsible Manager:	Matthew Hawkins, Supply Chain Manager – Mining Chemicals
Address:	Orica Australia Pty Ltd GPO Box 4311 Melbourne 3000
State/Province:	Victoria
Country:	Australia
Telephone:	+61 3 9665 7739
Fax:	+61 3 9665 7908
E-Mail:	matthew.hawkins@orica.com

1.2 Orica Australia Pty Ltd

Orica is an Australian-owned, publicly listed company with global operations. Orica is managed as discrete business units that produce a wide variety of products and services. The Mining Chemicals unit is based in Australia and exports products to Asia, Africa and the Americas, as well as supplying the local Australian industry. This unit's main product is sodium cyanide, which is manufactured at Orica's Yarwun facility in Queensland, Australia. Orica Mining Chemicals is the world's second largest producer of cyanide.

1.3 Yarwun Production Facility

Orica's Yarwun facility, which is located approximately 8 km by road from Gladstone, Queensland, commenced operations in 1989 and is engaged in the manufacture of cyanide (both solid and liquid forms), ammonium nitrate, nitric acid, chlorine, sodium hydroxide, sodium hypochlorite, hydrochloric acid and expanded polystyrene balls. The cyanide production facility at Yarwun was certified by ICMI as being compliant with the Code on 1 December 2006.

Cyanide manufactured at Yarwun is handled within the Transfer Facility in Ghana.

1.4 Ghana Box to Sparge Transfer Facility

Orica's Transfer Facility in Ghana was constructed to supply Newmont's Ahafo mine with cyanide transported within sparge isotainers. Barbex operates the Transfer Facility at their transport and storage depot located in Tarkwa, Ghana; this storage depot is located within Gold Fields Ghana Limited's mining lease.

After two upgrades, the Transfer Facility was completed in late 2006 and currently supplies approximately 200 tonnes per month of cyanide in sparge isotainers to Newmont's Ahafo mine, the Golden Star Bogoso mine and the Bonikro mine in the Cote D'Ivoire.

Orica Australia Pty Ltd

Name of Facility

Signature of Lead Auditor

28 February 2011

Date



1.5 Auditors Findings and Attestation

in full compliance with

The International Cyanide Management Code

Orica is:

in substantial compliance with

not in compliance with

Audit Company: Golder Associates

Audit Team Leader: Edward Clerk, CEnvP (112), RABQSA (020778)

Email: eclerk@golder.com.au

Name and Signatures of Other Auditors

Name	Position	Signature	Date
Edward Clerk	Lead Auditor and Technical Specialist		28 February 2011

Dates of Audit

The production audit and reporting was undertaken between September and December 2010. The field component of the audit was undertaken over two man-days between 22 and 24 September 2010.

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 Production Operations and using standard and accepted practices for health, safety and environmental audits.

Orica Australia Pty Ltd

28 February 2011

Name of Facility

Signature of Lead Auditor

Date

Orica Australia Pty Ltd

28 February 2011

Name of Facility

Signature of Lead Auditor

Date



2.0 PRINCIPLE 1 – OPERATIONS

Design, construct and operate cyanide production facilities to prevent release of cyanide.

2.1.1 Production Practice 1.1

Design and construct cyanide production facilities consistent with sound, accepted engineering practices and quality control/quality assurance procedures.

in full compliance with

The operation is

in substantial compliance with

Production Practice 1.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 1.1 requiring cyanide production facilities to be designed and constructed consistent with sound, accepted engineering practices and quality control/quality assurance procedures.

Quality control and quality assurance programmes have been implemented during construction of cyanide production and storage facilities, but not all of the records have been retained. An appropriately qualified engineer responsible for the design and construction of the facility has provided assurance to Orica that that aspect of the facility was built as proposed and approved. Orica has obtained separate written assurance from a Ghanaian professional engineer who has inspected the civil and building aspects of the facility concluding that its continued operation within the parameters established by operating and maintenance will protect against cyanide exposures and releases subject to the completion of a weatherproof access-way which has since been completed. Orica has also obtained an assurance from the hire company that provides a crane for the handling of empty isotainers.

An Engineer from Orica, Yarwun confirmed that the intermediate bulk containers (IBCs), which hold cyanide solution, and the cyanide solution pump and associated hoses and pipework, are fabricated from a range of materials including mild steel, nylon, natural rubber (hoses) and polypropylene (pump and IBC).

There are appropriately reliable systems to ensure that cyanide handling equipment (including hoists and hoppers) go to safe conditions to prevent releases that could otherwise occur due to power outages or equipment failures.

Cyanide solids and solutions are managed on a concrete surface that can minimise seepage to the subsurface. Concrete surfaces are present in the Transfer Facility as well as in areas where waste packaging materials are handled.

The facility employs appropriate methods to prevent the overfilling of cyanide vessels, including checklist-driven procedures to address the quantity of material in an isotainer before filling and the quantity of material to be introduced during filling. In addition, a weighbridge at a nearby mine is available should the filling status of an isotainer be in doubt.

The secondary containments that form part of the facility are constructed of materials such as concrete and masonry that provide a competent barrier to contain solid cyanide and cyanide solutions as appropriate and they are sized to hold a volume greater than that of the largest credible release that could occur within the containment. The release of an entire isotainers inventory of cyanoids is not deemed a credible failure scenario. The auditor accepts that overfilling of a hopper by one bag is the only credible scenario. As such, the loading bay is sized to hold one spilt bag of cyanoids.

Spill containment measures are provided for all cyanide solution pipelines that form part of the Transfer Facility. Flexible hoses are installed to connect the cyanide solution pump to the IBCs holding cyanide

Orica Australia Pty Ltd

Name of Facility

Signature of Lead Auditor

28 February 2011

Date



solution, and to the loading bay sump, to enable solution transfers to be made as required. The hoses are contained within the banded loading bay area and the building cladding will act to deflect any release from those hoses to within the containment area.

2.1.2 Production Practice 1.2

Develop and implement plans and procedures to operate cyanide production facilities in a manner that prevents accidental releases.

in full compliance with

The operation is

in substantial compliance with

Production Practice 1.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 1.2 requiring the development and implementation of plans and procedures to operate cyanide production facilities in a manner that prevents accidental releases.

The Orica Transfer Facility has plans and procedures that describe the standard practices necessary for its safe and environmentally sound operation, mostly under the document control of Orica Mining Chemicals. These procedures address process descriptions, the use of PPE and cyanide test kits, pre-transfer inspection and other preparations by the operating team and detailed instruction for the transfer operation, including cautions and notes regarding hazardous aspects.

The Transfer Facility has procedures for contingencies during upsets in its activities (such as power failure, compressed air failure, overfilling, bag breakages and hose leaks) that may result in cyanide exposures or releases.

The Transfer Facility have implemented the Management of Change procedure to identify when site operating practices have or will be changed from those on which the initial design and operating practices. Orica has provided evidence to demonstrate that this is effective (installing windows at Level 3 Transfer Facility).

Preventive maintenance programmes are implemented on weekly and fortnightly schedules and activities documented for equipment and devices necessary for cyanide production and handling. Orica has a procedure that describes the periodic checks required to be undertaken weekly and fortnightly. These checks include hoists, cone valves, exhaust air filters, PPE, safety showers and sump pumps.

Process instrumentation is not critical to the prevention of cyanide releases and exposures as manually-controlled parameters are used. These include visual verification that isotainers are empty and simple counting of the numbers of 1,135 kg bags (weighed and labelled in Australia) proposed to be loaded into the empty isotainer.

The facility has an environmentally sound procedure to prevent unauthorised/unregulated discharge to the environment of any cyanide solution or cyanide-contaminated water that is collected in a secondary containment area. All water collected in the Transfer Facility secondary containment is pumped into a one cubic metre intermediate bulk container where it is temporarily stored prior to being pumped into empty sparge isotainers prior to filling. If for any reason this procedure could not be implemented, Barbex has the capability to accept cyanide-contaminated water into its waste management facility and to transfer such waste water to the Goldfields Ghana Mine tailings storage facility.

Orica has a contract with Barbex to implement environmentally sound procedures for disposal of cyanide or cyanide-contaminated solids. These include the recovery of solid cyanide spills for delivery to customers,

Orica Australia Pty Ltd

Name of Facility

Signature of Lead Auditor

28 February 2011

Date



the disposal of cyanide-contaminated bags to a nearby tailings storage facility, the decontamination of damaged timber and the return of intact timber to Australia for reuse by Orica.

Except immediately prior to transfer to isotainers, the storage of cyanide at Tarkwa is under the control of Barbex Technical Services, a Code-certified cyanide transporter. The Orica Transfer Facility is located within the same secure environment as the Barbex warehouses and the transfer operations are configured for effective ventilation and moisture exclusion.

There are procedural arrangements to ensure that the cyanide supplied by Orica in Ghana is packaged as required by the political jurisdictions through which loads will pass. The applicable jurisdictions are Ghana and Ivory Coast (though the customer in Ivory Coast is not a Code signatory). There is no specific legislation covering the transport of dangerous goods in Ghana or Ivory Coast at this time. However, Ghana is a signatory to the *International Maritime Dangerous Goods Code*, which establishes a reasonable expectation that dangerous goods transported within Ghana will be transported to international standards or higher. In the absence of specific law, Orica's current practice for road transport in Ghana is in general accordance with the *Australian Dangerous Goods (ADG) Code* for road transport. Placards or other signage is used to identify the shipment being dispatched from the Transfer Facility as cyanide, as required by international regulations or standards.

2.1.3 Production Practice 1.3

Inspect cyanide production facilities to ensure their integrity and prevent accidental releases.

in full compliance with

The operation is

in substantial compliance with

Production Practice 1.3

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 1.3 requiring the inspection of cyanide production facilities to ensure their integrity and prevent accidental releases.

The Orica Transfer Facility conducts routine inspections of components critical to the safe containment and handling of solid cyanide and cyanide solutions, including hoists, hoppers, tanks, pumps and pits. The inspection check sheets are detailed to direct the inspector's attention to the points of vulnerability to failure. Inspections are carried out on weekly, fortnightly and batch-wise schedules. These inspection frequencies are adequate to assure that equipment is functioning within design parameters.

The check sheets detail specific items to be observed and include the date of the inspection, the name of the inspector, and observed deficiencies.

The nature and date of corrective actions are documented on the inspection forms. Barbex produces a weekly report of issues that are raised as requiring corrective action and recording the resolutions undertaken. The report is provided to Orica so help them monitor the resolution of issues and to provide resources as necessary.

The issues are registered in Orica's Safety Health and Environment Management Information System (SHERMIS) which is a companywide system.

During the audit, a leaking valve was identified on the southern IBC allowing a stream of cyanide contaminated water to flow to the sump in the loading bay. Orica has provided documentation of how and when this incident was reported, who repaired it (how and when) and copies of batch sheets that have monitored progress of the repair.

Orica Australia Pty Ltd

Name of Facility

Signature of Lead Auditor

28 February 2011

Date



PRINCIPLE 2 – WORKER SAFETY

Protect workers’ health and safety from exposure to cyanide.

2.1.4 Production Practice 2.1

Develop and implement procedures to protect plant personnel from exposure to cyanide.

in full compliance with

The operation is

in substantial compliance with

Production Practice 2.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 2.1 requiring the facility to develop and implement procedures to protect plant personnel from exposure to cyanide.

Orica has developed procedures for the Transfer Facility that cover worker safety during product loading, maintenance, non-routine and emergency situations. The Orica procedures and others developed by Barbex with input from Orica have been formally adopted at the Transfer Facility and include procedures that require review of proposed process or operational changes to provide assurance that appropriate worker protection measures are included when changes are adopted. Orica has provided evidence to demonstrate that this is effective (installing windows at Level 3 Transfer Facility). The Transfer Facility involves workers in consideration of proposed changes at the plant that may affect worker safety, mostly through weekly toolbox talks and also when workers raise issues for discussion.

The facility uses four personal hydrogen cyanide monitors rather than fixed monitors to confirm that worker exposure to hydrogen cyanide is below limits. The personal monitoring equipment is maintained, tested and calibrated by a consulting chemist, as per the manufacturers’ recommendations. Another mobile analyser is used to monitor ambient air quality. The equipment is sent to South Africa periodically for calibration and an analytical laboratory provides monitoring services whilst the equipment is unavailable on site.

Areas and activities have been identified where specific PPE requirements need to be applied. These involve box handling, preparation for loading, loading and packaging waste handling.

The Transfer Facility planned its operations so that there are five employees involved in each loading operation. This ensures that a buddy system applies to all workers directly engaged in cyanide handling operations. This ensures that workers can request assistance through their buddy. In addition, all teams have radios for further communication. Barbex employees engaged in waste operations also work in pairs.

All Transfer Facility employees are required to undergo an independent medical physical to evaluate their fitness for complete site duties prior to employment and periodically; medicals are conducted under arrangements with the medical centre at a nearby gold mine where cyanide is used.

The Transfer Facility has a formal clothing change policy for employees, contractors and visitors to all areas with the potential for cyanide contamination of clothing during operations. The Transfer Facility prohibits personnel from smoking, eating and drinking, and having an open flame in areas with the potential for cyanide exposure – communicating this requirement via its induction training and by the display of signage.

Orica Australia Pty Ltd

Name of Facility

Signature of Lead Auditor

28 February 2011

Date



2.1.5 Production Practice 2.2

Develop and implement plans and procedures for rapid and effective response to cyanide exposure.

in full compliance with

The operation is

in substantial compliance with

Production Practice 2.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 2.2 requiring the development and implementation of plans and procedures for rapid and effective response to cyanide exposure.

The Transfer Facility has developed specific written emergency response plans and procedures to respond to cyanide exposures. These are based on standard Orica cyanide training materials and include features such as summoning help, removal of the casualty from the source of cyanide, the administration of oxygen and other first aid, flushing the skin clear of cyanide and obtaining expert medical assistance.

Safety showers, low-pressure eye wash stations and non-acidic fire extinguishers are located at strategic locations in the Transfer Facility and these are inspected on a fortnightly or batch-wise basis as appropriate. Incident response supplies are available including fresh water, oxygen, resuscitator, antidotes and radios for emergency notifications. These items are checked for their ready availability to be used effectively if required on a weekly basis. The long lead time to replace the Cyanokit antidote kits has been identified and replacements will be ordered 3 months ahead of the use by date of the existing kits.

The Transfer Facility inspects its first aid equipment weekly to assure that it is available when needed. The first aid and emergency response equipment is stored and tested as directed by their manufacturer and replaced on a schedule that assures they will be effective when used.

A current MSDS for sodium cyanide (in English, the official language of Ghana) is available in the area where operations are conducted. This includes first aid advice and other important information on cyanide safety. Personal protective equipment requirements are displayed in the workplace by the use of enlarged photographs in prominent locations.

Storage tanks, containers, piping, hoses and other plant items that may contain or be contaminated with cyanide are labelled to alert workers of their contents or possible contamination.

The Transfer Facility has a decontamination procedure for employees, contractors and visitors leaving areas where they may become contaminated with cyanide, requiring them to change clothes and to wash hands and face before drinking, eating, toileting or smoking.

The Transfer Facility has an on-site first aid capability to provide first aid to workers exposed to cyanide. Medical assistance would be provided under arrangements established with the medical centre at a nearby gold mine that uses cyanide. Arrangements have been pre-planned to transport an exposed employee to medical aid. There are two local gold mines that are in a position to provide qualified assistance and the Transfer Facility has alerted local hospitals and clinics located more remotely of the potential need to treat patients for cyanide exposure if the primary and secondary arrangements are unavailable. The primary provider is also engaged in the provision of medical support for medical surveillance of the facility's workers.

Mock emergency drills are conducted periodically to test response procedures for various exposure scenarios, and the lessons learned from the drills are incorporated into response planning. The normal schedule is for two drills per year. Orica and Barbex have procedures in place to investigate and evaluate cyanide exposure incidents to determine if the facility's programmes and procedures to protect worker health and safety and to respond to cyanide exposures are adequate or need to be revised. There have been no reported incidents of worker cyanide exposure since the Transfer Facility was established in 2006.

Orica Australia Pty Ltd

Name of Facility

Signature of Lead Auditor

28 February 2011

Date



PRINCIPLE 3 – MONITORING

Conduct environmental monitoring to confirm that planned or unplanned releases of cyanide do not result in adverse impacts.

2.1.6 Production Practice 3.1

Conduct environmental monitoring to confirm that planned or unplanned releases of cyanide do not result in adverse impacts.

in full compliance with

The operation is in substantial compliance with **Production Practice 3.1**

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 3.1 requiring environmental monitoring to be conducted to confirm that planned or unplanned releases of cyanide do not result in adverse impacts.

The Orica Transfer Facility has neither direct nor indirect discharges to surface water. Cyanide-contaminated water is disposed of by including it in deliveries of solid cyanide dispatched to customers in isotainers. Cyanide solutions arising from Barbex’ waste management operations are disposed of the tailings storage facility of a neighbouring gold mine. Concentrations of WAD and free cyanide in groundwater less 0.01 mg/L at the points adopted for monitoring compliance points below the facility, which is protective of the existing beneficial use of ground water for gold mining. As the existing beneficial use is protected, there is no need for the Transfer Facility to be engaged in remedial activity to prevent further degradation or restore beneficial use.

The Ghana EPA does not provide numerical limits for atmospheric emissions of cyanide. The Transfer Facility has therefore adopted limits for hydrogen cyanide as per the Orica MSDS (4.7 ppm). This limits atmospheric process emissions of hydrogen cyanide gas such that worker health is protected. There are no communities in close proximity to the Facility, however potential industrial receptors are located approximately 100 meters from the transfer facility. Barbex monitor for air emissions of cyanide through the use of personal monitors and the MultiGas detector SPERIAN PHD6. The personal detectors are used daily for the duration that a worker is handling cyanide. The PHD6 is used weekly for 15 minutes. Compliance with the adopted limit is achieved through the inherent advantage of handling only solid product and by limits on working inventory and the use of filtered air extraction systems when handling product.

Surface water quality is monitored at two sampling points: one upstream of the site and the other downstream. Groundwater quality is monitored at three bores: one upstream of the Transfer Facility and two downstream. Monitoring is carried out monthly in both media. This seems sufficient to show consistent trends in both media, indicative of compliance with environmental quality criteria.

<u>Orica Australia Pty Ltd</u>	 _____ Signature of Lead Auditor	<u>28 February 2011</u> Date
Name of Facility		



PRINCIPLE 4 – TRAINING

Train workers and emergency response personnel to manage cyanide in a safe and environmentally protective manner.

2.1.7 Production Practice 4.1

Train employees to operate the plant in a manner that minimises the potential for cyanide exposures and releases.

in full compliance with

The operation is

in substantial compliance with

Production Practice 4.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 4.1 requiring employees to be trained to operate the plant in a manner that minimises the potential for cyanide exposures and releases.

The facility trains workers to understand the hazards of cyanide and refresher training is periodically conducted. The Orica Mining Chemicals Sodium Cyanide Safety Guidelines training is provided to all staff on a two yearly basis. The Training Matrix for 2010 included Orica Mining Chemicals Sodium Cyanide Safety Guidelines training.

The facility trains workers in the use of PPE and when and where this equipment is required. PPE training materials introduce the items of personal protective equipment, both basic and supplementary, that are in use at the Transfer Facility.

The facility trains workers to perform their normal production tasks with minimum risk to worker health and safety and in a manner that prevents unplanned cyanide releases. The materials used for Sodium Cyanide Box to Sparge Training are comprehensive. They include photographs of key equipment (PPE, sparge isotank, flange guards, sparge hatch access point, transfer hopper and chute, crane hoist including bag lifter and bag splitter) and steps involved in its use. Requirements for PPE use, spill response and the management of packaging waste are included.

Barbex in consultation with Orica personnel have developed a training matrix to manage the training requirements for all employees and visitors entering the Transfer Facility. The training matrix details:

- The training that is required to be undertaken
- The frequency at which each of the training modules is to be conducted
- A record of training undertaken by specific personnel

Employees are trained prior to being allowed to work with cyanide, and appropriately qualified personnel provide the training. It was noted that a number of trainers have learned their training skills on the job rather than having a formal training qualification. However, in the opinion of the auditor, there is a sound base of technical expertise in the team of people involved in providing training, both in general and particular to the cyanide operations.

The facility evaluates the effectiveness of cyanide training by testing. Evaluation quizzes are used to evaluate the effectiveness of training.

Orica Australia Pty Ltd

Name of Facility

Signature of Lead Auditor

28 February 2011

Date



2.1.8 Production Practice 4.2

Train employees to respond to cyanide exposures and releases.

in full compliance with

The operation is

in substantial compliance with

Production Practice 4.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 4.2 requiring employees to be trained to respond to cyanide exposures and releases.

The facility provides training in procedures for response to cyanide releases. This includes training in emergency response, fire extinguishers, MSDS, first aid, PPE and sodium cyanide safety.

The facility trains workers to respond to worker exposure to cyanide and are routine drills used to test and improve their response skills. The ERP requires emergency response simulation drills to be conducted twice a year which simulate cyanide or other dangerous goods spill events. These drills include employees and external agencies. Briefing notes are produced at the end of each mock drill to allow for lessons learnt to be introduced into future training and drills.

Confirmation of training attendance/participation records are retained throughout an individual's employment documenting the training they have received, including the names of the employee and the trainer, the date of training, the topics covered. The records indicate whether an employee demonstrated an understanding of the training materials. This is done either through a question and answer sheet or through the trainer's observations after verbalising the questions.

Orica Australia Pty Ltd

Name of Facility

Signature of Lead Auditor

28 February 2011

Date



PRINCIPLE 5 – EMERGENCY RESPONSE

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

2.1.9 Production Practice 5.1

Prepare detailed emergency response plans for potential cyanide releases.

in full compliance with

The operation is

in substantial compliance with

Production Practice 5.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 5.1 requiring a detailed emergency response plan (ERP) for potential cyanide releases.

Barbex has developed an ERP for the management of cyanide related emergencies associated with the Transfer Facility and cyanide transportation. In addition, Barbex also refers to Orica's *Emergency Response Guide – Sodium Cyanide* for technical guidance. The ERP was developed by Barbex with the assistance of Orica to ensure the ERP is consistent with emergency response guidance issued to Barbex by Orica. Orica provide oversight of the ERP and are provided opportunity to comment on revisions to the ERP.

The ERP considers potential site specific failure scenarios and contains sufficient procedural information to be followed in the case of an emergency. The worst case scenario of a release of cyanide at the Transfer Facility would involve dropping an IBC during a transfer operation. This would result in a maximum spillage of 1.1 tonnes of solid cyanide.

The ERP describes response actions for persons involved in the management of the emergency. These response actions are detailed for the potential site specific scenarios as well as for specific personnel. The ERP also contains a procedure for responding to cyanide poisoned casualties, as well as a procedure to limit the spread of releases at their source. In addition, the ERP describes specific actions necessary for containment, assessment, mitigation and future prevention of releases.

2.1.10 Production Practice 5.2

Involve site personnel and stakeholders in the planning process.

in full compliance with

The operation is

in substantial compliance with

Production Practice 5.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 5.2 requiring the operation to involving site personnel and stakeholders in the planning process.

The facility has involved its workforce and stakeholders in the emergency response planning process. The ERP designates roles for employees and external agencies, which have participated in mock emergency drills.

The SHE Distribution Risk Manager advised the worst case scenario of an incident at the Transfer Facility would involve dropping an IBC during a transfer operation resulting in a maximum spillage of 1.1 tonnes of solid cyanide. The zone of influence of such a scenario is limited to the Warehouses and Transfer Facility

Orica Australia Pty Ltd

Name of Facility

Signature of Lead Auditor

28 February 2011

Date



and would not impact industrial receptors which are located approximately 100 meters from the Transfer Facility. There are no communities in close proximity to the Facility. As such, communities and neighbouring industrial facilities have not been consulted within regard to Transfer Facility specific emergencies.

Barbex has involved local response agencies such as outside responders and medical facilities in the emergency planning and response process. External responders include Orica, medical facilities, police and mine emergency response teams.

Police emergency services, and mine site responders, have been advised of their responsibilities in writing. The roles and responsibilities of the police are consistent with their normal duties associated with traffic and crowd control.

The Transfer Facility has engaged in regular consultation and communication with stakeholders to assure that the ERP addresses current conditions and risks. The ERP notes that the Facility Manager and Safety and Environment Coordinator are responsible for updating and reviewing the plan and informing all plan holders of any relevant changes. Barbex sent the latest ERP (Revision 8) and an accompanying letter requesting comments to all mine sites that they supply cyanide to.

2.1.11 Production Practice 5.3

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

in full compliance with

The operation is

in substantial compliance with

Production Practice 5.3

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 5.3 requiring designated appropriate personnel and committed equipment and resources for emergency response.

The Barbex ERP:

- Designates primary and alternate emergency response coordinators. The coordinators have authority to commit resources necessary to implement the ERP during an emergency situation.
- Identifies Emergency Response Teams. Two complete Emergency Response Teams (Team A and Team B) are detailed within the ERP. Each team consists of a Response Coordinator, a Team Leader and three Responders.
- Requires appropriate training for emergency responders. Barbex have developed and implemented a training scheme and mock drills for its Emergency Response Team.
- Includes call-out procedures and 24-hour contact information for the coordinators and response team members.
- Specifies the duties and responsibilities of the coordinators and team members.
- Includes procedures to inspect emergency response equipment and assure its availability when required. Transport emergency response equipment is checked prior to each shipment, while equipment contained within the Emergency Response Room and personal emergency response equipment and PPE is checked monthly.

Orica Australia Pty Ltd

Name of Facility

Signature of Lead Auditor

28 February 2011

Date



- Describes the role of outside responders and medical facilities. Barbex has identified and advised outside responders of their roles and responsibilities in emergency response through correspondence and involvement in emergency response exercises. However, the nature of the Transfer Facility operation, and limited local availability of qualified external responders means that emergency response is largely self-contained. Emergency drills involving the Transfer Facility and cyanide transportation from the Transfer Facility have engaged external responders and have been undertaken yearly since 2008.

2.1.12 Production Practice 5.4

Develop procedures for internal and external emergency notification and reporting.

in full compliance with

The operation is

in substantial compliance with

Production Practice 5.4

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 5.4 requiring development of procedures for internal and external emergency notification and reporting.

The emergency response plan includes contact information and procedures for notifying management, regulatory agencies, outside response providers, the community, medical facilities and the media of an emergency, as appropriate.

Communities are unlikely to be impacted by an incident or required in emergency response measures as the worst case scenario at the Transfer Facility would involve a maximum spillage of 1.1 tonnes of solid cyanide. As such the communities have not been consulted.

2.1.13 Production Practice 5.5

Incorporate into response plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals.

in full compliance with

The operation is

in substantial compliance with

Production Practice 5.5

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 5.5 requiring the operation to incorporate monitoring elements that account for the additional hazards of using cyanide treatment chemicals into response plans and remediation measures.

The ERP describes specific, appropriate remediation measures, 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. This includes descriptions on decontamination of soils or other contaminated media. Specific information concerning the management of spill clean-up debris is not provided. The procedures require the responder to notify the relevant parties listed in the Guide. Orica Emergency Response Service is listed as the prime contact and information concerning the management of spill clean-up debris is initiated through this service. The ERP contains a warning not to use sodium hypochlorite or ferrous sulphate to treat cyanide that has been released into natural surface waters

Orica Australia Pty Ltd

Name of Facility

Signature of Lead Auditor

28 February 2011

Date



The ERP addresses the need for environmental monitoring (in water and soil) to identify the extent and effects of a release, and includes sampling methods, parameters and locations. Section 4.5 (Environmental Monitoring) of the ERP states that Barbex shall arrange for the incident area to be monitored in accordance with direction from the Ghana EPA and the product manufacturer.

2.1.14 Production Practice 5.6

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

in full compliance with

The operation is

in substantial compliance with

Production Practice 5.6

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Production Practice 5.6 requiring the operation to periodically evaluate response procedures and capabilities and revise them as needed.

The ERP includes provisions for reviewing and evaluating its adequacy on an annual basis. The ERP (Revision 8) was last reviewed on 23 September 2010. The facility conducts mock drills and the operation has a systematic process whereby the lessons learnt from drills are translated into corrective actions.

Orica Australia Pty Ltd

Name of Facility

Signature of Lead Auditor

28 February 2011

Date



Report Signature Page

GOLDER ASSOCIATES PTY LTD

A handwritten signature in black ink, appearing to read 'E. Clerk', located below the company name.

Ed Clerk
ICMI Lead Auditor and Transport Technical Specialist

EWC/ST/arp

A.B.N. 64 006 107 857

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation..

\\pth1-s-file01\jobs\env\2010\107643313 - orica cn audit tarkwa ghana\report - production\107643313-004-r-rev1 production sar.doc



APPENDIX A

Limitations



LIMITATIONS

This Document has been provided by Golder Associates Pty Ltd ("Golder") subject to the following limitations:

This Document has been prepared for the particular purpose outlined in Golder's proposal and no responsibility is accepted for the use of this Document, in whole or in part, in other contexts or for any other purpose.

The scope and the period of Golder's Services are as described in Golder's proposal, and are subject to restrictions and limitations. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Golder in regards to it.

Conditions may exist which were undetectable given the limited nature of the enquiry Golder was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.

In addition, it is recognised that the passage of time affects the information and assessment provided in this Document. Golder's opinions are based upon information that existed at the time of the production of the Document. It is understood that the Services provided allowed Golder to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

Any assessments made in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in this Document.

Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Golder for incomplete or inaccurate data supplied by others.

Golder may have retained subconsultants affiliated with Golder to provide Services for the benefit of Golder. To the maximum extent allowed by law, the Client acknowledges and agrees it will not have any direct legal recourse to, and waives any claim, demand, or cause of action against, Golder's affiliated companies, and their employees, officers and directors.

This Document is provided for sole use by the Client and is confidential to it and its professional advisers. No responsibility whatsoever for the contents of this Document will be accepted to any person other than the Client. Any use which a third party makes of this Document, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Golder accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this Document.

At Golder Associates we strive to be the most respected global group of companies specialising in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organisational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

Africa	+ 27 11 254 4800
Asia	+ 852 2562 3658
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

solutions@golder.com
www.golder.com

Golder Associates Pty Ltd
Level 3, 1 Havelock Street
West Perth, Western Australia 6005
Australia
T: +61 8 9213 7600

