

*LAGUNAS NORTE MINE – BARRICK GOLD CORPORATION*

# *Cyanide Code Audit Summary Audit Report*

*PROJECT NO. 0351773*

*JULY 2017*

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## SUMMARY AUDIT REPORT

### 1 GENERAL SUMMARY

#### 1.1 INFORMATION ON THE AUDITED OPERATION

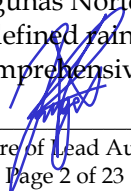
Name of Mine: Lagunas Norte Gold Mine  
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Name of Mine Operator: Minera Barrick Misquichilca S.A.  
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#### Location detail and description of operation:

The Lagunas Norte Mine, operated by Barrick Gold Corporation's Peruvian wholly owned subsidiary Minera Barrick Misquichilca S.A. (MBM), is located in the Alto Chicama Mining District in north-central Peru (Province of Santiago de Chuco, District of Quiruvilca, Department of La Libertad), 140 kilometers east of the coastal city of Trujillo. The property is situated in the Peruvian Andes Mountains at an elevation of 4,000 to 4,260 meters above mean sea level and straddles the continental divide. The mine is accessed year round by road from Trujillo and Huamachuco. 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 of rainfall occurs.

Lagunas Norte comprises an open pit mine, two waste rock storage areas, two geomembrane-lined heap leaching facilities, process and storm water pond system, acid rock drainage treatment plant, barren solution treatment plant using the INCO SO<sub>2</sub> process, a Carbon in Column plant 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 either the west or east storage areas designed specifically for this purpose. Ore is placed on the heap leach facilities by truck. There are two heap leach facilities fully lined with geomembrane and drain by gravity to the Sedimentation Ponds 1 and 2, both of which are covered with netting and fences to protect wildlife. Once suspended solids settle, the pregnant leach solution is directed to the PLS Ponds 1 and 2, each of which is connected to an emergency overflow pond or Process Overflow Ponds (POP) that provide storage for extreme storms and drain down. The PLS Ponds 1 and 2 are covered with bird balls and fences to prevent wildlife access; whereas only POP 1 is covered with bird balls and fences. Gold is recovered using conventional methods of heap leaching with dilute sodium cyanide solution for a 45-day leach cycle. Understanding and managing the process water balance is a critical function at Lagunas Norte because of the relatively high precipitation occurring in a well-defined rainy season. Lagunas Norte has developed and implemented a comprehensive process water balance program

Lagunas Norte Gold Mine  
Name of Mine

  
Signature of Lead Auditor

July 7, 2017  
Date

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that includes monitoring and regular updates to track and plan water management activities. Lagunas Norte uses “raincoats” on the heap leach facilities 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. 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 Lagunas Norte facilities except those necessary for continuous environmental protection will be closed and rehabilitated.

In the past three years Lagunas Norte had three cyanide incidents. The first incident occurred on 22 February 2014, a CIC operator put solution into a tote; not noticing that there were residues of an encrusting substance inside which caused for small quantities of HCN to form. The second incident occurred on 8 September 2015, an operator was splashed by leach solution from a pump relief valve and the third incident occurred on 16 May 2017, an inspection identified a pile of ore (approximately 250Kg) that had detached from a slope of the new leach pad, the ore was found near the perimeter entryway into the leach pad, near a small puddle of rainwater but away from natural water bodies. The three incidents were documented in an Incident Report and Investigation form and the Barrick’s tap root system was used to investigate the events

**SUMMARY AUDIT REPORT**

**1.2 OVERALL AUDITOR'S FINDING**


This operation is

- in full compliance
- in substantial compliance \*(see below)
- not in compliance

with the International Cyanide Management Code.

\* For cyanide transportation operations seeking Code certification, the Corrective Action Plan to bring an operation in substantial compliance into full compliance must be enclosed with this Summary Audit Report. The plan must be fully implemented within one year of the date of this audit.

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Date(s) of Audit: April 24 to 27, 2017

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.

## SUMMARY AUDIT REPORT

### 2 SUMMARY REPORT

This operation is

- in full compliance
- in substantial compliance
- not in compliance

with the International Cyanide Management Code.

#### 2.1 **PRODUCTION: ENCOURAGE RESPONSIBLE CYANIDE MANUFACTURING BY PURCHASING FROM MANUFACTURERS THAT OPERATE IN A SAFE AND ENVIRONMENTALLY PROTECTIVE MANNER.**

##### 2.1.1 **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.**

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 1.1
- not in compliance with

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

Lagunas Norte 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, Lagunas Norte has bought cyanide from Orica, which was

first certified as code compliant on 28 November 2006; the facility has maintained the certification with the latest recertification being granted in February 2017. According to the personnel interviewed there were not events that caused interruption of service from Orica and no other providers were used. Orica's Yarwun plant was recertified as fully compliant again in 29 October 2013. Lagunas Norte has bought cyanide from a Code compliant manufacturer for the duration of this recertification period.



## SUMMARY AUDIT REPORT

### 2.2 **TRANSPORTATION: PROTECT COMMUNITIES AND THE ENVIRONMENT DURING CYANIDE TRANSPORT.**

#### 2.2.1 **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.**

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 2.1
- not in compliance with

*Summarize 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.

Since 01 January 2009, Lagunas Norte has bought its cyanide from Orica under a cyanide purchase contract The Cyanide Supply Contract between Lagunas Norte and Orica contains clauses requiring that the supply of cyanide (i.e. manufacture and supply chain) be fully compliant with the Code.. According to the reviewed contract, Orica is responsible for itself and its subcontractors, including transportation, for Code compliance. The contract also establishes the requirements for manufacturing, handling, storing, packaging labeling, transporting and emergency response to be compliant with the Code.

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

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 2.2
- not in compliance with

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

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

Since 01 January 2009 the cyanide supply contract for the mine has been with Orica. The cyanide supply contract requires that the supply chain be certified as fully compliant under the Code.

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Transport from Yarwun to the Port of Brisbane is covered under Orica's Australia supply chain certification dated 05 October 2010.

Stiglich Transportes S.A. (Stiglich) was used as transporter until September 2014; then, it was replaced by Orica with DCR Minería y Construcción (DCR). Stiglich was certified in full compliance during the period that they provided services to Orica/Lagunas Norte. DCR has been certified in full compliance during the period they have provided services to Orica/Lagunas Norte.

The procurement department at Lagunas Norte keeps copies of the relevant documentation of the supply chain from Yarwun to the mine site which demonstrates that cyanide is delivered to site via a Code certified supply chain and this documentation was made available to the auditors.

### 2.3 **HANDLING AND STORAGE: PROTECT WORKERS AND THE ENVIRONMENT DURING CYANIDE HANDLING AND STORAGE.**

#### 2.3.1 **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.**

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 3.1
- not in compliance with

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

The operation is fully compliant with Standard of Practice 3.1. The unloading, storage, and mixing areas were designed and constructed with sound engineering practices, as determined by the initial certification audit in 2007, and there have been no changes since that time. The unloading, storage, and mixing facilities are located well inside the secure mine area and away from any occupied offices for mine staff. These facilities have been maintained in good working order as verified by auditors inspection. Likewise, these facilities are located away from surface water. Lagunas Norte does not receive liquid cyanide and thus there is no possibility of leakage from tanker trucks and subsequent seepage. The mixing and storage tanks have automatic level indicators and shutoffs, and the mine provided graphical examples of their performance. The mixing and storage tanks are located on a concrete floor with curbs, both in good condition, that provide a barrier to leakage and seepage. The solid cyanide is stored in a warehouse that prevents water entry and allows for passive ventilation via windows. Likewise, the mixing and storage room in the plant protects against water entry and is actively ventilated by a blower and wall fan. Both the warehouse and mixing/storage room are within the secured area of the mine and are kept locked. No incompatible materials are stored near these the unloading, storage, and mixing areas.

## SUMMARY AUDIT REPORT

**2.3.2** *Standard of Practice 3.2: Operate unloading, storage and mixing facilities using inspections, preventive maintenance and contingency plans to prevent or contain releases and control and respond to worker exposures.*

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 3.2
- not in compliance with

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

The operation is fully compliant with Standard of Practice 3.2. The procedure for treatment and disposition describes washing of both outer plastic bag and inner woven bag. The rinse water is collected in the tray surrounding the sprayer and incorporated into the mixing tank.

Rosandina is the company responsible for depositing the bags in inactive areas of the leach pad according to the procedure for management of residual solids. An incinerator is available as alternative option to dispose of this waste but the disposal of the waste in the leach pad is included in the facility environmental authorizations.

Lagunas Norte has developed procedures for operating valves, handling boxes, stacking boxes, cleaning up spills, observing mixing, and using PPE, and has completed forms showing their continuous use.

**2.4** **OPERATIONS: MANAGE CYANIDE PROCESS SOLUTIONS AND WASTE STREAMS TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT.**

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

The operation is:

- in full compliance with
- in substantial compliance with Standard of Practice 4.1
- not in compliance with

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

The operation is fully compliant with Standard of Practice 4.1. Cyanide solutions and waste streams are managed to protect human health and the environment. Lagunas Norte has numerous reports and standard operating procedures for its cyanide facilities, and these documents identify key design criteria and operating parameters.

## SUMMARY AUDIT REPORT

Lagunas Norte has developed, and used, a change management procedure that also includes formal risk assessment. Lagunas Norte has a set of contingency plans for upset or temporary conditions, including power outages. These documents have been reviewed and updated annually and after the review of any incidents. Lagunas Norte has a set of inspection forms and checklists and completes them on a daily, weekly, and monthly basis, depending on the nature of the inspection. Specifically, the pad, ponds, leak detection sumps, channels, pipes, tanks, valves, and appurtenances are inspected. Preventative maintenance consists of reactive maintenance, based on items identified in the inspections, and proactive maintenance based on an annual schedule. Lagunas Norte has seven 1.25 MW emergency generating sets. The generators are inspected and tested regularly.

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

The operation is

**THIS PRACTICE DOES NOT APPLY TO THE OPERATION**

- in full compliance with
- in substantial compliance with Standard of Practice 4.2
- not in compliance with

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

As described in Section 1, the scope of this audit was only for the heap leach operations performed by Lagunas Norte; therefore, this standard of practice does not apply.

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

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 4.3
- not in compliance with

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

The operation is in Full Compliance with Standard of Practice 4.3 which requires that the operation implement a comprehensive water management program to protect against unintentional releases. Lagunas Norte has developed a comprehensive water balance model that tracks water flow throughout the site-wide engineered water management structures, including water conveyance channels, pipelines, holding ponds, water treatment facilities, and sedimentation ponds.

## SUMMARY AUDIT REPORT

Lagunas Norte has updated and modified the water balance as the operations have changed. The water balance model is updated every week using data collected onsite. The model is regularly calibrated against actual data and shows a very close correlation, maximum and operation capacities are outlined below:

- PLS pond 1 has a maximum capacity of 100,000 m<sup>3</sup> and it is generally operated at around 95% capacity (operation capacity);
- PLS pond 2 has a maximum capacity of 300,000 m<sup>3</sup> and it is generally operated at 78% of its maximum capacity;
- POP 1 has a maximum capacity of 416,000 m<sup>3</sup> and it is generally operated at around 70%; and
- POP 2 has a maximum capacity of 600,000 m<sup>3</sup> and it is generally operated at around 75% of its maximum capacity

Lagunas Norte monitors and inspects a number of key parameters and facilities to ensure the safe management of the water balance at the site. Such installations include flow meters for irrigation of the leach pile and pond level indicators, which have readouts and alarms in the plant central control room. Lagunas Norte actively manages the site water balance, updating it each week with site collected rainfall data. The Goldsim model is run to predict pond volumes based on historic data to enable the operation of the pond levels and solution application rates to be managed safely. This is done in 2 parts:

- Short term pond level prediction on a monthly basis for operational control.
- Long term pond level prediction on a quarterly basis – when pond overflow is indicated by the model the strategy for directing flows to different ponds or recirculating to the leach pad is discussed.

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

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 4.4
- not in compliance with

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

The operation is fully compliant with Standard of Practice 4.4. Lagunas Norte has implemented measures to protect birds, wildlife and livestock. The mine has restricted livestock and wildlife access to the mine with fencing, and has restricted access to open cyanide solutions with closed conduits, bird balls, and netting.

## SUMMARY AUDIT REPORT

From 18 March to 8 June 2015, the average concentration of WAD cyanide in the POP 2 was 70 mg/l due to process water being directed from PLS Pond 2 to POP 2 in order to repair a damaged liner in the PLS Pond 2. As it was expected, WAD cyanide concentrations started to increase in POP 2. Immediately after high concentrations were detected, in March 24th, 2015, the event was recorded in the RIMS system (Responsible Incident Management System), Corrective and Preventive Actions (MAN-PLN-004) (Register N° EHSIN 9749). The following corrective and preventive actions were determined in the RIMS system; continuous WAD cyanide monitorings; monthly water balance reports; cyanide water above 50 mg/l to be directed to POP 1 and in an extreme case then conducted to POP 2; and continuous wildlife monitoring. Lagunas Norte documented only one bird mortality in April 21, 2017 in the Sedimentation Pond 2 (birds were trapped in the protective net). This event was not related to cyanide exposure.

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

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 4.5
- not in compliance with

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

The operation is fully compliant with Standard of Practice 4.5. Concentrations of WAD cyanide were reviewed for the period between 2014 and March 2017 and they were noted not to exceed 0.5 mg/l at any of the monitoring points. Lagunas Norte has implemented measures to protect fish and wildlife from discharges to surface water. Lagunas Norte has a direct discharge to surface water in the Quebrada Laguna Negra. Concentrations of free cyanide were reviewed for the period between 2014 and March 2017, the concentration of free cyanide did not exceed the 0.022 mg/l standard at point SWQN-40. Past exceedances have been corrected basically due to the installation of the reverse osmosis prior to discharge.

The water quality in the receiving waters meets the requirements of the Peruvian General Law on water for a category 3 watercourse, from which the water is suitable of irrigation of vegetables to be eaten raw, and for watering of livestock. There is no evidence of indirect discharges to surface water and therefore no remedial actions are being undertaken.

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### 2.5 STANDARD OF PRACTICE 4.6: IMPLEMENT MEASURES DESIGNED TO MANAGE SEEPAGE FROM CYANIDE FACILITIES TO PROTECT THE BENEFICIAL USES OF GROUND WATER.

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 4.6
- not in compliance with

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

The operation is fully compliant with Standard of Practice 4.6. Lagunas Norte has implemented measures to manage seepage to protect groundwater. There is no designated down gradient beneficial use, nor any actual point of groundwater use, nor any applicable groundwater standard. Nonetheless, Lagunas Norte has lined (i.e., geomembranes, clay, concrete) all cyanide facilities, including the heap leach, process ponds, solution conveyances, and the plant, to reduce the potential for seepage. Groundwater monitoring data from wells down gradient of cyanide facilities indicated non-detect concentrations for all cyanide species for the period from October 2014 to October 2017. Lagunas Norte has neither a mill that produces tailings nor underground workings.

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

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 4.7
- not in compliance with

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

The operation is fully compliant with Standard of Practice 4.7. Lagunas Norte has implemented procedures and physical measures for spill prevention at all cyanide unloading, storage, mixing, and process solution tanks. The physical measures consist of alarms, secondary containments connected to a principal sump, and a Plant Emergency Pond. The secondary containments are sized for 110% of the single largest tank plus precipitation, and the Plant Emergency Pond provides an additional level of tertiary containment. The secondary containments flow to a principal sump that then pumps solutions back into the process circuit.

There are no tanks without secondary containment. All pipelines to and from the leach pad are installed in geomembrane-lined ditches. There are no surface water bodies warranting special protection. All pipelines, tanks, and valves are constructed of materials compatible with high pH cyanide solutions, such as HDPE and stainless steel.

## SUMMARY AUDIT REPORT

2.5.2 ***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.***

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 4.8
- not in compliance with

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

The operation is fully compliant with Standard of Practice 4.8 which requires that the operation implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.

Since the last recertification audit the following cyanide facilities works have been undertaken:

- Leach Pad 2, PLS pond 2 and POP 2 (stages 6 and 7); and
- Reverse osmosis plant

Ausenco Vector has undertaken the design, specification and construction quality assurance of facilities constructed as a result of the expansion works (Stage 6 and 7) such as the leach pad 2, PLS pond 2 and POP 2 and Motta Engil undertook the construction of the expansion facilities Ausenco Vector has undertaken the design and specifications for the new reverse osmosis plant, Haug Ingeniería undertook the construction of the new reverse osmosis plant and Bureau Veritas undertook the quality assurance of its construction.

The site retains all CQA records; including the field notes, sampling records, and test records. CQA reports for the following facilities were reviewed:

- Reverse Osmosis Plant (civil and mechanic works);
- Leach pad 2 (civil works)
- Liners and secondary containment ditches (civil works)
- PLS pond 2 (civil works)
- POP 2 (civil works)

The CQA reports for the leach pad construction have been prepared by Vector Peru SAC, a respected engineering design company. The report has been signed off by Heriberto Frank Alva, Ausenco Vector General Manager. Mr. Alva is a registered professional engineer with the School of Engineers of Peru.



## SUMMARY AUDIT REPORT

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

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 4.9
- not in compliance with

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

The operation is fully compliant with Standard of Practice 4.9. Lagunas Norte has implemented monitoring programs for wildlife, surface water and groundwater. Monitoring programs are governed by standard operating procedures and monthly schedules. The protocols were prepared by properly qualified consultants and mine staff. Lagunas Norte uses a certified laboratory for chemical analysis. Sampling procedures specify field and laboratory methods, lists of constituents, chain of custody requirements and shipping protocols. Field conditions are documented on field forms by the sampler. Wildlife mortalities are observed and investigated. Surface water is sampled monthly and groundwater is sampled quarterly, and is augmented by daily monitoring of field parameters and flow rates (part of daily inspections). Additional weekly sampling is undertaken for the purpose of determination of free cyanide levels, although this is not required under their environmental permits. Finally, the periodic sampling, in conjunction with daily monitoring of field parameters and flow rates, is sufficient to identify changes in a timely manner.

### 2.6 **DECOMMISSIONING: PROTECT COMMUNITIES AND THE ENVIRONMENT FROM CYANIDE THROUGH DEVELOPMENT AND IMPLEMENTATION OF DECOMMISSIONING PLANS FOR CYANIDE FACILITIES.**

#### 2.6.1 *Standard of Practice 5.1: Plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife and livestock.*

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 5.1
- not in compliance with

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

Lagunas Norte is fully compliant with Standard of Practice 5.1. The mine has both regulatory (external) and internal closure plans that include cyanide facilities. In addition, Lagunas Norte has a specific procedure for closure, decommissioning and demolition that is regularly updated. The regulatory closure plan contains a general schedule for the sequence and duration of closure activities.

## SUMMARY AUDIT REPORT

The MEM approved the updated Mine Closure Plan in November 2016. Under Peruvian regulations, this plan requires an update 3 years after its approval, and thereafter every 5 years. Consequently, the next update is not required by the MEM until 2021.

**2.6.2** *Standard of Practice 5.2: Establish an assurance mechanism capable of fully funding cyanide related decommissioning activities.*

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 5.2
- not in compliance with

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

Lagunas Norte is fully compliant with Standard of Practice 5.2. Lagunas Norte has a closure cost estimate based on third-party contractors. This estimate was prepared in accordance with Peruvian regulations. The MEM-approved plan is not required to be updated until 2021, but Lagunas Norte annually updates their internal Provisions for Environmental Risk (PER) closure costs. Closure bonds have been issued by the Banco de Crédito de Perú, BBVA Continental and Scotia Bank on behalf of Lagunas Norte to a total of USD 115,373,950.

**2.7** **WORKER SAFETY: PROTECT WORKERS' HEALTH AND SAFETY FROM EXPOSURE TO CYANIDE.**

**2.7.1** *Standard of Practice 6.1: Identify potential cyanide exposure scenarios and take measures as necessary to eliminate, reduce and control them.*

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 6.1
- not in compliance with

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

The operation is fully compliant with Standard of Practice 6.1. Lagunas Norte has identified potential cyanide exposure scenarios and developed procedures and plans to eliminate, reduce and control exposure. Lagunas Norte's operating plans and individual task specific SOPs provide details for safe operation of cyanide equipment, personal protective equipment requirements and inspection requirements. Lagunas Norte has successfully implemented a program where job safety assessments are completed and documented prior to every cyanide related task. Lagunas Norte has safety meetings to provide information and training to employees as well as solicit input from employees and subcontractors on worker safety issues.

## SUMMARY AUDIT REPORT

Lagunas Norte has a Change Management procedure that requires any proposed changes in process operations and cyanide management be formally evaluated with the area supervisors prior to implementation. All changes are communicated to the workforce and training requirements updated.

**2.7.2** *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.*

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 6.2
- not in compliance with

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

The operation is fully compliant with Standard of Practice 6.2. Lagunas Norte has established the minimum pH level for limiting the evolution of hydrogen cyanide gas during mixing and production activities. The pH is monitored and maintained as recommended. Lagunas Norte has established requirements for personal protective equipment at all relevant process areas and for all cyanide related activities. Fixed HCN monitors are installed in areas of potential exposure to cyanide. In addition, operators working in areas where cyanide is present are required to wear portable HCN meters to conduct their tasks. Prior to maintenance work or confined space entry, work areas are checked for HCN concentrations with a portable HCN meter. HCN sensors are set at 4.7 ppm low level alarm and 10 ppm high level alarm. HCN monitors are maintained, calibrated and inspected as recommended by the manufacturer. Warning signs are 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. Pipes carrying cyanide are tagged and the direction of flow is indicated with arrows on the pipe. Signage for confined spaces at the tank entry points has also been placed. Lagunas Norte provides the cyanide safety information (MSDS and first aid procedures) at all key process locations and on the Lagunas Norte intranet. Lagunas Norte has implemented an accident investigation process to report and investigate all cyanide related incidents. In the past three years three incidents occurred, all of which were promptly investigated and both preventive and correction actions were taken to prevent recurrence.

**2.7.3** *Standard of Practice 6.3: Develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.*

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 6.3
- not in compliance with

## SUMMARY AUDIT REPORT

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

The operation is fully compliant with Standard of Practice 6.3. Lagunas Norte has developed an Emergency Response Plan and implemented the Plan through training and installation of emergency response equipment. Lagunas Norte has safety equipment including safety showers with eyewash stations, first aid equipment (cyanide antidotes, medical oxygen, and resuscitator), two ambulances, and employee first aid training. Lagunas Norte has an Emergency Response Team for all shifts. The team is trained to provide first aid for cyanide exposure including oxygen administration. Lagunas Norte has a program to store and replace cyanide exposure antidotes in accordance with the manufacturer's requirements at several locations on the property. In the event of a worker exposure, Lagunas Norte will provide onsite first aid. Lagunas Norte has two onsite medical facilities that are always staffed by at least one physician and one nurse. The on-site medical physician will provide intravenous cyanide antidote for treatment of the patient if required. Lagunas Norte has conducted cyanide exposure drills, and tests the relevant emergency procedures annually.

**2.8** ***EMERGENCY RESPONSE: PROTECT COMMUNITIES AND THE ENVIRONMENT THROUGH THE DEVELOPMENT OF EMERGENCY RESPONSE STRATEGIES AND CAPABILITIES.***

**2.8.1** ***Standard of Practice 7.1: Prepare detailed emergency response plans for potential cyanide releases.***

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 7.1
- not in compliance with

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

The operation is fully compliant with Standard of Practice 7.1. Lagunas Norte has developed plans and SOPs that address emergency response to potential accidental releases of cyanide. Lagunas Norte plans contain procedures for potential scenarios such as: 1) Catastrophic release of hydrogen cyanide from storage or process facilities; 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 cyanide treatment, destruction or recovery systems; 10) Failure of tailings impoundments, heap leach facilities and other cyanide facilities.

## SUMMARY AUDIT REPORT

### 2.8.2 *Standard of Practice 7.2: Involve site personnel and stakeholders in the planning process.*

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 7.2
- not in compliance with

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

The operation is fully compliant with Standard of Practice 7.2. The General Emergency Plan has been designed to be implemented entirely by trained, onsite personnel. Lagunas Norte has onsite fire-fighting capabilities, a fully equipped emergency response vehicle, a hazmat vehicle and trained First Responders, firefighters and hazmat personnel. Lagunas Norte emergency response teams are trained to respond to all potential cyanide incidents at the site. Lagunas Norte's General Emergency Plan has been developed with the involvement and input of its workforce. Lagunas Norte's workforce has the ability to participate in the emergency response planning process through weekly safety meetings and mock drills. Lagunas Norte involves site personnel in mock drills and revises the emergency response procedures as needed.

### 2.8.3 *Standard of Practice 7.3: Designate appropriate personnel and commit necessary equipment and resources for emergency response.*

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 7.3
- not in compliance with

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

The operation is fully compliant with Standard of Practice 7.3. Lagunas Norte 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. Lagunas Norte has certified First Responders and Brigade Members including firefighters and hazmat personnel. Lagunas Norte'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. Lagunas Norte requires training and certification for Emergency Responders, including advanced first aid (cyanide exposure, administering antidote, locations of cyanide antidote kits, medical oxygen); Hazardous Materials Level I, II, and III; confined spaces; firefighting and others.

## SUMMARY AUDIT REPORT

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 Lagunas Norte 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.

**2.8.4** *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 Standard of Practice 7.4
- not in compliance with

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

The operation is fully compliant with Standard of Practice 7.4. Lagunas Norte's General Emergency Plan and related facility plans detail the procedures (including current contact telephone numbers) for internal and external emergency notification and reporting.

The General Emergency Plan includes procedures and current contact information for notifying management, regulatory agencies (DIGESA, Ministry of Energy and Mines, Ministry of the Environment, Civil Defense, Labour and others), Cyanide supplier and transporter (Orica and DCR), National Police of Peru, off-site medical facilities, the media, and other stakeholders. The General Emergency Plan and the Chuyugual River Basin Evacuation Plan include communication procedures as well as contact information for community representatives in the nearby areas. Media communication procedures are also included in the plan.

**2.8.5** *Standard of Practice 7.5: Incorporate into response plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals.*

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 7.5
- not in compliance with

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

The operation is fully compliant with Standard of Practice 7.5. Lagunas Norte has prepared cyanide response and remediation plans that address appropriate uses and situations for cyanide treatment chemicals.

## SUMMARY AUDIT REPORT

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.

Lagunas Norte prohibits the use of sodium hypochlorite or other chemicals to treat cyanide that has been released into surface waters. Sodium hypochlorite is only to be used in cases where the solution is fully contained on site and will not enter surface waters. Lagunas Norte has developed plans to sample and monitor soils and water to identify the extent and effect of a cyanide release. Spill management procedures describe what final cyanide concentration will be allowed in residual soil as evidence that the release has been completely cleaned up.

**2.8.6** *Standard of Practice 7.6: Periodically evaluate response procedures and capabilities and revise them as needed.*

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 7.6
- not in compliance with

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

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

At least once per year Lagunas Norte conducts cyanide related mock drills to practice and prepare for emergencies and to provide insight into the effectiveness of its emergency response plans. Lagunas Norte has conducted three cyanide related mock drills since the 2011. Auditors verified that General Emergency Plan and the contingency plans have been updated and/or revised since the previous re-certification audit.

**2.9** *TRAINING: TRAIN WORKERS AND EMERGENCY RESPONSE PERSONNEL TO MANAGE CYANIDE IN A SAFE AND ENVIRONMENTALLY PROTECTIVE MANNER.*

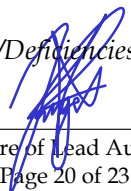
**2.9.1** *Standard of Practice 8.1: Train workers to understand the hazards associated with cyanide use.*

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 8.1
- not in compliance with

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

Lagunas Norte Gold Mine  
Name of Mine

  
\_\_\_\_\_  
Signature of Lead Auditor

July 7, 2017  
Date

## SUMMARY AUDIT REPORT

Lagunas Norte is in full compliance with Standard of Practice 8.1., which requires that the site train workers to understand the hazards associated with cyanide use.

Lagunas Norte provides training to all employees, contractors and visitors with the potential to be exposed to cyanide, on the hazards of cyanide and provides annual refresher training. Lagunas Norte retains all cyanide training records for employees. The cyanide related performance assessment tests are also retained in employee permanent records.

**2.9.2** *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.*

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 8.2
- not in compliance with

*Summarize 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.

Lagunas Norte's training program identifies the specific cyanide management elements that each employee must be trained in to perform that specific job properly. All Lagunas Norte employees and contractors, with the potential to be exposed to cyanide, receive annual refresher training that includes cyanide safety. Lagunas Norte employees working in specific cyanide management tasks receive annual refreshers for those tasks. Lagunas Norte 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. Task training related to cyanide is provided to the operations personnel by experienced and qualified supervisors, to the emergency response brigade either by an internal competent trainer or through external specialized companies. Finally, general cyanide training is provided by trainers certified by Peruvian the Institute of Mining safety (ISEM by its initials in Spanish).



## SUMMARY AUDIT REPORT

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

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 8.3
- not in compliance with

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

The operation is fully compliant with Standard of Practice 8.3. Personnel responsible for unloading, mixing, production, and maintenance are trained in decontamination and first aid procedures for cyanide release incidents. Task specific SOPs, the General Emergency Plan and Pre Plans describe response procedures and first aid if a person is exposed to cyanide or if there is an environmental release. Lagunas Norte emergency response team (including Emergency Coordinators) is trained in the procedures described in the emergency response plans and the use of necessary response equipment. Lagunas Norte response personnel receive annual refresher courses in first aid for cyanide intoxication, cyanide emergency response, safety cyanide management, and decontamination and remediation procedures for cyanide related exposures and releases.

Lagunas Norte conducts mock emergency drills based on likely release/exposure scenarios. Cyanide emergency drills are evaluated from a training perspective to determine if personnel have knowledge and skills required for effective response. Training procedures are revised, if necessary. Training records are retained throughout an individual's employment documenting the cyanide training they receive. The records include the names of the employee and the trainer, the date of training; the topics covered, and test results demonstrating an understanding of the training materials.

### 2.10 **DIALOGUE: ENGAGE IN PUBLIC CONSULTATION AND DISCLOSURE.**

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

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 9.1
- not in compliance with

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

Lagunas Norte is fully compliant with Standard of Practice 9.1. Lagunas Norte provides multiple opportunities to third parties and to local residents to communicate issue of concern with mine staff.

## SUMMARY AUDIT REPORT

The communities and other stakeholders can provide submit their issues regarding any topic of the mine by several ways:

- Phone call
- Letter,
- Information fairs organized by the mine, derived from the environmental management system.
- Interaction with representatives during scheduled visits from the Communication and Public Relations team to the communities
- Directly to their information offices located in Quirubirca and Santiago de Chuco.

Lagunas Norte has implemented a there is a grievance mechanism that includes posting information in four communities

- Visits to the mine
- A fan page in social media

All communications are managed through the community relations management system which is database that registers all communication and the actions taken.

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

The operation is

- in full compliance with
- in substantial compliance with Standard of Practice 9.2
- not in compliance with

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

Lagunas Norte is fully compliant with Standard of Practice 9.2. Lagunas Norte provides multiple opportunities to interact with stakeholders and to provide them information regarding cyanide management. In addition to the opportunities listed previously under Standard of Practice 9.1. Lagunas Norte has provided information regarding their cyanide management practices through illustrated books to community leaders and local authorities. These books were provided in hand with a brief explanation.

. Lagunas Norte publishes quarterly newsletter focused for the three basins located in their influence zone (three different newsletters each quarter).

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

The operation is


- in full compliance with
- in substantial compliance with Standard of Practice 9.3
- not in compliance with

## SUMMARY AUDIT REPORT

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

Lagunas Norte is fully compliant with Standard of Practice 9.3. Lagunas Norte continuously makes information regarding cyanide activities available in a variety of written, verbal, and visual formats for different levels of education and ages. Specific information on exposures and releases is required to be reported to the Ministry of Energy and Mining, and is publically available at the MEM website. Barrick also voluntarily makes this information available at their website.

Lagunas Norte Gold Mine  
Name of Mine

  
\_\_\_\_\_  
Signature of Lead Auditor  
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July 7, 2017  
Date