February 2011

INTERNATIONAL CYANIDE MANAGEMENT CODE CYANIDE TRANSPORTATION AUDIT

Barbex Technical Services Ltd, Ghana, West Africa, Transport Recertification Summary Audit Report

Submitted to:

International Cyanide Management Institute (ICMI)
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UNITED STATES OF AMERICA

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REPORT

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Table of Contents

1.0 INTRODUCTION

1.1 Operational Information

Name of Transportation Facility:	Barbex Technical Services
Name of Facility Owner:	Barbex Technical Services
Name of Facility Operator:	Barbex Technical Services
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1.2 Description of Operation

1.2.1 Barbex Technical Services

Barbex was established in 1990 as a logistical support company. In 1994, Barbex constructed a 1,500 square metre warehouse complex on the Ashanti Goldfields (now AngloGold Ashanti) property in Obuasi. In 1997, Barbex constructed a similar warehouse complex (1,200 square metres) on the Teberebie Goldfields property near Tarkwa in the Western Region of Ghana. The Barbex Tarkwa Facility is used to store cyanide (up to 3,000 tonnes) and other chemicals for mines in the region. The Facility consists of the following:

- Office
- Transfer facility (intermediate bulk containers (IBC) to sparge tank transfer facility). This is facility, owned by Orica Australia Pty Ltd (Orica) and operated by Barbex. The Transfer Facility is addressed in a separate Production Facility certification audit report
- Three warehouses
  - Warehouse 1 (IBC to sparge tank transfer facility warehouse)
  - Warehouse 2 (IBC transit store)
  - Warehouse 3 (waste bag temporary storage area)
- Annex between Warehouse 2 and 3 (IBC dismantling area)
- Waste bag strapping facility

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

- Incinerator for disposal of waste bags and IBCs
- Change house
- Transport yard

Barbex currently transports approximately 20,000 tonnes per annum of cyanide from its Tarkwa Facility. The Company also provides a service to the mines whereby it collects the empty boxes and the polypropylene and polyethylene outer and inner liners (where applicable) and returns them to the Barbex Tarkwa Facility for incineration.

1.2.2 Sodium Cyanide Transportation

Solid cyanide manufactured by E.I. DuPont de Nemours and Company (DuPont) and Orica is packaged in IBCs, which are in turn packed into a container. The containers are dispatched from their countries of origin and are delivered by ship to the Ports of Takoradi and Tema in Ghana. The ports are operated by the Ghana Ports and Harbours Authority (GPHA), a government body.

At the ports, the containers are unloaded from the ship by GPHA stevedores onto GPHA transport trailers, using the ship's cranes, as there are no ship unloading facilities.

The GPHA trailers deliver the containers to an open area in the port, which is dedicated to cyanide storage. The area is isolated by at least 15 m from all other operations, goods and containers. The trailers are unloaded using top lifters that are used for all container operations at the port, including 12 m (30 tonne) containers.

Customs clearance takes place at the point where containers are collected by Barbex. The containers may be opened in the presence of Barbex personnel who then lock the containers before they are loaded onto trucks using GPHA top-lifters.

From the Port storage area, the cyanide is loaded onto Barbex semi-trailer trucks and transported, in convoy, north to the Barbex Tarkwa Facility where the containers are unpacked.

Cyanide IBCs stored within the Barbex Tarkwa Facility can be either:

- Emptied into sparge tanks using Orica's Box to Sparge Transfer Facility located adjacent to the warehouse (Orica cyanide only) and then transported to mine sites within Ghana, or
- Repacked into shipping containers and transported to mine sites within Ghana (Orica and DuPont cyanide)

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

Table 1 details the transport routes used by Barbex at the time of the audit.

Table 1: Barbex Transport Routes

Origin	Destination	Company	Distance (km)
Barbex Facility	Tarkwa Mine, Ghana	Goldfields Ghana Limited	14 (on private mine road)
Barbex Facility	Damang Mine, Ghana	Goldfields Ghana Limited	51
Barbex Facility	Bogoso Mine, Ghana	Golden Star Resources	62
Barbex Facility	Wassa Mine, Ghana	Golden Star Resources	70
Barbex Facility	Ahafo Mine, Ghana	Newmont Ghana Limited	320
Barbex Facility	Chirano Mine, Ghana	Redback Mining	210
Barbex Facility	Iduapriem Mine, Ghana	Anglogold Ashanti	5
Barbex Facility	Bonikro Mine, Cote D'Ivoire	Newcrest Mine Limited	630
Takoradi Port	Barbex Facility, Ghana	Barbex	90
Tema Port	Youga Mine, Burkina Faso	Burkina Mining Company	884
Tema Port	Kalsaka Mine, Burkina Faso	Cluff Mining Limited	134

1.3 Auditors Findings and Attestation

Barbex Technical Services is:

☒ **in full compliance with**

☐ in substantial compliance with

☐ not in compliance with

The International Cyanide Management Code

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		3 February 2011

Barbex Technical Services — Name of Facility

 — Signature of Lead Auditor

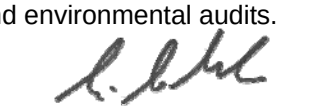
3 February 2011 — Date

Dates of Audit

The transportation audit and reporting was undertaken between September and December 2010. The field component of the audit was undertaken over two main-days between 24 and 25 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 Transportation Operations and using standard and accepted practices for health, safety and environmental audits.

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

2.0 PRINCIPLE 1 – TRANSPORT

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

2.1.1 Transport Practice 1.1

Select cyanide transport routes to minimise the potential for accidents and releases.

☒ **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:

Barbex is in FULL COMPLIANCE with Transport Practice 1.1 requiring cyanide transport routes to be selected to minimise the potential for accidents and releases.

Barbex, in consultation with its suppliers and clients has implemented a procedure for the transport route selection to minimise potential for accidents and releases, in an environment where there are limited practical alternative transport routes.

The transportation routes have been analysed for hazards and inherent risk and mitigation measures are determined. Drivers assess and report on conditions during each trip. Barbex seeks input in regards to route selection from communities, stakeholders and government agencies when necessary. In addition to this, the routes are routinely re-assessed as they are driven. Barbex implements a procedure to evaluate the risks of selected cyanide transport routes every two years, when there is a major accident, when there are new or changes to legislation or when there are significant changes to a feature on a particular route. The procedure also outlines the measures necessary to manage these risks.

The transport routes do not present special security concerns, despite this, convoys are used for every delivery except for the short delivery runs to Tarkwa mines, which do not use public roads. Convoys consist of a leading support vehicle and either a single truck or several trucks.

Barbex does not subcontract any of the cyanide handling or transport operations.

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.

☒ **in full compliance with**

The operation is ☐ in substantial compliance with **Transport Practice 1.2**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

Barbex is in FULL COMPLIANCE with Standard of Practice 1.2 requiring personnel operating cyanide handling and transport equipment to perform their jobs with minimum risk to communities and the environment.

Barbex only uses trained and competent operators to drive its transport vehicles. Vehicle licences are issued by the Driver Vehicle Licensing Authority (DVLA) in Ghana. For drivers delivering cyanide to countries surrounding Ghana, an International Drivers Licence is required and these are issued by the DVLA. The republic of Ghana is a member of ECOWAS and drivers' licences issued in Ghana are valid in other ECOWAS member countries.

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

All Barbex 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. There is no requirement in Ghana for drivers to be licensed for dangerous goods transport. To compensate, Barbex provides drivers with Transport Procedure Training on a yearly basis. The training module includes information on dangerous goods. Prior to convoy departures, the Convoy Leader completes a Cyanide Delivery Checklist which contains a prompt to check whether each driver has a valid driver's licence and current Cyanide Awareness training.

Barbex does not subcontract cyanide handling or transport operations.

2.1.3 Transport Practice 1.3

Ensure that transport equipment is suitable for the cyanide shipment.

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

Summarise the basis for this Finding/Deficiencies Identified:

Barbex is in FULL COMPLIANCE with Standard of Practice 1.3 requiring that transport equipment is suitable for the cyanide shipment.

Barbex only use equipment designed and maintained to operate within the loads it will be handling when transporting cyanide.

Barbex maintains a dedicated fleet of 10 MAN Diesel prime movers and 14 drop deck King Trailers to transport freight containers and isocontainers. The equipment was purchased specifically to transport product along roads rough roads in West Africa. Vehicle power, axle loadings and other parameters are set by the manufacturer and the single container/isotainer loads are within the capacities of the vehicles and legal capacities of the public roads.

Barbex vehicles are subject to a tiered service programme. The service program includes checks on the integrity of specific components of the vehicles.

There are several checks and inspections in addition to scheduled services as outlined below:

- Daily pre-start checklists are completed for the prime movers. The checks include checks on hydraulics, electrics, windscreen and mirrors, air pressure and brakes
- Weekly checks are conducted on the prime movers. The checks include tyre parameters, lubrication points, suspension and frame and panel integrity
- Daily pre-start checks are completed for the forklifts. The checks include checks on structural integrity and signs of stress and overloading
- Weekly checklists are completed for the trailers. The checks include checks on structural integrity and signs of stress and overloading
- A defect report process is used to record defects identified during this inspection process or during a journey
- Cyanide Delivery Checklist is completed prior to departure. This requires the Convoy Leader to confirm that a number of items (25) are safe prior to the convoy departs

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

Procedures are in place to assure the adequacy of the equipment for the load and to prevent overloading. Vehicle power, axle loadings and other parameters are set by the manufacturer and the single container/isotainer loads are within the capacities of the vehicles and legal capacities of the public roads. Forklifts are used to move cyanide only on pallets in single units which is well below the design capacity of the forklifts.

Barbex does not subcontract cyanide handling or transport operations.

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:

Barbex is in FULL COMPLIANCE with Standard of Practice 1.4 requiring an implemented a safety program for transport of cyanide.

Barbex has procedures to ensure that the cyanide is transported in a manner that maintains the integrity of the packaging. Barbex has written procedures to check seals on all containers at the receival port. Upon arrival at the warehouse, containers checked again for their condition and security.

Barbex ensures placards or other signage used to identify the shipment as cyanide, as required by local regulations or international standards. There are no dangerous goods transport laws in Ghana, however as all cyanide is delivered by sea, containers arrive placarded in accordance with the IMDG Code. The presence of the placards is checked routinely prior to departure and on arrival at Tarkwa.

Barbex implements a safety program for cyanide transport that includes:

- vehicle inspections prior to each departure/shipment
- a preventive maintenance program
- limitations on operator or drivers' hours
- procedures to prevent loads from shifting
- procedures by which transportation can be modified or suspended if conditions such as severe weather or civil unrest are encountered
- a drug abuse prevention program

Records are maintained for all aspects of the Safety Program.

Barbex does not subcontract cyanide handling or transport operations.

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

2.1.5 Transport Practice 1.5

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

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

Summarise the basis for this Finding/Deficiencies Identified:

Standard of Practice 1.5 requiring the operation to follow international standards for transportation of cyanide by sea and air is NOT APPLICABLE to Barbex.

Barbex does not transport consignments of cyanide by sea or air within the scope of this audit. Consignments of cyanide transported by Barbex arrive in Ghana the Port of Takoradi and Tema from Orica and DuPont who are a Code certified cyanide producers. Code certified cyanide producers 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.

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:

Barbex is in FULL COMPLIANCE with Standard of Practice 1.6 requiring Tracking of cyanide shipments to prevent losses during transport.

Barbex transport vehicles have several means to communicate with the warehouse base, the mining operation, the cyanide producer and emergency responders. All vehicles have communications systems that include satellite tracking, cell phones and a two-way radio. All communication equipment is checked prior to each delivery as part of the pre-trip check. Communication between the convoy and the Barbex Tarkwa Facility is coordinated by the Escort Leader using a Barbex mobile phone. Communication with the cyanide producer is coordinated from the Barbex Freight Forwarding office in Takoradi and communication with the mine site is coordinated from the Barbex Tarkwa Facility.

Barbex has identified minor communication blackout areas along the transport route and special procedures implemented. In the event that emergency communication is required in a black spot, the procedure is for a vehicle (preferably the Escort Vehicle) to continue forward or back to regain a signal. The satellite tracking with associated duress buttons and text messaging is functional across all routes.

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

Barbex has extensive procedures to track the progress of cyanide shipments. These include:

- advising the mine when shipments leave each departure point and estimated time or date of arrival of the consignment. This is done by the warehouse supervisor telephoning the warehouse manager at the relevant mine
- use of phones and GPS (which is continuously monitored) to report progress along the routes
- attaching locks on shipments prior to departure (full and empty) and regularly checking the locks throughout the journey, specifically at each of the rest stops or transit points

The tracking procedures are very effective for maintaining security. For each convoy, there is a designated departure time and arrival time and every journey is logged to monitor progress.

Barbex implements inventory controls and chain of custody documentation to prevent loss of cyanide during shipment. Barbex has written procedures to check seals on all containers at the receival port. The containers are checked at this time by customs and Barbex, and the seals and container numbers are crosschecked against shipping records. At the mine, the consignee checks the condition of the load during the unpacking process and reports on the standard of the IBCs. The waybill is stamped by the receiving mine indicating that the product was received in full and undamaged. For sparge isotainer delivery, the mine site completes a form noting any damage to the isocontainer and seals prior to unloading. The controls in place would allow any loss of product to be promptly detected.

Shipping records indicating the amount of cyanide in transit and MSDS are available during transport. A Waybill is generated for the deliveries to and from the warehouse to the mine noting specific information about the delivery, including the container number, quantity and weights.

Barbex does not subcontract cyanide handling or transport operations.

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

PRINCIPLE 2 – INTERIM STORAGE

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

2.1.7 Transport Practice 2.1

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

The operation is

☒ **in full compliance with**

☐ in substantial compliance with

☐ not in compliance with

Transport Practice 2.1

Summarise the basis for this Finding/Deficiencies Identified:

Barbex 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.

Warning signs are posted alerting workers:

a) that cyanide is present

b) that smoking, open flames, eating and drinking are not allowed

c) what personal protective equipment must be worn

The site has signage indicating PPE requirements, and signage prohibiting smoking, open flames, eating and drinking at all entrances. Signs indicating the site is a cyanide depot and chemical storage area were visible on the main security gate. The induction stated that cyanide is present on-site, reinforces the prohibition of smoking, eating and drinking on-site, and outlines PPE requirements.

The Barbex Tarkwa facility is located on a secure mine site and the only access is through several supervised mine site security gates. The facility is fenced (3 m brick or link mesh wire fence, topped with loops of barbed wire) and is attended at all hours. Access to the facility is monitored by two security guards 24 hours each day and entry is restricted to authorised persons at all times.

All cyanide on-site is in solid form in IBCs in a warehouse or in sparge tanks. The warehouses are bunded and dedicated for cyanide storage or materials potentially contaminated by cyanide, such as empty bags or boxes pending disposal. The warehouses appear to have adequate ventilation to prevent the build-up of hydrogen cyanide gas.

Only solid cyanide is stored at the facility, and there is negligible potential for contact with water. Warehouses used to store IBCs are roofed and have concrete floors and side walls extending up to approximately 0.3 m resulting in secondary containment for products in storage. The facility has an adequate set of procedures to manage spills.

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

PRINCIPLE 3 – EMERGENCY RESPONSE

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

2.1.8 Transport Practice 3.1

Prepare detailed Emergency Response Plans for potential cyanide releases.

The operation is

☒ **in full compliance with**

☐ in substantial compliance with

☐ not in compliance with

Transport Practice 3.1

Summarise the basis for this Finding/Deficiencies Identified:

Barbex is in FULL COMPLIANCE with Standard of Practice 3.1 requiring a detailed Emergency Response Plan (ERP) for potential cyanide releases.

Barbex has developed a Sodium Cyanide ERP for the management of cyanide related emergencies associated with the Transfer Facility and cyanide transportation.

The ERP is specifically drafted around solid cyanide as it is the only material transported and it utilises the specialist advice and assistance of Orica and DuPont in its emergency procedure. The ERP specifically focuses on road transport and storage within the Barbex Tarkwa Facility. A description of transport infrastructure is contained in Section 2.6 of the ERP.

The ERP considers site specific conditions and the design of the transport vehicle and storage facility.

The emergency response approach detailed within the ERP is flexible enough to accommodate and describe the response actions to be taken for the types of potential release scenarios identified. The ERP contains sufficient procedural information to allow these actions to be conducted and details persons responsible to undertake the actions.

The ERP also lists a number of credible scenarios, which Barbex uses for training purposes.

The ERP identifies the roles and responsibilities of outside medical facilities, fire services, police, mine emergency response teams, affected communities, the manufacturers' emergency response services, and relevant contact details are specified.

Outside responders, have been advised in writing and through emergency response exercises of their designated responsibilities. Communities are consulted where route risk assessments have identified the need for consultation to ensure they understand their role in emergencies. Where Barbex has identified a relative higher risk to communities along the route, the Company has engaged in community consultation covering properties of cyanide, cyanide transportation, and hazards. The roles of communities during emergencies was also specified during these meetings.

Orica and DuPont play a significant advisory and technical role in the emergency response process in the event of a cyanide release. Both Orica and DuPont have assisted in the development of the ERP and this was confirmed in a discussion with representatives of the companies.

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

2.1.9 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:

Barbex is in FULL COMPLIANCE with Standard of Practice 3.2 requiring designated appropriate response personnel and committed resources for emergency response.

Emergency response training of appropriate personnel is provided. Section 6.2 of the ERP lists the annual emergency training requirements of Barbex Emergency Response Personnel.

The Sodium Cyanide ERP clearly identifies the key roles and responsibilities in the event of an emergency. Sections 5.5.1 (Emergency Response Duties) and 5.5.2 (Emergency Response Procedures) detail the roles and responsibilities for key people.

A lists of warehouse emergency response equipment is contained within the ERP, cyanide delivery checklists require cyanide safety equipment checks, and emergency response equipment lists for trucks are kept in a file in the Safety and Environment Coordinator's office. When asked, drivers could produce the equipment and demonstrate its use. Emergency response checklists focus on the serviceability of the equipment as well as its presence. All emergency response equipment listed within the ERP is available at the Barbex warehouse and within the trucks inspected.

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

Emergency response training requirements and training frequencies are detailed within a Training Matrix and tracked by the Safety and Environmental Coordinator using Training Register. Training records and interviews confirmed that the training was conducted and indicated knowledge of emergency response procedures.

Barbex does not subcontract cyanide handling or transport operations.

2.1.10 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:

Barbex is in FULL COMPLIANCE with Standard of Practice 3.3 requiring procedures for internal and external emergency notification and reporting.

Communication procedures and contact information for notifying the producer, receiver/consignee, regulatory agencies, outside response providers, medical facilities and potentially affected communities of an emergency are all contained in the ERP.

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

The Health and Safety Manager is responsible for updating and reviewing the plan including contact numbers and informing all plan holders of any changes. The plan is reviewed annually or as required. Contact numbers are updated twice a year and mock drills performed twice in a year.

The document history section of the ERP details the date of publication, previous revision number, new revision number and a description of the revision. The revision comments noted that the call list was formally reviewed on 24 November 2004 and 4 February 2008. In addition to this, the plan is to be updated as changes take effect or at least annually. The Safety and Environment Coordinator advised that this included contact details.

2.1.11 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:

Barbex is in FULL COMPLIANCE with Standard of Practice 3.4 requiring they develop procedures for remediation of releases that recognise the additional hazards of cyanide treatment.

Barbex's ERP contains procedures and information for remediation including recovery or neutralisation of solutions and solids, decontamination of soils or other contaminated media and management and/or disposal of spill clean-up debris. The ERP specifically prohibits the use of chemicals such as sodium hypochlorite, ferrous sulfate and hydrogen peroxide to treat cyanide that has been released into surface water.

The ERP requires the incident area to be monitored in accordance with direction from the Ghana EPA and the product manufacturer.

Barbex has not had any actual emergencies involving cyanide spills, however they routinely carries out emergency drills and training exercises to ensure their capability to respond is high.

2.1.12 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:

Barbex is in FULL COMPLIANCE with Standard of Practice 3.5 requiring the operation periodically evaluate response procedures and capabilities and revising them as needed.

The ERP contains provisions for periodically reviewing and evaluating the ERP's adequacy and they are being implemented. The document history section of the ERP details the date of publication, previous revision number, new revision number and a description of the revision. The ERP is also required to be updated as changes take effect or at least annually.

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

Emergency response simulation drills are conducted twice a year whereby one specific aspect of the plan is evaluated at a time. Full scale incident scenarios involving external agencies such as mining companies, police, fire service and a hospital or clinic are done annually. The emergency drills are used as an effective part of the ERP evaluation process.

Barbex Technical Services		3 February 2011
Name of Facility	Signature of Lead Auditor	Date

Report Signature Page

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APPENDIX A

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