



June, 2014

## ICMI CERTIFICATION SUMMARY REPORT

# Minera Barrick Misquichilca, Pierina Mine, Peru

**Submitted to:**

Barrick Gold Corporation  
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REPORT



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**Distribution:**

Barrick Gold Corporation - 2 copies (1 pdf)  
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### 1.0 SUMMARY AUDIT REPORT FOR GOLD MINING OPERATIONS

**Name of Mine:** Pierina Mine

**Name of Mine Owner:** Minera Barrick Misquichilca SA

**Name of Mine Operator:** Minera Barrick Misquichilca SA

**Name of Responsible Manager:** Cecilia Melgarejo

**Address:** Mine Pierina

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Huaraz-Tarica

**Country:** Peru

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### 2.0 LOCATION DETAIL AND DESCRIPTION OF OPERATION

The Pierina Mine (Pierina) is located in the District of Yangas, Province of Huaraz, Department of Ancash in the Cordillera Negra of the Andes Mountains, in the north-central part of Peru, approximately 10 kilometers to the northwest of the city of Huaraz. Pierina is located at an elevation ranging from 3,800 to 4,100 meters.

The mine is accessed by road from the town of Yangas (16 kilometers), north of Huaraz. The mining facilities are located within the Rio Santa Basin and sub-basins, all of which drain to the east into the Rio Santa. Pierina is located across a deep valley from the Huascarán National Park, which is located in the Cordillera Blanca of the Andes and is a designated UNESCO Natural Heritage site. The mine has no direct or indirect impact on the Park. The climate in the project area is characterized by defined rainy and dry seasons. The rainy season extends from November to April when approximately 1 meter (m) of rainfall occurs.

Pierina is comprised of an open pit mine, a waste rock storage area, a valley-fill heap leaching facility, process and storm water pond system, acid rock drainage treatment plant, barren solution treatment plant using hydrogen peroxide, and a Merrill Crowe processing plant to recover gold, silver and mercury as a by-product. The open pit has been developed by conventional mining methods using trucks and loaders to extract gold-bearing ore. The waste is transported by trucks to a storage area designed specifically for this purpose. Ore is placed on the valley fill heap leach facility by truck. The valley fill heap leach facility is fully lined with geomembrane and employs a cross-valley dam to impound pregnant process solutions within the placed ore. Gold is recovered using conventional methods of heap leaching with dilute sodium cyanide solution. The auxiliary facilities required for the mining operation include administration offices and buildings, laboratories, warehouses, maintenance shops, emergency facilities, electric power distribution, water supply, roads, fuel and reagent storage tanks, drainage structures, and explosive storage areas. Once the ore has been extracted and processed, all the Pierina facilities except those necessary for continuous environmental protection will be closed and rehabilitated.

  
Signature of Lead Auditor




Pierina uses a Merrill Crowe process to recover the gold and silver from the pregnant leach solution. Pierina has two secure cyanide storage areas: 1) solid sodium cyanide box warehouse, and 2) liquid mixing and storage area. Pierina has developed and implemented a number of operational procedures for the safe storage, handling and mixing of solid sodium cyanide briquettes into high-strength cyanide solution. The cyanide storage mixing and storage tanks are under a roof and within concrete containments with spill collection sumps. The area has appropriate ventilation and hydrogen cyanide (HCN) monitoring, and high-level alarms to prevent overfilling. Cyanide is added to the pregnant solution line prior to the Merrill Crowe processing. pH control is maintained by adding lime to the heap leach ore. Pierina stores and manages sodium cyanide in engineered tanks, pipelines and lined ponds constructed under appropriate quality control and quality assurance programs. Pierina employees are trained in cyanide hazards and first aid, first response, emergency response, and specific operational tasks. Pierina facilities are fenced to preclude wildlife and livestock from entering cyanide process areas. Pierina employs comprehensive inspection and preventive maintenance programs to assure that all cyanide equipment and facilities are functioning as designed and to monitor process solutions. Pierina has developed closure and reclamation plans and procedures to complete the appropriate management of cyanide solutions and solids, and the decontamination of cyanide pipelines and equipment.

Understanding and managing the process water balance is a critical function at Pierina because of the relatively high precipitation occurring in a well-defined rainy season. Pierina has developed and implemented a comprehensive process water balance program that includes monitoring and regular updates to track and plan water management activities. Pierina uses "raincoats" on the valley fill heap leach facility to minimize infiltration of rainfall on inactive portions of the heap. The raincoats are high-density polyethylene (HDPE) geomembrane covers that convey clean precipitation to the storm water management system. At present, Pierina is in the progressive closure phase according to the closure plan and cyanide consumption has reduced significantly since the last audit.

From 01 January 2009, Pierina has bought cyanide from Orica; Orica's Yarwun plant was recertified as fully compliant on 17 March 2010 and again on 29 October 2013. Pierina has bought cyanide from a Code compliant manufacturer for the duration of this recertification period. Pierina has an emergency response team that is trained to respond to onsite fires, chemical spills and worker exposures to cyanide. Pierina works with local community emergency responders to assure that adequate resources are available to address both offsite and onsite emergencies.

In the last three years Pierina had three cyanide incidents. The first incident occurred on August 12, 2011 (Leach Pad), when the contractor operator noticed an excessive flow through the channel to the 4000 level. The affected area was inspected and a broken pipeline was found. The second incident occurred on July 09, 2012. Filter press 2 lost pressure causing significant flooding the secondary containment of the surrounding areas. A worker assigned to clean the area reported symptoms consistent with cyanide intoxication 1 hour later. The third incident occurred on March 10, 2012. Approximately 4.5 m<sup>3</sup> of barren solution overflowed outside the secondary containment area reaching a plant site surface water drainage ditch, which reports to the collection pond (no solution arrived at the collection pond). The incidents were documented in an Incident Report and Investigation form and Barrick's tap root system was used to investigate the events.

  
Signature of Lead Auditor



### 3.0 SUMMARY AUDIT REPORT

#### Auditors Findings

**Pierina Mine is:**

☒ in full compliance with

☐ in substantial compliance with

☐ not in compliance with

**The International Cyanide Management Code**

**This operation has not experienced compliance problems during the previous three-year audit cycle.**

**Audit Company:** Golder Associates

**Audit Team Leader:** Alistair Cadden, Lead Auditor and Gold Mining Technical Specialist

**Email:** acadden@golder.com

#### Name of Other Auditors

Adolfo Mesones, Golder (Certified ISO 9001, 14001 and OSHA 18001 auditor).

#### Dates of Audit

The Certification Gold Mining Operations Verification Audit was undertaken within four days (eight man days) between 28 and 31 October 2013.

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

Pierina Gold Mine

Name of Facility

Signature of Lead Auditor

June 17, 2014

Date



### PRINCIPLE 1 – PRODUCTION

#### Encourage Responsible Cyanide Manufacturing by Purchasing from Manufacturers that Operate in a Safe and Environmentally Protective Manner

**Standard of 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


**Standard of Practice 1.1**

☐ not in compliance with

#### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 1.1 which requires that the site 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.

From 01 January 2009, Pierina has bought cyanide from Orica, Orica's Yarwun plant was recertified as fully compliant on 17 March 2010 and again on 29 October 2013. Pierina has bought cyanide from a Code compliant manufacturer for the duration of this recertification period.

  
Signature of Lead Auditor



### PRINCIPLE 2 – TRANSPORTATION

#### Protect Communities and the Environment during Cyanide Transport

**Standard of Practice 2.1: Establish clear lines of responsibility for safety, security, release prevention, training and emergency response in written agreements with producers, distributors and transporters.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 2.1**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 2.1 which requires that the site establish clear lines of responsibility for safety, security release prevention, training and emergency response in written agreements with producers, distributors and transporters.

The NaCN supply contract specifies that Orica is responsible for transport of NaCN from the Yarwun plant to the mine site, and that responsibilities for code compliance extend to all subcontractors.

- Clause 13.1 Orica is responsible for itself and its subcontractors, including transportation for code compliance.
- Clause 13.2 specifies the requirements for manufacturing, handling, storing, packaging labelling, transporting and emergency response.

The entire supply chain has been fully compliant with the Code for the duration of the recertification audit period. Orica Australia supply chain certification for the section Yarwun to Port of Brisbane October 5, 2010; recertification has been submitted with an auditor finding of full compliance and is pending review by ICMI. Orica Latin America Supply Chain Certification from Port of Brisbane to Pierina (April 14, 2011). Stiglich Transportes certification May 27, 2010 and recertification 25 November 2013.

**Standard of Practice 2.2: Require that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 2.2**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 2.2 which requires that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management.

The entire supply chain has been fully compliant with the Code for the duration of the recertification audit period. Orica Australia supply chain certification for the section Yarwun to Port of Brisbane October 5, 2010; recertification has been submitted with an auditor finding of full compliance and is pending review by ICMI. Orica Latin America Supply Chain Certification from Port of Brisbane to Pierina (April 14, 2011). Stiglich Transportes certification May 27, 2010 and recertification 25 November 2013. Pierina maintains documentation describing the entire chain of custody for cyanide shipments including Multimodal Dangerous Goods forms from Yarwun to Callao and Orica/Stiglich Chain of Custody forms from Callao to the mine.



### PRINCIPLE 3 – HANDLING AND STORAGE

#### Protect Workers and the Environment during Cyanide Handling and Storage

##### Standard of

##### Practice 3.1:

**Design and construct unloading, storage and mixing facilities consistent with sound, accepted engineering practices, quality control/quality assurance procedures, spill prevention and spill containment measures.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 3.1**

☐ not in compliance with

##### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 3.1. Pierina has a solid sodium cyanide warehouse where one-ton “bag in box” containers are stored. The solid sodium cyanide briquettes are mixed with barren solution in cyanide mixing and storage tanks within the Merrill Crowe plant building. The design and construction of the cyanide warehouse, mixing and storage facilities have been completed appropriately as documented in final design and construction drawings prepared by qualified Professional Engineers.

The cyanide warehouse, mixing and storage facility quality control and assurance procedures and documentation include construction level drawings with detailed specifications noting foundation compaction and concrete reinforcement, and piping and tankage materials. The cyanide solution storage tanks each have a high-level alarm and level indicator. The unloading and storage areas are located away from public access and no surface water bodies are nearby. The solid cyanide warehouse storage facility has adequate ventilation, is located within a secure and roof-covered building. The cyanide mixing and storage area is also a secure locked room within the larger Merrill Crowe plant building with adequate fan driven ventilation.

During unloading and mixing, traffic and access is controlled by the operators with warning cones. The site is currently undergoing progressive closure and so the rate of cyanide usage has been reduced significantly. The cyanide warehouse and the mixing and storage areas are within concrete containment to contain releases and precipitation that may contact cyanide.

##### Standard of

##### Practice 3.2:

**Operate unloading storage and mixing facilities using inspections, preventative maintenance and contingency plans to prevent or contain releases and control and respond to worker exposures.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 3.2**

☐ not in compliance with

##### Summarise the basis for this Finding/Deficiencies Identified:

Pierina is in FULL COMPLIANCE with Practice 3.2. Pierina has developed and implements procedures to prevent exposure and releases of cyanide during unloading, stacking, mixing and storage, and processing. The SOPs include operation of critical valves and pumps, handling of cyanide containers, spill cleanup during the mixing, appropriate PPE and the management and disposal of the empty bags and boxes. Pierina prohibits using the empty bags and boxes for other purposes. In addition, the procedures require that cyanide boxes be stacked no more than three high during unloading of trucks or within the warehouse. The procedures also require that all cyanide mixing be completed under the observation by another qualified operator or by video observation by the control room. Pierina uses inspection forms and a preventive





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maintenance program that identifies and tracks all maintenance activities at the unloading and the storage warehouse and tank areas. Pierina is in a stage of progressive closure, and the rate of cyanide consumption has reduced significantly.

  
Signature of Lead Auditor



### PRINCIPLE 4 – OPERATIONS

#### Manage Cyanide Process Solutions and Waste Streams to Protect Human Health and the Environment

**Standard of Practice 4.1: Implement management and operating systems designed to protect human health and the environment including contingency planning and inspection and preventative maintenance procedures.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 4.1**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Practice 4.1. Pierina has operating plans and SOPs that describe the management and operation of the cyanide facilities (e.g. the Merrill Crowe Plant, the Leach Pad Facility and the cyanide destruction treatment plant). These plans and procedures cover the safe operation of the entire cyanide management facilities.

The SOPs and operating plans were found to have adequate contingency planning, routine inspections, and a preventive maintenance program. SOPs address all the cyanide management tasks such as unloading and storage of cyanide boxes, mixing of liquid cyanide, cleaning and disposal of cyanide bags and boxes, management of the ore placement and heap leach operations, and operation of the cyanide destruct circuit. Pierina has established inspection frequency on a daily shift, weekly and monthly basis. These inspections are sufficient to assure and document that they are functioning with the design parameters. Contingency planning documents have been developed and implemented to support the process solution and pond management, control of solution inventory during power failure, and extreme rainfall events. Pierina has backup generators to ensure that essential process equipment and systems continue to operate during power failures and conducts inspections that include regular testing of the backup power generator. Pierina uses a computer based preventive maintenance system, Oracle®, to identify, issue work orders and document all preventive maintenance activities. The SOPs and other documentation have been maintained up to date during the recertification period.

Pierina has developed and implements a SOP called Management of Change (MOC) to be used when an operational or process change/modification/alteration (with the potential of impacting the environment or the health and safety of workers) is proposed. The procedure considers the involvement of process, environmental and safety personnel, if required, in the assessment of the proposed changes. The approved change/modification will be communicated to workers and training will be provided, if necessary, prior to the change/modification implementation.

**Standard of Practice 4.2: Introduce management and operating systems to minimise cyanide use, thereby limiting concentrations of cyanide in mill tailings.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 4.2**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 4.2, which requires that the site introduce management and operating systems to minimise cyanide use, thereby limiting concentrations of cyanide in mill tailings is NOT APPLICABLE as Pierina uses only heap leaching technology.



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**Standard of Practice 4.3: Implement a comprehensive water management programme to protect against unintentional releases.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 4.3**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 4.3. Pierina has developed a comprehensive and probabilistic water balance that addresses the uncertainty and variability of climatic data to prevent overtopping of the process facilities.

Process facility inspection procedures and data collection programs have been implemented to update the water balance model on a regular basis. Daily shift inspections include process flows, pond levels and available freeboard monitoring that can be incorporated into the water balance model and operational planning to prevent potential overtopping. Pierina measures precipitation and evaporation for incorporation into the water balance for calibration and evaluation. The water balance is updated on an as needed basis to support tracking and evaluation of the system to prevent overtopping and discharge.

**Standard of Practice 4.4: Implement measures to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 4.4**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 4.4. Pierina has two heap leach process ponds and one conveyance ditch containing process solution with WAD cyanide concentrations at or above 50 mg/L.

All three of these solution areas are netted to protect bird and wildlife exposure. Pierina's other wildlife protection facilities include a perimeter fence around the entire heap leach and processing area. During periods of high rainfall, ponding on the surface of the heap leach facility is controlled by the placement of netting frames, reduction of solution application or by shutting down solution application in the ponding areas. Excess barren process solution can be treated at the cyanide destruction plant and discharged. No cyanide related wildlife mortality incidents were reported during this recertification period.

**Standard of Practice 4.5: Implement measures to protect fish and wildlife from direct or indirect discharges of cyanide process solutions to surface water.**


☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 4.5**

☐ not in compliance with

  
Signature of Lead Auditor



### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.5. Pierina is designed and operated for zero-discharge of process fluids unless treated for discharge under Peruvian regulations. Pierina has authorization to discharge treated barren solution to the Rio Santa. Pierina's discharge has complied with the Cyanide Code limit of 0.5 mg/L WAD cyanide. Pierina has discharge authorizations for each year that permit a variable quantity of solution to be discharged at or below a WAD cyanide concentration of 0.008 mg/L in accordance with General Law for Waters. The concentration of free cyanide in the Rio Santa downstream of the discharge has met the Cyanide Code limit of 0.022 mg/l. Pierina conducts monitoring to characterize the seepage collection system, leak detection system, and surface water and groundwater quality. Pierina has discharged treated process water during some days in the past three years. Monitoring information indicates there is no impact to groundwater or surface water quality from the heap leach operations and processing facilities.

### Standard of Practice 4.6: Implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of groundwater.

☒ in full compliance with

The operation is

☐ in substantial compliance with

Standard of Practice 4.6

☐ not in compliance with

### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.6. The Pierina heap leach and processing facilities are designed and operated to protect groundwater resources. The project cyanide facilities include a number of seepage control technologies, including: double geomembrane liner systems below the in-heap solution storage and process ponds with leak detection and leak collection systems; composite liner under the heap leach facility outside the impoundment area; and concrete containments in process areas to protect the beneficial water use.

Pierina completes weekly monitoring of the leak detection systems and quarterly water quality sampling and analysis of a groundwater monitoring network. WAD cyanide concentrations in groundwater at compliance points are below the level of detection and are protective of identified beneficial uses of the groundwater.

### Standard of Practice 4.7: Provide spill prevention or containment measures for process tanks and pipelines.

☒ in full compliance with

The operation is

☐ in substantial compliance with

Standard of Practice 4.7

☐ not in compliance with

### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.7. The Pierina operation has secondary curbed or walled concrete containments for all cyanide storage and processing areas. Other secondary containments include geomembrane-lined channels for process solution pipelines. The secondary containments in the cyanide processing areas have been designed to contain at least 110 % of the largest tank volume and the 100-year, 24-hour storm event.

Secondary containments in the cyanide mixing room and process areas have automated pumping systems for collection and management of process leakage. SOPs have been developed to address management of spill response and clean-up within the containments. Review of the operation indicates that all tanks, piping and containments are constructed of materials appropriate for handling high pH cyanide solutions.



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Pierina does not have any perennial or ephemeral surface water bodies that require special protection needs for pipelines.

**Standard of Practice 4.8: Implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 4.8**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 4.8. Pierina was recertified as fully compliant with the Code on 10<sup>th</sup> February 2011 indicating that all previous works had undergone adequate quality control and quality assurance. Pierina has implemented QC/QA programs for all earthworks projects related to tank foundations, compacted subgrades, clay liners, geomembrane liners for ponds and heap leach facilities. These QC/QA reports include information on subgrade preparation, grading, soil liner material properties and compaction characteristics, leak detection construction, solution collection piping, geomembrane liner seams and testing. The reports include copies of the field inspection reports, lab and field data, construction observations, and photographs. Pierina has retained qualified engineering personnel to review and provide construction verification documentation. The QC/QA reports are all prepared by qualified engineering companies Pierina maintains copies of all QC/QA documentation onsite.

**Standard of Practice 4.9: Implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface and groundwater quality.**

☒ in full compliance with

The operation is


☐ in substantial compliance with

**Standard of Practice 4.9**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 4.9. Pierina inspects for wildlife mortalities, monitoring is conducted at frequencies adequate to characterize the medium being monitored and to identify changes in a timely manner. Pierina has environmental monitoring programs developed to evaluate the performance of the cyanide management systems on wildlife, process ponds, leak detection systems, and surface and groundwater quality. The environmental programs have been prepared and approved by qualified professionals and implemented by qualified personnel. The plans have also been reviewed and approved by MEM. The plans include all appropriate sampling and analysis documentation.

  
Signature of Lead Auditor



### PRINCIPLE 5 – DECOMMISSIONING

#### Protect Communities and the Environment from Cyanide through Development and Implementation of Decommissioning Plans for Cyanide Facilities.

##### Standard of

##### Practice 5.1:

**Plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife and livestock.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 5.1**

☐ not in compliance with

##### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 5.1, which requires that the mine plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife and livestock.

Pierina is currently in the phase of progressive closure in accordance with previously written closure plans reviewed for the 2010 recertification audit, subsequently updated in 2012 and approved by MEM.

The mine closure plan includes GANTT charts for the closure planning, closure works and post closure periods. These incorporate the activities relevant for a comprehensive mine closure plan such as rehabilitation of the heap leach piles, plant demolition and ongoing monitoring and maintenance works.

The progressive closure plan is to continue recirculation leach solution until no further economic benefit is gained from the further recirculation and then to allow pile to wash naturally, collect the water and treat in the water treatment plant. The plan includes demolition and decontamination of plant and pipes, closure of heap leach, operation of detox and water treatment plants. The closure plan is currently under review alongside the Life of Mine plan. Under Peruvian regulations the plan is updated every 3 years. The most recent update was approved by MEM in December 2012

MBM undertakes an evaluation of Provisions for Environmental Risks (PER) costs annually.

##### Standard of

##### Practice 5.2:

**Establish an assurance mechanism capable of fully funding cyanide related decommissioning activities.**


☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 5.2**

☐ not in compliance with

  
Signature of Lead Auditor



### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 5.2 which requires that the mine establish an assurance mechanism capable of fully funding cyanide related decommissioning activities.

An initial cost estimate for third party implementation of the closure plan was developed by Vector Engineering Peru. This has subsequently been updated annually as part of the PER. The prices for the works are obtained from contractors by the Logistics department and these prices are used by the closure planners to update the budgets estimates.

The mine updates the PER annually using third party contractor prices for the works.

- 2011 USD223 millions
- 2012 USD247 millions

The approval of the closure plan by the Peruvian Authorities (Ministerio de Energía y Minas) requires that the mine provide an irrevocable letter of credit for the closure works. The mine has provided such a letter of credit as required by the Peruvian authorities. The value of the letter of credit for the closure is for all the mine facilities, including the decommissioning of cyanide facilities, and is considered to be sufficient for this.

  
Signature of Lead Auditor



### PRINCIPLE 6 – WORKER SAFETY

#### Protect Workers' Health and Safety from Exposure to Cyanide

##### Standard of

##### Practice 6.1:

**Identify potential cyanide exposure scenarios and take measures as necessary to eliminate, reduce and control them.**

☒ in full compliance with

**The operation is**

☐ in substantial compliance with

**Standard of Practice 6.1**

☐ not in compliance with

##### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 6.1 which requires that the operation identify potential cyanide exposure scenarios and take measure as necessary to eliminate, reduce and control them.

Pierina has operating plans and procedures that describe the management and operation of the cyanide facilities. These plans and procedures cover the safe operation of the entire cyanide management facilities. Pierina has a procedure to review proposed process and operational changes and modifications for their potential impacts on worker safety which documents the changes and outlines how to apply a risk assessment to the proposed changes.

All workers and contractors undergo site specific inductions highlighting the presence of cyanide at the site.

The procedures detail the risks involved with each task and adequately describe safe work practices. Task specific personal protective equipment (PPE) requirements are stated in each standard operating procedure. The procedures have been updated as required and at regular intervals during the past three years since initial certification.

Pierina solicits worker input in developing and evaluating health and safety procedures via an intranet-based suggestion box. Through the suggestion box, supervisors receive input from workers. Additionally, direct communication to supervisors in meetings or otherwise is actively encouraged

##### Standard of

##### Practice 6.2:

**Operate and monitor cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures.**

☒ in full compliance with

**The operation is**

☐ in substantial compliance with

**Standard of Practice 6.2**

☐ not in compliance with

##### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 6.2, which requires that the site operate and monitor cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures.

Pierina has determined the appropriate pH of the operation of the plant. Automatic sensors for HCN gas are located inside the cyanide mixing room and the refinery and are monitored continuously in the process plant control room. The monitors have a digital readout and a low level and high-level alarm system. In addition to an audible alarm, there are warning lights and an alarm display in the control room. The low level and high-level alarm settings are 4.7 ppm and 10 ppm, respectively.





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The procedure for entering the cyanide storage building includes using a hand-held portable monitor to verify that HCN levels are safe prior to entering the building. HCN levels at the leach pad are monitored twice a week.

Pierina has identified cyanide risk areas and provided maps showing areas with varying HCN levels around the mine site and process plant. High-risk areas are identified in an employee induction presentation given to all workers and contractors.

Pierina has six cyanide gas detection monitors (Ultima ® X) in the cyanide mixing room and the refinery. These monitors are inspected monthly and calibrated annually by the maintenance department who are trained and certified by the safety company called MSA and records are held for a minimum of one year. Certificates for Mine Safety Appliance testing for four maintenance staff were reviewed.

Pierina uses 4 operating personal hand-held HCN monitors which are calibrated by Global Group, annually, according to the manufacturer's specification. Calibration certificates were reviewed and all monitors were found to be in calibration.

Warning signs are posted in areas where cyanide is used to alert workers that cyanide is present, that smoking, open flames, eating and drinking are not allowed and that the necessary cyanide-specific PPE must be worn.

Showers, low pressure eye wash stations and non-acidic sodium bicarbonate fire extinguishers are located at strategic locations throughout the operation including the cyanide storage building, refinery, and process plant and are maintained, inspected and tested.

Pipes containing cyanide are marked as containing cyanide solution and show flow direction. Pierina also uses a colour-coded piping system to further identify pregnant solution, barren solution, makeup water, etc. The cyanide storage, mixing and process tanks are marked as containing cyanide and include hazardous material risk diagrams and signage for confined areas at the tank entry points.

First aid instructions for cyanide exposure are in each first aid kit, which are located in areas where reagent grade cyanide is handled and in the process control room. MSDS are provided and emergency response actions posted in strategic areas of the process plant. The information is in Spanish, the language of the workforce.

In the last three years Pierina had three cyanide incidents (1 Leach Pad, 1 Refinery and 1 in Merrill Crowe Plant). The mine implemented its procedures to deal with these incidents and resolve them satisfactorily and to implement procedural changes to reduce the probability of reoccurrence. Pierina uses the tap root tracking system, which allows a safety incident and near miss to be recorded, evaluated and followed through to remediation. The system allows Pierina and Barrick to evaluate any potential trends of incidents and determine if changes are required in the operation's programs and procedures.



## ICMI CERTIFICATION SUMMARY REPORT

### Standard of

#### Practice 6.3:

**Develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.**

☒ in full compliance with

**The operation is**

☐ in substantial compliance with

**Standard of Practice 6.3**

☐ not in compliance with

#### **Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 6.3 which requires that the site develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.

Water, oxygen, resuscitator, antidote kits and a radio, telephone, alarm system or other means of communication or emergency response are readily available at the Pierina mine. The operation has 4 antidote kits which are located in the mine clinic (2 contain amyl nitrite, sodium nitrate and thiosulphate) and two have the same without the amyl nitrite. The amyl nitrite parts of each of the kits are kept in the process control room, the refinery and the leach pad.

The first aid and antidote kits are checked on a daily basis by the Occupational Health Department for completeness, to ensure there is adequate oxygen in the cylinders, the condition of the rubber on the resuscitator masks and the temperature the kits are stored at. Manufacturer's guidelines recommend the kits are kept at a temperature between 20 – 25 degrees centigrade.


The Site has an Emergency Pre-Plan which details emergency response to actions which involve the use of cyanide. Additionally Pierina posts emergency procedures at strategic locations throughout the plant.

Pierina has two medical centres, one on the mine site which is the first point of call; the second off-site centre is a larger centre that includes x-ray, laboratory, pharmacy and an emergency room.

Pierina has six physicians and two emergency response specialists (medically trained). At any one time there would be one doctor and one nurse (emergency response specialists on the mine. The Head of the medical centre and one doctor and one nurse would be at the off-Site medical centre.

Patients affected by cyanide would be referred to either San Pablo Clinic or Victor Ramos Guardia Hospital, both located in the city of Huaraz. The Patient Evacuation procedure details how a patient is removed by on-site ambulance to one of these facilities. A medical practitioner would travel with the patient. Pierina has a fully equipped ambulance unit located onsite. Pierina has established formalized arrangements with the medical facilities located in Huaraz regarding the potential to treat patients for cyanide exposure. Pierina has determined that the facilities have adequate, qualified staff, equipment and expertise to respond effectively. Every year the medical manager visits both off-site medical facilities to assess the facilities and the understanding of the staff for the treatment of patients exposed to cyanide. A letter is written to the hospital stating that the mine is satisfied with the facilities they have. The letter is signed by the hospital and returned to Pierina.

Pierina has conducted cyanide exposure drills, and tests the relevant emergency procedures annually. Mock drills are conducted regularly as part of the Emergency Response Plan, lessons learned from the drills are incorporated into the ERP.

  
Signature of Lead Auditor



### PRINCIPLE 7 – EMERGENCY RESPONSE

#### Protect Communities and the Environment through the Development of Emergency Response Strategies and Capabilities

**Standard of**

**Practice 7.1:**

**Prepare detailed emergency response plans for potential cyanide releases.**

☒ **in full compliance with**

**The operation is**

☐ in substantial compliance with

**Standard of Practice 7.1**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is fully compliant with Standard of Practice 7.1. Pierina has developed plans and SOPs that address emergency response to potential accidental releases of cyanide.

Pierina plans contain procedures for potential scenarios such as:

- 1) cyanide intoxication;
- 2) accidents during cyanide transportation;
- 3) releases during unloading and mixing;
- 4) release of cyanide during fires and explosions;
- 5) pipe, valve or tank ruptures;
- 6) overtopping of ponds;
- 7) electrical power outages and pump failures;
- 8) uncontrolled seepage;
- 9) failure of the heap leach facility;
- 10) cyanide spill control and clean-up; and
- 11) decontamination and emergency evacuation.

**Standard of**

**Practice 7.2:**

**Involve site personnel and stakeholders in the planning process.**


☒ **in full compliance with**

**The operation is**

☐ in substantial compliance with

**Standard of Practice 7.2**

☐ not in compliance with

  
Signature of Lead Auditor



### Summarise the basis for this Finding/Deficiencies Identified:

The operation is fully compliant with Standard of Practice 7.2. Pierina involves its workforce and stakeholders, including potentially affected communities, in the cyanide emergency response planning. Periodically meetings related to emergency subjects take place with representatives from all areas of the operation. Every year Pierina organizes a talk where they invite stakeholders (fire fighters, police, government and communities authorities, and hospitals) for awareness of the nature of the risks associated with accidental cyanide releases and preparation for emergencies. Pierina involves outside responders as fire fighters, police and medical facilities in the cyanide emergency planning and response process and communicates with stakeholders to keep the Emergency Response Plan current.

### Standard of

#### Practice 7.3:

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

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 7.3**

☐ not in compliance with

### Summarise the basis for this Finding/Deficiencies Identified:

The operation is fully compliant with Standard of Practice 7.3. Pierina has committed, in the General Emergency Plan, Pre Plans and training SOPs, the necessary emergency response equipment and first aid to manage all cyanide incidents at the operation and to coordinate transportation to the nearest medical facilities.

Pierina has certified First Responders and Brigade Members including firefighters and hazmat personnel. Pierina's General Emergency Plan defines the primary and alternative response coordinators, including Incident Commanders and the establishment of the Incident Commander Team. The plan contains a list of onsite emergency responders, the ambulance service and the local medical providers. Pierina requires training and certification for Emergency Responders, including advanced first aid (cyanide exposure, administering amyl nitrite, locations of cyanide antidote kits, medical oxygen); Hazardous Materials, firefighting and others. The plan includes radio channel, office and 24-hour cell phone telephone numbers for the Emergency Response Team and Commanders. The plan has a section describing Pierina Personnel Duties and Responsibilities for the Incident Commander and Manager Succession. The plan also details the responsibilities of the Loss Control and Environmental Departments. The plan contains a list of emergency response equipment.

All emergency equipment and supplies are inspected on a regular basis by safety and emergency response personnel. The ERP details a chain of command and has contact details for all emergency response personnel who are appropriately trained. Emergency response training is a requirement to be on the emergency response team. The contact lists are updated regularly. The ERP gives detail of roles and responsibilities, and lists the equipment necessary. The equipment is checked regularly and records are kept on site. These were verified by the auditor.

The roles of outside responders are included in Pierina's ERP, these responders are made aware of their roles. Annually the Occupational Health Main Physician visits both off-site hospitals to assess the facilities and the understanding of the staff for the treatment of patients exposed to cyanide. The Huaraz medical facilities are aware of their potential role if the on-site Pierina medical facilities are not able to handle the number of victims. Pierina sent a letter to the fire department with general cyanide information, attaching a presentation on the cyanide code and information about cyanide use, how to handle a medical emergency with cyanide, route monitoring and second response by Security-Tech, Pierina General Emergency Plan, and Emergency Response with hazardous materials.



## ICMI CERTIFICATION SUMMARY REPORT

**Standard of  
Practice 7.4:**

**Develop procedures for internal and external emergency notification and reporting.**

**The operation is**

☒ **in full compliance with**

☐ in substantial compliance with

☐ not in compliance with

**Standard of Practice 7.4**

Signature of Lead Auditor



### Summarise the basis for this Finding/Deficiencies Identified:

The operation is fully compliant with Standard of Practice 7.4. which requires that the operation develop procedures for internal and external emergency notification and reporting.

The ERP, Section 7.2.6, details regulatory authorities' and outside responders' contact details as follows: Government Mining Department, Government Health Department, Civil Defence Department, Huaraz Fire Department, Caraz Fire Department, Government Department for Permitting Explosives, Regional Police (XIII Regional Division), OSINERGMIN (Organismo Supervisor de la Inversion en Energia y Minería) (Supervisory Body in the Investment in Energy and Mining), the Attorney General's office, Yungas Local Government, Hidrandina-Huallanca (Pierina's electricity provider), Environmental Affairs General Division of Peru and Regional Director of Transportation and Communication.

The ERP has contact information for village authorities within the area of influence. It includes contact names of staff, their positions and phone numbers. The Response Procedures determines that if surface waters are contaminated with cyanide then the incident is considered a 'high' level incident, and details give a number of communication steps to be taken which include of when to contact local communities.

As part of the ERP Pierina has a section titled 'Roles and responsibilities for community relations and the media'. This specifies a chain of command for media relations.

### Standard of Practice 7.5:

**Incorporate in 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

Standard of Practice 7.5

☐ not in compliance with

### Summarise the basis for this Finding/Deficiencies Identified:

The operation is fully compliant with Standard of Practice 7.5. Pierina has prepared cyanide response and remediation plans that address appropriate uses and situations for cyanide treatment chemicals. All contaminated soils are to be excavated, loaded, hauled and disposed of in the heap leach facility. Liquid spills are to be contained by perimeter berms and returned to the process facilities. Pierina has procedures in place to use bottled water for its alternate drinking water supply.

Hypochlorite, ferrous sulphate and hydrogen peroxide are prohibited from use in surface water. Sodium hypochlorite is only to be used in cases where the solution is fully contained on site and will not enter surface waters. Pierina has developed plans to sample and monitor soils and water to identify the extent and effect of a cyanide release. The Procedure for emergency soil sampling details the soil analysis that will be undertaken, the sampling methodologies and parameters.

### Standard of Practice 7.6:

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

☒ in full compliance with

The operation is

☐ in substantial compliance with

Standard of Practice 7.6

☐ not in compliance with

### Summarise the basis for this Finding/Deficiencies Identified:



## ICMI CERTIFICATION SUMMARY REPORT

The operation is fully compliant with Standard of Practice 7.6. Pierina has committed to annual evaluation and update of the General Emergency Plan, if needed based on review of the incidents and drills.

Additionally, at least once per year Pierina will conduct cyanide related mock drills to practice and prepare for emergencies and to provide insight into the effectiveness of its emergency response plans. Pierina has conducted three cyanide related mock drills since the Re-Certification Audit.

  
Signature of Lead Auditor



### PRINCIPLE 8 – TRAINING

#### Train Workers and Emergency Response Personnel to Manage Cyanide in a Safe and Environmentally Protective Manner

**Standard of Practice 8.1: Train workers to understand the hazards associated with cyanide use.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 8.1**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is fully compliant with Standard of Practice 8.1. Pierina provides training to all employees, with the potential to be exposed to cyanide, on the hazards of cyanide and provides annual refresher training. Pierina retains all cyanide training records for employees.

The cyanide related performance assessment tests are also retained in employee permanent records.

**Standard of Practice 8.2: Train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community and the environment.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 8.2**


☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is fully compliant with Standard of Practice 8.2. All personnel in job positions that involve the use of cyanide and cyanide management (including unloading, mixing, production and maintenance) receive training on how to perform their assigned tasks with minimum risk to worker health and safety. Individual training is provided for each specific task an operator will perform related to cyanide management. Task specific SOP training is provided prior to working with cyanide independently. The SOPs include the purpose of the SOP, the process description, task description, the PPE required, potential emergency scenarios, emergency communication procedures, and others.

Pierina's training program identifies the specific cyanide management elements that each employee must be trained in to perform that specific job properly. All Pierina employees and contractors, with the potential to be exposed to cyanide, receive annual refresher training that includes cyanide safety. Pierina employees working in specific cyanide management tasks receive annual refreshers for those tasks. The operation requires written tests to evaluate the effectiveness of cyanide training and those training records are retained throughout an individual's employment, documenting the training received. The records include the name of the employee and the trainer, the date of training; the topics covered, and test results demonstrating an understanding of the training materials.

Training is conducted by appropriately qualified personnel: the Occupational Health Main Physician, Pierina's internal Cyanide Code auditors and area supervisors. Emergency response training is provided by a technician certified in Hazmat.

  
Signature of Lead Auditor





## ICMI CERTIFICATION SUMMARY REPORT

**Standard of Practice 8.3: Train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.**

☒ in full compliance with

**The operation is**

☐ in substantial compliance with

**Standard of Practice 8.3**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is fully compliant with Standard of Practice 8.3. which requires that the operation train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.

Workers and emergency response supervisors are trained in procedures to be followed in the event of a release of cyanide solution or HCN gas, and safe working procedures exist for a number of reasonably foreseeable events. The procedures include cleanup of spills, decontamination of equipment and emergency first aid response.

Pierina has a number of formalized agreements with local emergency services, such as the police, brigadas and local hospitals for dealing with cyanide emergencies.

Cyanide emergency response refresher training is carried out regularly. Drills are also undertaken and have dealt with scenarios, such as earthquake, spills and poisoning. The drills are evaluated to assess the effectiveness of the procedures and training.

Emergency response training records are kept on the training database (Consolidado).

Signature of Lead Auditor



### PRINCIPLE 9 – DIALOGUE

#### Engage in Public Consultation and Disclosure

**Standard of Practice 9.1: Provide stakeholders the opportunity to communicate issues of concern.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 9.1**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in fully compliant with Standard of Practice 9.1 which requires that provide stakeholders with the opportunity to communicate issues of concern.

The operation has a detailed complaints handling procedure and offers many opportunities for stakeholders to express their concerns. These include community workshops, site visits, a formal complaints system and regular community liaison meetings.

**Standard of Practice 9.2: Initiate dialogue describing cyanide management procedures and responsively address identified concerns.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 9.2**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is fully compliant with Standard of Practice 9.2. which requires that the operation initiate dialogue describing cyanide management procedures and responsively address identified concerns.

The mine has a number of initiatives such as a complaints procedure, workshops and attendance at community fairs to help improve community dialogue.

Pierina has produced and distributed two leaflets on cyanide management: These documents are updated annually


- 'Así manejamos el cianuro en la mina Pierina' produced 2004, updated 2011, 2012
- 'Como transportamos el cianuro' 2008 updated 2009.
- 'Adecuándonos a los nuevos estándares para calidad de agua en el Perú' 2013 information on what Pierina is doing to achieve the new water quality standards

In addition the operation has run a training programme for local communities: Plan de capacitación. Due to a degree of illiteracy in the local population the programme uses images/drawings photos to explain.

Continue with ferias alongside other public health campaigns – cyanide transport; hazardous substances and Voluntary Principles for human rights

A previous initiative to promote APELL has now finished. Emergency Response capacity now resides in the communities but needs constant reinforcement by Barrick staff.

Pierina organizes a program of visits to communities further afield.

  
Signature of Lead Auditor



## ICMI CERTIFICATION SUMMARY REPORT

Pierina organizes educational visits to the mine for about 1500 people per year. These incorporate all aspects of the mine and processing plant and are free of charge. They are conducted in both Spanish and Quechua. The records maintained by the Department of Communications and Public Relations show a diverse range of attendees including universities, schools, government officials and community representatives from around the country. The restrictions on attending the visits are that attendees must be 11 years old or over and those older than 70 must have medical checks.

Communication is undertaken in both Spanish and Quechua as necessary.

**Standard of Practice 9.3: Make appropriate operational and environmental information regarding cyanide available to stakeholders.**

☒ in full compliance with

The operation is

☐ in substantial compliance with

**Standard of Practice 9.3**

☐ not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is fully compliant with Standard of Practice 9.3. which requires that the operation make appropriate operational and environmental information regarding cyanide available to stakeholders.

Pierina has an extensive community liaison program and spends a great deal of effort communicating with stakeholders regarding the activities at the mine, the use of cyanide, its potential hazards and its safe management. These activities include numerous site visits by interested parties, local trade shows (ferias) and community education programs with meetings held in Spanish and Quechua. Pierina has a legal obligation to report all cyanide related incidents to the Peruvian authorities. This data is then on the public record and can be accessed by interested parties on demand. In addition, Barrick publishes a range of communications such as its sustainability reports, and environmental, social and health and safety performance figures which are free to access.

<http://barricksudamerica.com/publicaciones/>

<http://www.barrick.com/responsibility/reporting/default.aspx>

  
Signature of Lead Auditor



### Report Signature Page

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Reviewer

AC/bp

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