REPORT

Gold Mine Certification Audit – Summary Audit Report

PT J Resources Bolaang Mongondow (JRBM)

Submitted to:

International Cyanide Management Institute (ICMI)

1400 I Street, NW- Suite 550
Washington DC 20005
United States of America

Submitted by:

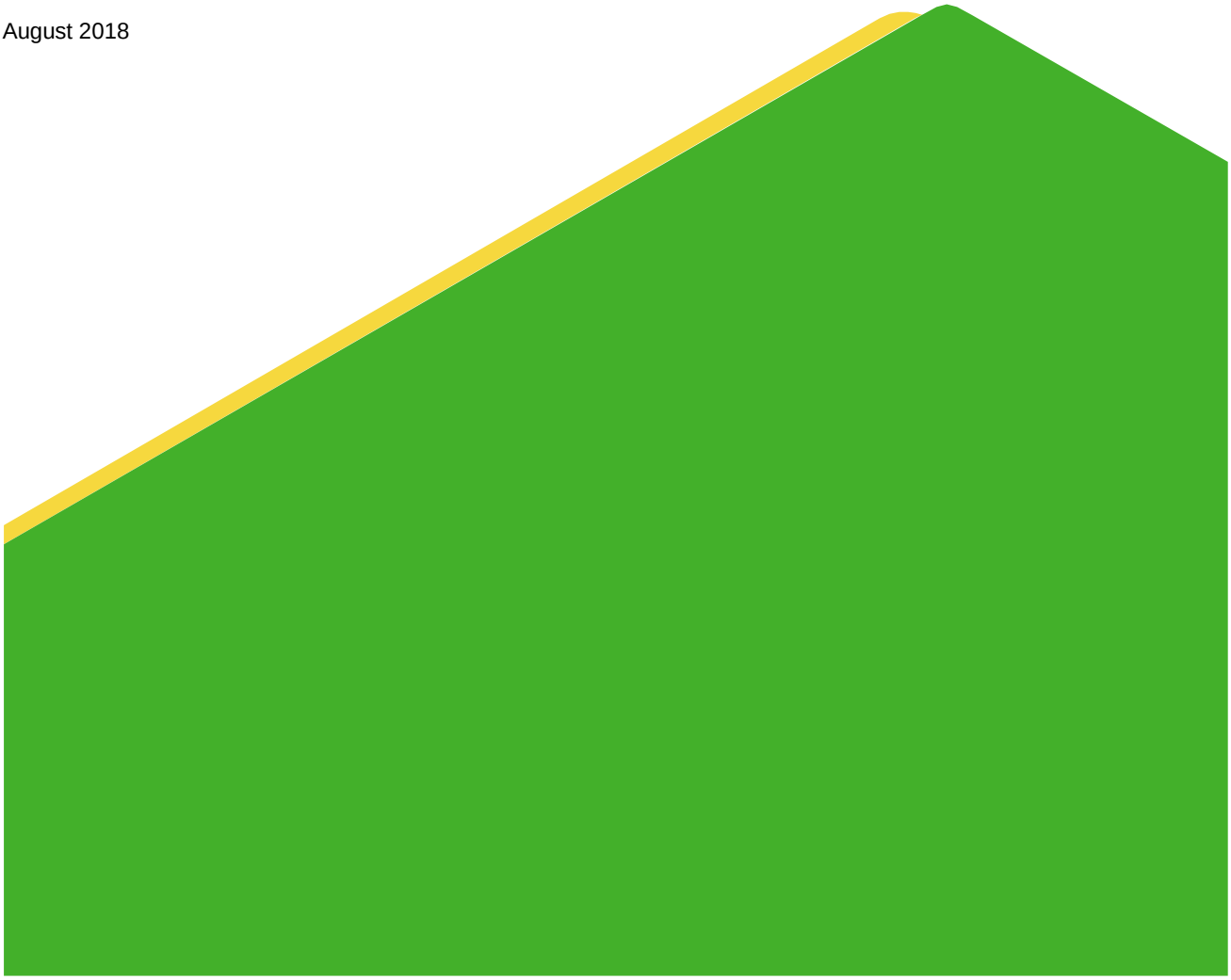
Golder Associates (PT Geotechnical & Environmental Services Indonesia)

10th Floor, Graha Paramita, Jl. Denpasar, Block D-2, Kuningan, Jakarta 12940,
Indonesia

+62 21 252 1975

178713026-006-R-Rev0

August 2018



Distribution List

1 Copy – International Cyanide Management Institute (ICMI)

Electronic Copy – J Resources Bolaang Mongondow (JRBM)

Electronic Copy – Golder Associates Pty Ltd

Electronic Copy – Golder Associates (PT Geotechnical & Environmental Services Indonesia)

Summary Audit Report

FOR OPERATIONAL GOLD MINES

Name of Mine:	PT J Resources Bolaang Mongondow (JRBM)
Name of Mine Owner:	PT J Resources Nusantara
Name of Mine Operator:	PT J Resources Nusantara
Name of Responsible Manager:	Rendi Teguh Martono
Address:	Jln. Jhony Suhodo No. 41, Lingkungan IV, Kel. Kotabangun, Kotamobagu Timur – 95712
State/Province:	Sulawesi Utara
Country:	Indonesia
Telephone:	+62 434 262 8778
Email:	rendi.martono@jresources.com

LOCATION DETAIL AND DESCRIPTION OF OPERATION

PT J Resources Nusantara

PT J Resources Nusantara (JRN) as a subsidiary of PT J Resources Asia Pasifik Tbk (J Resources) and is an Indonesian owned intermediate gold producer with production capacity of approximately 250 000 ounces per annum.

JRN mines low grade-epithermal deposits and operates heap leach system for its gold mining projects and they have eight sites in total. Four sites are in production phase: Bakan and North Lanut in North Sulawesi, Seruyung (SPP) in North Kalimantan, and Penjom in Pahang, Malaysia. Pani (Gorontalo, Sulawesi) and Doup (North Sulawesi) are in feasibility phase and Bolangitang (North Sulawesi) and Bulagidun (Gorontalo, Sulawesi) are in exploration phase.

PT J Resources Bolaang Mongondow

PT J Resources Bolaang Mongondow (JRBM) is a subsidiary of JRN and holds a Contract of Work (CoW) covering 58 150 ha in two separate land blocks; the Bakan Block and North Lanut Block, both in North Sulawesi Province, Indonesia. The Bakan Block contains the Bakan gold mine (Bakan) that has been in production since December 2013.

The operation is located in North Sulawesi, approximately 5 km south-east from the nearest community Bakan and approximately 18 km South from the larger city of Kotamabago.

The mine uses a dynamic heap leach approach suitable for high sulphidation, epithermal, low-grade oxide ores. JRBM has reported that the operation has a production capacity of 4 000 000 tonnes per annum.

AUDITORS FINDINGS

The PT J Resources Bolaang Mongondow Gold Mine is:

☒ **in full compliance with**

☐ in substantial compliance with

☐ not in compliance with

The International Cyanide Management Code

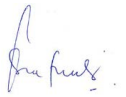
No significant cyanide incidents or cyanide exposures and releases were noted as occurring during the audit period.

Audit Company: Golder Associates

Audit Team Leader: Jaclyn Ennis-John, Lead Auditor and Technical Specialist

Email: jennis-john@golder.com

Name and Signatures of Other Auditors:

Name	Position	Signature	Date
Jaclyn Ennis-John	Lead Auditor and Technical Specialist		28 August 2018
Binafeda Harimundarti	Auditor		28 August 2018
Frank Nijman	Auditor		28 August 2018

Dates of Audit

The Certification Audit site visit was conducted over five days between 30 October and 1 November 2017; and on 12 to 13 February 2018.

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's *Mining Operations Verification Protocol* and using standard and accepted practices for health, safety and environmental audits.

Table of Contents

APPENDICES

1.0 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.**

The operation is

☒ **in full compliance with**

☐ in substantial compliance with **Standard of Practice 1.1**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

JRBM is in FULL COMPLIANCE with Standard of Practice 1.1, requiring the operation 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.

JRBM has agreements to purchase its sodium cyanide (cyanide) from UNID Global Corporation (Formerly OCI Corporation) (UNID) and Hebei Chengxin Co. Ltd (Hebei) under Sales Contracts. UNID sources cyanide through TaeKwang Industrial Co (TaeKwang) which is also certified producer. Both agreements require the seller to have a valid certification under the Code for the duration of the sales contract.

Hebei was recertified as being fully compliant with the Code on 16 December 2015.

TaeKwang was recertified as being fully compliant with the Code on 19 June 2017.

Cyanide is not purchased from an independent distributor. Cyanide purchased by JRBM is manufactured at a facility certified as being in compliance with the Code

A review of delivery documents provided no evidence to suggest that JRBM receives bulk delivery of cyanide from any other producers.

2.0 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:

JRBM is in FULL COMPLIANCE with Standard of Practice 2.1, requiring that the operation establish clear lines of responsibility for safety, security, release prevention, training and emergency response in written agreements with producers, distributors and transporters.

JRBM has written agreements with Hebei Transport, PT Energy Logistics and PT Transcontinent designating some transportation-related responsibilities identified by the Code.

PT Transcontinent is a freight forwarder used by JRN to transport cyanide deliveries to SPP and Bakan from the Terminal Petikemas Surabaya to the mine site.

PT Energy Logistics is a freight forwarder used by JRBM to transport cyanide deliveries to Bakan from the Terminals Petikemas Surabaya and Petikemas Bitung to the mine site.

The text of the Goods Contract does not specifically document all of the transportation responsibilities required under the Code, but the specific reference to Code compliance implies that all of the transportation responsibilities must be complied with.

PT Energy Logistics was recertified as being fully compliant with the Code on 4 December 2017.

PT Transcontinent was recertified as being fully compliant with the Code on 2 December 2014 and recertified on January 29, 2018.

Transport from the certified producer Hebei is certified under two supply chains covering transport within China and a Global Ocean Supply Chain. Hebei Chengxin Transport was certified as compliant with the Code on 27 January 2017 and the Ocean Supply Chain was certified on 29 August 2017.

The certification audits of the cyanide transport activities assures that the designation of responsibilities during transport has been adequately addressed.

***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

Summarise the basis for this Finding/Deficiencies Identified:

JRBM is in FULL COMPLIANCE with Standard of Practice 2.2, requiring that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management.

JRBM's contract with its cyanide transporter requires that the transporter be certified under the Code.

PT Energy Logistics was recertified as being fully compliant with the Code on 4 December 2017.

PT Transcontinent was recertified as being fully compliant with the Code on 2 December 2014 and recertified on January 29, 2018.

Transport from the certified producer Hebei is certified under two supply chains covering transport within China and a Global Ocean Supply Chain. Hebei Chengxin Transport was certified as compliant with the Code on 27 January 2017 and the Ocean Supply Chain was certified on 29 August 2017.

The operation has chain of custody records identifying all elements of the supply chain (producer and transporter) that handle the cyanide brought to its site. Chain of custody documents were reviewed for November 2017 for all relevant parties.

3.0 PRINCIPLE 3 – HANDLING AND STORAGE

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

***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:

JRBM is in FULL COMPLIANCE with 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.

Facilities for mixing and storing cyanide have been designed and constructed in accordance with sound and accepted engineering practices for these facilities. As-built Drawings and a signed technical note were provided for the cyanide mixing tank and cyanide storage warehouse. These indicate that the cyanide facilities have been designed and constructed in accordance with sound and accepted engineering practices.

Cyanide mixing, unloading and storage areas are located away from people and surface waters. JRMB has reviewed the distances from the facilities to the nearest permanent surface water body, nearest residential location (Accommodation Village) and nearest work office. Based on the distances recorded, operation has not considered it necessary to evaluate the potential for releases to surface water and/or human exposure.

Liquid cyanide is not unloaded at the facility.

JRBM uses both automated and manual level indication on the cyanide mixing tank. The mixing tank is equipped with an ultrasonic level indicator that is used for monitoring, this provides a reading level of 0-100% of the tank, also installed is a mechanical atmospheric level indicator, which is a transparent hose reading 0-50 m^3.

There is an alarm system that alerts the operators when the level is nearing capacity, if the level continues to rise, the second sensor will be alerted and will automatically close the pneumatic valve and prevent the addition of water into the tank.

The mixing tank overflows to the bund area during an emergency release event. No overflows have been recorded or observed during the audit period.

The Operators also manually inspect the levels each a shift as part of the Checklist Equipment Cyanide Mixing Tank and Checklist Level Indicator Tank Bakan Site.

The cyanide mixing tank and warehouse storage areas are located on a concrete surface that can prevent seepage to the subsurface. They have been designed and constructed to sit on concrete slab footings. Additionally, the cyanide mixing tank bund wall provides full concrete secondary containment.

An inspection of the secondary containments for cyanide storage and mixing tanks indicated that they were constructed of materials that provide a competent barrier to leakage.

The cyanide mixing tank is installed in the roofed plant area that is open on all four sites to allow for ventilation and away from occupied areas. It is located within a fenced area and a locked, manned gate prevents unauthorised access to the area. Bunding prevents mixing with incompatible materials.

The cyanide storage warehouse allows for ventilation through manual extractor fans on the roof. It has been designed to prevent contact with water and locked to prevent unauthorised access and prevent mixing with incompatible materials. It is located within a fenced area and a locked, manned gate prevents unauthorised access to the area.

***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.**

☒ **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:

JRBM is in FULL COMPLIANCE with 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.

JRMB prevents the empty cyanide containers from being used for any purpose other than holding cyanide. Empty cyanide boxes and (cleaned) used bags are disposed of at a separate section of the waste rock dump.

The *Mixing Sodium Cyanide Task Procedure* require that following cyanide mixing, liners are to be rinsed with water three times. The effluent is collected in the mixing tank containment sump and pumped back into the tank. Rinsed bags are placed back into the empty cyanide boxes for transportation to the waste rock dump.

Task Procedures have been developed covering the mobilisation of the cyanide containers and mixing and storing of cyanide. They detail the steps necessary to safely and correctly transport cyanide boxes and mix cyanide solution; and the operation of all valves and couplings for transporting cyanide and mixing solid cyanide.

The cyanide boxes are transported following the relevant Task Procedures. Boxes are stacked three high within the locked warehouse facility.

Procedures are in place to promptly clean up spills during the mixing process and require the presence of an observer during the mixing process and during transportation.

Task procedures list the required measures and personal protective equipment (PPE) requirements for each task. The Auditor observed cyanide box mobilisation and mixing on site and it was confirmed that personnel used PPE correctly and that there was always a second Operator observing who was removed from the mixing; additionally, the Area Supervisor was further away in the “safe area” conducting planned task observations.

4.0 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 preventive 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:

JRBM is in FULL COMPLIANCE with 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.

Written management and operating plans or procedures have been developed for areas of the operation that involve cyanide solutions greater than 0.5 mg/L weak acid dissociable (WAD) cyanide.

J Resources has developed Corporate Standard Operating Procedures for key cyanide related tasks. JRBM has then developed site specific Task Procedures for common tasks and uses Job Safety Analysis (JSA) for assessing and documenting steps and controls for non-routine activities. The JSA process is also used as an assessment tool to evaluate low level changes in the management of change process.

Task Procedures have been developed for cyanide related activities from transport of the product, operation, mining, management of the pads (ploughing, trenching), decontamination and contingency planning.

The Task Procedures detail the hazards, PPE and actions to be taken to undertake the task in a safe manner and prevent exposure.

The operation has plans and procedures that identify the assumptions and parameters on which the facility designs were based and any applicable regulatory requirements to prevent or control cyanide releases and exposures consistent with applicable requirements. There are no surface water diversions at the Operation.

The internal memo *Pengaturan Dosing Sianida De Leachpad* is a key document that lists the blending strategy for the ore, irrigation rates for each ore type; and pH and cyanide ppm requirements for each pond. This memo was issued to the all process plant operators from Process Manager.

The operation has plans or procedures that describe the standard practices necessary for the safe and environmentally sound operation of the facility including the specific measures needed for compliance with the Code, such as inspections and preventative maintenance activities.

Key Corporate standard operating procedures (SOPs) and JRBM specific Task Procedures and Work Instructions outline the specific measures for Code compliance including operation of the facility and inspections.

All process and pond pumps, pipes, valves and tanks are registered within a yearly Preventative Maintenance Spreadsheet. Specific maintenance tasks and associated frequencies have been assigned for each item. The tasks and frequencies were initially set by the Maintenance Planners using the recommendations contained within the equipment manuals. The tasks and frequencies were later adjusted based on observations made when conducting the tasks as well as experience gained from Work Orders raised from inspections.

The Change Management procedure outlines the principles and process for use at JRBM to manage proposed changes on site. Once the requirement for Change Management is identified. The proposed changes must go through the Approval Sheet process. This process incudes objectives of new design; hazard identification, risk assessment and controls; Review by key departments; figures and diagrams of change. Approved projects are recorded on the Management of Change Register

The Cyanide Emergency Response Plan (CERP) details procedures for situations related to upsets in the operation of the facility. The Decommissioning Plan details the process of cessation of operations and decontamination. The Environmental Manager, who has a key role in crisis management and emergency response, advised that in the case of the temporary closure or cessation of processing the decommissioning plan would be referred to. Site procedures also contain contingency information.

The operation does inspect cyanide facilities on an established frequency sufficient to assure and document that they are functioning within design parameters. All process and pond pumps, pipes, valves and tanks are registered within yearly Preventative Maintenance Spreadsheets (mechanical and electrical). Specific maintenance tasks and associated frequencies have been assigned for each item. Frequencies are daily, weekly, monthly and three-monthly.

The inspections are guided by inspection sheets that prompt the inspector to check specific items on specific pumps, valves, pipes and tanks within the area being inspected. Daily checks are observation only for any obvious faults by the operators. Monthly and three-monthly are completed by electrical and mechanical operators combined. Any observations requiring follow up actions are raised on Work Orders.

There are also inspection checks completed for each shift. Should there be an issue identified, it is either immediately corrected or a Work Order is raised. Tanks holding cyanide solutions are inspected for structural integrity and signs of corrosion and leakage. JRBM has adopted relevant Preventative Inspection frequencies all tanks containing cyanide solution. In addition to scheduled maintenance inspections, the body of the mixing tank is checked as part of routine operator inspections.

JRBM inspects secondary containments for their integrity, the presence of fluids and their available capacity, and to ensure that any drains are closed to prevent accidental releases to the environment. This is conducted and recorded as part of routine operator checks.

A manual leak detection system is installed under every pond containing cyanide solution.

Included within the daily operator inspection sheets is the requirement check for leaks of the pond liner.

Groundwater monitoring bores are installed around the perimeter of the ponds. These are monitored every quarterly.

Pumps, pipes, valves and tanks of key cyanide areas are listed on the relevant daily inspection sheets. These are conducted and recorded three times a shift as part of routine operator checks.

Freeboards for the ponds are inspected on a daily basis at least once a shift to confirm that they are still within the design limits.

Inspections are documented, including the date of the inspection, the name of the inspector, and any observed deficiencies. The nature and date of corrective actions are also documented, and records are maintained.

All documentation reviewed contained the name of the inspector, the reviewer of the inspection form, and the date of the inspection.

The check sheets and log sheets document deficiencies and include a description of the deficiency and immediate corrective action.

Records are retained as hard copy. Examples were provided for the Auditors' review.

Preventive maintenance programmes are implemented, and activities documented to ensure that equipment and devices function as necessary for safe cyanide management. JRBM has determined what equipment is critical in preventing releases and exposures and included it in its preventative maintenance and inspection schedules.

Excel schedules are used to track preventative maintenance activities. A review of preventative maintenance schedules of cyanide critical equipment confirmed that preventative maintenance inspection reports had been developed and scheduled for all cyanide critical equipment. Records of maintenance were also reviewed.

JRBM has four backup generators in good condition. The generators are part of the operation's general inspection process as well as undergoing yearly work safety examination by a third party.

The Process Manager advised that should there be a power failure, and the pumps fail, solution will flow through gravity into the surface water pond (SWP) and then into the Polishing Pond as a second backup. Both ponds are lined.

***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:

JRBM is in FULL COMPLIANCE with Standard of Practice 4.2; introduce management and operating systems to minimize cyanide use, thereby limiting concentrations of cyanide in mill tailings.

JRBM has implemented a program to determine the appropriate cyanide addition rates to the heap leach; and evaluate and implement cyanide control strategies.

The Senior Metallurgist confirmed that testwork was completed in 2014 and in 2016, revising the management for each ore type. The new test work revised dosing requirements and heap leach pad management. The revised measurements listed in *Pengaturan dosing sianida di leachpad* (Setting dosing cyanide in leachpad). This procedure lists the cyanide limits for each ore type (oxide, high grade and transition) at each leaching stage (primary, secondary and reploughing). It also lists all the required CN and pH concentrations for each pond.

The metallurgist sends regular emails alerting the operations team to the current requirements of the various cells and heap leach pads.

As per the *Pengaturan dosing sianida di leachpad* the operators undertake two hourly sampling of the pH and CN (ppm) as well as flow and totaliser at various locations. Locations include pumps, header tanks and individual cells. This checklist also records pond levels and Cyanide mixing tank levels. Completed checklists were reviewed.

***Standard of Practice 4.3*:** **Implement a comprehensive water management program 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:

JRBM is in FULL COMPLIANCE with Standard of Practice 4.3; implement a comprehensive water management program to protect against unintentional releases.

JRBM has developed a comprehensive and probabilistic water balance.

The water balance has been developed based on the minimum and maximum levels of each pond determined through an assessment of pond volumes, allowing for an amount of freeboard applicable to the site conditions and management strategies. The water balance can be adjusted to reflect the current site operations. The JRBM Water Balance considers the following inputs in a reasonable manner for the site setting:

- Solution application rates applied to the heap leach. This is based on the current application rates determined by Senior Metallurgist and Process Plant Manager.
- 100-year 24-hour storm event, calculated by hydrologist. 1 in 100-year average recurrence indicator (ARI) of 265 mm with the assumption of rain for 12 hours of 22.1 mm / h.
- Precipitation data have been collected from site weather conditions stations since the operations commencement. Evaporation has not been included and due to the humid location is not a factor that would affect the water balance.
- Run-off is not applicable to the site as the ponds are constructed at a higher level to prevent runoff entering, except for the Storm Water Pond (SWP) which is designed to capture runoff.
- Freezing and thawing conditions are not applicable and there not included.
- It is designed for a worst-case scenario when there is no power and no detox facility. As discussed in Question 4.1.10, JRBM has four backup generators to operate the critical components at the cyanide facilities in the event of a power outage. The Process Manager advised that should there be a power failure, and the pumps fail, solution will flow through gravity into the SWP and then into the Polishing Pond as a second backup. Both ponds are lined.
- Capacity for the detox system has been included. The Water Balance identifies when the Detox is required to be run and for what capacity.
- Not applicable because the high-density polyethylene (HDPE) liner prevents interaction between groundwater and leach solutions.

JRBM has implemented procedures which incorporate inspection and monitoring activities to implement water balance and prevent overtopping of the ponds. Every two hours during a shift the Operators visually inspect the level of the ponds. On the walls of the ponds there are markings showing low and high allowable levels. This was observed during the site inspection.

JRBM has designed and operates their ponds with adequate freeboard based on the Water Balance and related calculations. The internal memo *Kapasitas Pond dan Petunjuk Pengaturan Level Pond* has calculated the levels of capacity for each pond.

JRBM uses a site-specific rainfall gauge, both manual and automatic rain levels are recorded. Precipitation is recorded, and the water balance is amended accordingly.

***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:

JRBM is in FULL COMPLIANCE with Standard of Practice 4.4; implement measures to protect birds, other wildlife, and livestock from adverse effects of cyanide process solutions.

JRBM has implemented measures to restrict access by wildlife to open waters where WAD cyanide exceeds 50 mg/L WAD cyanide.

The Pregnant, Intermediate, Barren, Polishing and Detox ponds are netted. JRBM also installs paranet (portable covers) over ponding on the heap leach pads or at the Launder. The Surface Water Pond and Polishing ponds are not netted as they contain <50 mg/L WAD cyanide. Test results taken in March 2017 identified that that SWP and Polishing Pond were less than 50 mg/L, demonstrating that open waters do not exceed 50 mg/L WAD cyanide.

JRBM conducts weekly inspection on cyanide facilities to inspect ponds condition including the net to prevent access of any wildlife. Maintaining a concentration of less than 50 mg/L WAD cyanide is observed to be preventing significant wildlife mortality. The Environmental Manager reported that no wildlife mortalities have been reported.

JRBM applies solution in a manner designed to prevent ponding and limit overspray. The operation has developed an internal memorandum that details the strategies for both the metallurgist and operations to implement. Supporting this is Task Procedure – Transfer Cyanide to the Heap Leach Pad . This address actions to prevent ponding.

There was no significant ponding observed during the site visit. Ponding and overspray is checked as part of the daily check lists and recorded on the log sheets.

***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

Summarise the basis for this Finding/Deficiencies Identified:

JRBM is in FULL COMPLIANCE with Standard of Practice 4.5; implement a comprehensive water management program to protect against unintentional releases.

JRBM does have a direct discharge to surface water that is less than 0.5 mg/L WAD. The nearest permanent surface water is the Dumagin River located approximately 400m to the south. Following the detox and Polishing process, water from the Polishing pond can be directly discharged to the environment via Compliance Point 2 (CP2). Cyanide concentrations from CP2 are less than 0.5 mg/L.

JRBM has obtained a wastewater discharge permit that has defined the mixing zone area. The South Bolaang Mongondow District Office defines the existing monitoring point S. Cabang Dumagin as the approved mixing zone. Monitoring results indicated that the WAD cyanide concentration was < 0.005 mg/L.

JRBM does not have an indirect discharge to surface water.

***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:

JRBM is in FULL COMPLIANCE with Standard of Practice 4.6; implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of groundwater.

JRBM has implemented preventative maintenance and monitoring measures to manage seepage to protect the beneficial uses of the groundwater beneath and/or immediately downgradient of the operation.

All leach pads are lined with HDPE liner to prevent seepage. Each pond is double lined and has leak detection and monitoring system installed between the liners.

Seepage is also monitored quarterly through the groundwater bores (four bores) surrounding the mine site. The one bore is downgradient of the Polishing pond. The groundwater bores are monitored for free cyanide concentrations on weekly basis and based on monitoring results reviewed, the analysis reported 0 ppm.

On quarterly basis, JRBM sends the same water samples collected from monitoring bores for cyanide analysis. Environmental test analysis reports Total cyanide concentration less than the limit of reporting (LOR) of 0.001 mg/L.

Referring to Government Regulation (GR) 82/2001, the limit criteria for cyanide concentration is 0.02 mg/L.

The operation does not use mill tailings as underground backfill.

The operation advised there are no defined beneficial use of groundwater in the area and monitoring indicates there is no cyanide impacts to groundwater.

***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

Summarise the basis for this Finding/Deficiencies Identified:

JRBM is in FULL COMPLIANCE with Standard of Practice 4.7; Provide spill prevention or containment measures for process tanks and pipelines.

JRBM has spill containment measures for all the cyanide-related storage, mixing and process tanks. The secondary containments of the Process Plant, Ponds and Detox Area have all been designed and constructed with secondary containment measures. All tanks have been designed and constructed with solid concrete bases under the tank floor.

The containments were observed to be in good condition and suitable for use. The auditors also reviewed design, as-built documentation and signed Technical Note confirming they were built as construction requirements.

JRBM has adequately sized spill containment measures for all the cyanide-related storage, mixing and process tanks. Calculations have been completed for all secondary containment onsite confirming that all bund areas comply with the set requirements.

JRBM has implemented procedures to prevent discharge to the environment of any cyanide solution or cyanide-contaminated water that is collected in the secondary containment area. The Process Manager has confirmed that all leach pads and ponds are double lined and bunded; a leak detection system is between the two liners, collecting and monitoring for any leakage.

All drainage from sumps are collected and pumped back into the cyanide tank, other vessels or gravity fed to the Barren Leach Solution (BLS) pond or SWP.

Pipes containing cyanide with a solution greater than 0.5 mg/L outside the plant bunded areas been double wrapped with HDPE liner. This was confirmed during the site inspection.

Checklists for all areas include the requirement to Examination of leakage on the liner in the pond. All pipework is inspected for visual signs of leaks three times a shift.

Areas where cyanide pipelines present a risk to surface water have not been specifically evaluated for special protection needs. Instead, JRBM has double wrapped all pipes containing cyanide with a solution greater than 0.5 mg/L with HDPE liner.

Cyanide tanks and pipelines are constructed of materials compatible with cyanide and high pH conditions. Materials used include carbon steel, glass flake epoxy and HDPE, which are suitable for the conditions.

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:

JRBM is in FULL COMPLIANCE with Standard of Practice 4.8 requiring that operations implement QA/QC procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.

QA/QC programs have been implemented for cyanide facilities. The auditors reviewed record of construction reports for cyanide facilities, which included signed as built drawings and a technical note signed by the Site Engineer confirming construction.

JRBM has implemented QA/QC programs that address the suitability of materials, adequacy of soil compaction for earthworks, and installation of geomembrane liners. QA/QC documentation describe the parties involved, QA/QC activities and testing, design modifications, and as built drawings. For the elements where full QA/QC documents were not available a suitably qualified JRBM Engineer provided confirmation that the facility was constructed as required by the design drawings.

JRBM has retained appropriate documentation for the applicable cyanide facilities.

Appropriately qualified personnel reviewed and approved the construction of the JRBM project. JRBM confirmed that QA/QC testing documentation for the facilities were reviewed and approved by licensed professional engineers. For the elements where full QA/QC documents were not available a suitably qualified JRBM Engineer provided confirmation that the facility was constructed in accordance with the design drawings.

***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:

JRBM is in FULL COMPLIANCE with Standard of Practice 4.9; implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface, and groundwater quality.

JRBM has developed written standard procedures and also refers to Corporate (JRN) procedures for monitoring activities. Interviews with the Sampling Operator confirmed his understanding of the sampling procedures.

Sampling and analytical procedures have been developed by appropriately qualified personnel in environment, health and safety (EHS) Department. The monitoring program is aligned with the approved environmental management and monitoring documents as a sub set document of Environmental Impact Assessment.

The JRBM sampling and monitoring procedure describes the compliance point, sampling point and the sampling frequency. The procedure also details sampling methodology, containers, tools and equipment, sample identification, sample storage, preservation and holding time.

Sampling conditions and procedures are documented in writing.

JRBM does have a direct discharge to surface water and therefore monitors direct discharges. Surface water is monitored for cyanide at the government authorised mixing point. A groundwater bore is also down gradient from the polishing pond discharge point and is monitored for cyanide.

There are another additional three groundwater bores and four surface water sampling points that are monitoring for cyanide.

Monitoring of leak detection system is also undertaken to understand if there is any potential for leakage from ponds

Monitoring is conducted at frequencies adequate to characterise the medium being monitored and to identify changes in a timely manner; with higher risk areas being sampled at least daily. Monitoring includes wildlife mortalities.

5.0 PRINCIPLE 5 – DECOMMISSIONING

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

***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:

JRBM is in FULL COMPLIANCE with Standard of Practice 5.1, requiring that a decommissioning plan is developed and implemented for effective closure of cyanide facilities to protect human health, wildlife and livestock.

JRBM has developed a Cyanide Facilities Decommissioning Plan for Bakan which supplements the Mine Closure Plan (*Rencana Penutupan Tambang – RPT*). The Plan details the actions to be taken at cessation of operations and addresses the cyanide facilities.

The Plan also includes details on purpose, scope, cyanide facilities, decommissioning strategy, implementation and costs. The implementation actions are conceptual due to the life of mine but are considered to be commensurate for the remaining life of mine.

The Cyanide Facilities Decommissioning Plan contains an implementation schedule for decommissioning activities. As the planned mine life is currently ten years, the schedule is conceptual. The schedule details activities at the key project stages.

JRBM reviews their decommissioning procedures for cyanide facilities during the life of the operation and revises them as needed. The Mine Closure Plan was developed in 2013 and reviewed in January 2017.

The *Cyanide Facilities Decommissioning Plan* also provides for review of cost estimates every five years.

***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

Summarise the basis for this Finding/Deficiencies Identified:

JRBM is in FULL COMPLIANCE with Standard of Practice 5.2, requiring that operation establish an assurance mechanism capable of fully funding cyanide related decommissioning activities.

JRBM has established a Cyanide Facilities Decommissioning Plan aligning with the Mine Closure Plan (MCP). JRBM has submitted a revised Mine Closure Plan to Ministry of Energy and Mineral Resources (MoEMR) and is waiting for approval and has therefore not placed a bond with MoEMR.

To address the requirement for third party funding prior to the acceptance of the MCP by MoEMR, JRBM engaged a mine closure consultancy, to review the mine closure costs developed by JRBM.

The company confirmed that the costs developed by JRBM and provided to them

"….is a fair reflection of the direct costs that would be incurred by a third party to mobilize, conduct the planned activities, and demobilised from site, in order to close all of the cyanide related facilities at Pt JRBM (Bakan Mine)."

The Cyanide Facilities Decommissioning Plan states that a review of decommissioning cost estimates is conducted every five years and when revisions are made to the cyanide decommissioning plan.

JRBM has established a cost estimate for the decommissioning of the operation and has submitted this to the MoEMR. However, until the Mine Closure Plan is approved by the MoEMR the Closure Bond cannot be placed. JRBM has instead established an insurance bond to cover decommissioning of cyanide related facilities. Correspondence provided from KBR Insurance Brokers informed that a bond of the required amount was processed via an Insurance Company.

6.0 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:

JRBM is in FULL COMPLIANCE with the Standard of Practice 6.1 requiring the operation to identify potential cyanide exposure scenarios and take measures as necessary to eliminate, reduce, and control them.

JRBM is in FULL COMPLIANCE with Standard of Practice 6.1, requiring that operation identifies potential cyanide exposure scenarios and takes measures as necessary to eliminate, reduce and control them.

JRBM has developed operational procedures related to cyanide tasks that describe how to minimise worker exposure.

JRBM undertakes HIRA (Hazard Identification Risk Assessment and Control) for all areas to include staging, storage, process plant, HLP, laboratory, detox, hauling, water treatment and fieldwork activities.

The risks identified are then assessed whether a work instruction (WI) or task procedures (TP) is required to be developed. The assigned risks category guides to what risks needed to be addressed in each procedure.

All cyanide related tasks are allocated a category rank of very high (AA), high (A) and therefore require development of a procedure. JRBM has specific procedures for all cyanide related activities. Each procedure details the task scope; PPE required; task steps for preparation and implementation of the task.

At the end of each task, for activities with high or very high ratings, there is discussion about the activity and any comments which will be put on the Planned Task Observation (PTO), recording both the positive and negative findings. JRBM conducts training or socialisation to ensure workers are understand the procedures. Workers' comments are welcomed and discussed. Inputs are also collected from the PTO.

***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:

JRBM is in FULL COMPLIANCE with Standard of Practice 6.2, requiring that operation operates and monitors cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures.

The operation has determined the appropriate pH for limiting the evolution of hydrogen cyanide (HCN) gas during mixing and production activities. JRBM has a target pH of 10-12. JRBM undertakes sampling every two hours to confirm the target pH.

Where the potential exists for significant cyanide exposure, the operation uses both fixed and portable monitoring devices to confirm that controls are adequate to limit worker exposure to HCN gas. A fixed monitor is located above the cyanide mixing tank and the requirement for a portable monitor is listed as part of the JSA/TP PPE requirements. The 4.7 ppm alarm is a warning alarm to notify the operators. The 10 ppm alarm is to alert the operator to leave the area immediately.

JRBM determines calibration schedule for all equipment (personal, fixed and portable gas detectors) based on manufacturers requirements. Calibration records were observed. Warning signs have been placed where cyanide is used advising workers that cyanide is present and that smoking, open flames and eating and drink are not allowed. The signage also stipulates the PPE that must be worn when working in the area. Signage was observed to be located at entrances to the plant areas and on fencing to storage areas. Signage was clear and legible and in the language of the workers.

Showers, low-pressure eyewash stations and dry-powder fire extinguishers are strategically located throughout the operation in the cyanide areas. Both the shower and eyewash stations and fire extinguishers are included in the relevant area inspection checklists.

Unloading and storage area, mixing and process tanks are identified to alert workers of their contents. Piping containing cyanide are identified to alert workers of their contents, and the direction of cyanide flow in pipes is designated.

Safety Data Sheets (SDS) are translated in Bahasa Indonesia and kept at the location where cyanide is managed. Copies of the SDS were observed at the cyanide storage warehouse and cyanide mixing area.

Procedures are in place, to investigate and evaluate cyanide exposure incidents to determine if the operations programmes and procedures to protect worker health and safety, and to respond to cyanide exposures, are adequate or need revising. Procedures are in place to investigate and evaluate cyanide exposure incidents to determine if the operations programmes and procedures to protect worker health and safety, and to respond to cyanide exposures, are adequate or need revising. Should there be a cyanide incident the operation would implement its *Incident Information, Reporting and Investigation System* Procedure.

***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

Summarise the basis for this Finding/Deficiencies Identified:

JRBM is in FULL COMPLIANCE with Standard of Practice 6.3, requiring that operation develops and implements emergency response plans and procedures to respond to worker exposure to cyanide.

The operation has necessary response and communication equipment readily available for use at cyanide unloading, storage and mixing locations including radio and emergency oxygen supply.

In the event of an emergency, personnel are instructed to raise the alarm via the emergency radio channel or the emergency phone number. These contact points are manned 24 hours a day by the Emergency Call Centre. Technical and manual alarms are installed to inform the employees.

JRBM provides equipment for emergency response situation. The equipment is stored in the Site Clinic and at the Emergency Response Team (ERT) Base Control room. The operation does inspect its first aid equipment regularly to ensure that it is available when needed. Cyanide antidotes are stored as directed by their manufacturer and replaced on a schedule to ensure that they will be effective when needed. JRBM conducts inspections against the emergency equipment, completed inspection forms were observed.

HCN antidotes are kept in cool temperature. Their expiry is tracked along with other medical supplies stored on site. The antidote was in date. Oxygen is checked daily.

The operation has developed specific written emergency response plans or procedures to respond to cyanide exposures. The operation has two documents that are implemented in the event of a release of cyanide, the cyanide emergency response plan (CERP) and the ERP. The CERP which addresses potential accidental releases of cyanide. It is required to be regularly updated following employees' comments and discussion post simulation or mock drill. The ERP covers the following key areas and is the overarching reference for responding to cyanide emergencies:

- Emergency classification and trigger of response
- Roles and responsibilities
- Activating the Emergency Response Team (ERT)
- Potential cyanide incident and scenario management
- General procedure cyanide incident
- Potential incident and scenario management.

The operation does have its own on-site capability to provide first aid or medical assistance to workers exposed to cyanide.

The emergency response team are the primary responders to an emergency, but all processing personnel are instructed in the actions to take in the event of a cyanide exposure. The Paramedic will always accompany the ERT to an emergency with casualties. The ERT also has the capability to provide basic cyanide first aid including decontamination and the administering of oxygen.

JRBM has a fully stocked medical clinic with oxygen, cyanide antidote kit and an ambulance. The clinic is staffed 24 hours/day with professional doctor, paramedic staff and a pharmacist. The operation has on-site capabilities to treat all cyanide exposures. As such, patients are unlikely to require transfer off site to other medical facilities. However, if this is required, the patient would be transferred by helicopter to one of the regional hospitals for treatment.

JRBM has developed procedures, and has agreements, to transport workers exposed to cyanide to locally available qualified off-site medical facilities where required. JRBM has established a health service agreement with Siloam International Hospital; as well as meetings with other local hospitals confirming their role in a cyanide emergency.

Transport procedure in an emergency is outlined in the CERP.

Mock emergency drills conducted are periodically to test response procedures for various cyanide exposure scenarios, and lessons learned from the drills are incorporated into response planning.

JRBM has conducted cyanide emergency drills as part of its emergency response planning. The emergency drills are conducted at varying scales and debrief reports are compiled following each exercise. Two mock drills were conducted in 2017.

7.0 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:

JRBM is in FULL COMPLIANCE with Standard of Practice 7.1 requiring an operation to prepare detailed emergency response plans for potential cyanide releases.

The operation has two documents that are implemented in the event of a release of cyanide, the CERP and the ERP.

The CERP that addresses potential accidental releases of cyanide. The ERP is the primary reference for responding to emergencies. The CERP is subsidiary to the ERP and describes specific response actions appropriate to the emergency situations such as clearing site personnel and potentially affected communities from the area of exposure, use of cyanide antidotes and first aid measures as well as supply clean water to communities if cyanide spills are suspected contaminated the surface water.

The ERP outlines how the alarm for a cyanide emergency is raised internally. The ERP also details the process to activate ERT and how to conduct medical evacuation of site personnel off the site.

The CERP provides first aid response to cyanide poisoning using the antidotes. Doctor and paramedics know how and when the antidote is administered. They are also involved in the emergency drills. The operation has developed a CERP that addresses potential accidental releases of cyanide. This plan is dedicated to responding to cyanide emergencies.

The CERP covers the following key areas and is the primary reference for responding to cyanide emergencies. JRBM CERP considers the potential cyanide failure scenarios appropriate for its site-specific environmental and operating circumstances.

JRBM CERP considers the potential cyanide failure scenarios appropriate for its site-specific environmental and operating circumstances.

The CERP provides a summary of site specific incident scenarios with specific response. The CERP considers both on-site transportation emergencies and the physical form of cyanide (solid sodium cyanide).

The site receives cyanide in solid form packaged in a wooden box with double layer of plastic packaging inside from a certified producer. Off-site Transport emergencies are managed under the Code certified transporters emergency management plan and the site would provide assistance as requested.

The CERP details the possible emergency situation related to on-site transport activities. As well as the ERT's response actions the following scenarios:

- Cyanide poisoning procedure

- Solid sodium cyanide spills to water
- Contained and uncontained spills.

The CERP describes specific response actions appropriate to the emergency situations such as clearing site personnel and potentially affected communities from the area of exposure, use of cyanide antidotes and first aid measures as well as supply clean water to communities if cyanide spills are suspected contaminated the surface water.

The CERP outlines how the alarm for a cyanide emergency is raised internally and the requirement to barricade and clear personnel upwind. It also discusses the requirement to implement the emergency communications plan if communities need notification.

The CERP also details the cyanide poisoning including, washing/flushing, use of high-flow oxygen and administration of assessment and treatment with antidotes, if required.

JRBM has developed procedures, and has agreements, to transport workers exposed to cyanide to locally available qualified off-site medical facilities where required. JRBM has established a health service agreement with Siloam International Hospital; as well as meetings with other local hospitals confirming their role in a cyanide emergency.

***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

Summarise the basis for this Finding/Deficiencies Identified:

JRBM is in FULL COMPLIANCE with Standard of Practice 7.2 requiring an operation to involve site personnel and stakeholders in the planning process.

JRBM has involved its workforce and stakeholders, including potentially affect communities, in the cyanide emergency response planning process. Mechanisms to consult with the workforce who are the main stakeholders for cyanide related emergencies include emergency drills, toolbox meetings, socialisation and planned task observations.

Given that the operation is remote from communities, accordingly specific response actions for communities from emergency event on site are not anticipated. Awareness for the potentially affected communities (i.e. local workers) are delivered through information and communication programs which from part of the workforce training.

JRBM has engaged with regional hospitals who may assist in a cyanide emergency confirming that they understand their role, cyanide risks and have the required equipment.

***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:

JRBM is in FULL COMPLIANCE with Standard of Practice 7.3 requiring an operation to designate appropriate personnel and commit necessary equipment and resources for emergency response.

The elements of the ERP and procedures include:

- General Manager (GM) as the Emergency Management Team (EMT) Leader and the EHS Manager as the Emergency Commander.
- The ERP identifies the roles of EMT Leader, EMT Member, Emergency Commander, Captain ERT, Security, Paramedic, Technician / Safety Rep, Cyanide Coordinator.
- Each member has responsibility to support and participate in an emergency as defined in the duty cards and described in the listed scenarios.
- Minimum training requirements for emergency responders.
- Call-out procedures and 24-hour contact information for the coordinators and response team members.
- Duties and responsibilities of the coordinators and team members.
- List emergency response equipment, including personal protection gear, available along transportation routes and/or on site.
- Procedures to inspect emergency response equipment to ensure its availability.
- The external responder which are Prodia that will provide medical evacuation by air and hospitals for further medical treatment.

The external responders detailed within the plan are Prodia and hospitals. Prodia will provide medical evacuation by air and hospitals will provide further medical treatment where necessary. Due to the remote location, no other response actions by external parties are envisaged. JRBM established a contract agreement with the Prodia and a Health Service Agreement to confirm the services required if needed.

***Standard of Practice 7.4*:** **Develop procedures for internal and external emergency notification and reporting.**

☒ **in full compliance with**

The operation is ☐ in substantial compliance with **Standard of Practice 7.4**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

JRBM is in FULL COMPLIANCE with Standard of Practice 7.4 requiring an operation develop procedures for internal and external emergency notification and reporting.

JRBM emergency documentation includes procedures and contact information for notifying management, regulatory agencies, outside response providers and medical facilities of the cyanide emergency.

In the event of an emergency, personnel are instructed to raise the alarm via the emergency radio channel or the emergency phone number.

All external communication is directed by the Crisis Management Team (CMT) Leader. Allowing the EMT Leader to manage the onsite emergency.

JRBM has mechanisms in place for external communication which is the responsibility of the CMT, this is detailed in the ERP and CERP. The CMT can delegate communications with government, stakeholders and mass media to the Emergency Coordinator.

***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:

JRBM is in FULL COMPLIANCE with Standard of Practice 7.5 requiring an operation to incorporate in response plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals.

The emergency response documentation describes specific remediation measures for:

- Recovery or neutralisation of solutions and solids
- Decontamination of soils and other contaminated media
- Management and/or disposal of spill clean-up debris
- Provision of an alternate drinking water supply.

The CERP prohibits the use of chemicals to treat cyanide that has been released into surface water.

As part of the treatment process with Sodium Hypochlorite, the CERP details the amount to be used for the size of spill. Sodium Hypochlorite is stored in the dedicated Dangerous Goods area away from incompatible materials. The CERP addresses environmental monitoring to identify the extent and effects of a cyanide release. For each procedure listed in the CERP there is the requirement to consult with the Environment Manager and the Process Manager in the recovery process and to test the soil content to confirm WAD cyanide is less than 0.5 ppm.

The Environment Manger confirmed that sampling methodologies, parameters and sampling locations would be confirmed through liaison with the Environment Manager.

PT J Resources Bolaang Mongondow (JRBM)		28 August 2018
Name of Facility	Signature of Lead Auditor	Date

***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:

JRBM is in FULL COMPLIANCE with Standard of Practice 7.6 requiring an operation to periodically evaluate response procedures and capabilities and revise them as needed.

JRBM reviews and evaluates the cyanide related elements of its emergency response plan for adequacy on a regular basis.

The ERP and CERP have been updated their development.

In addition to the scheduled periodic review process, JRBM also uses desktop exercises and emergency drills as part of the consultation process to keep the plan current. Those involved in the exercises and debriefs provide feedback post drills. All feedback and information collected in the debrief is included in reviews of emergency procedure and related documentation.

Mock emergency drills conducted are periodically to test response procedures for various cyanide exposure scenarios, and lessons learned from the drills are incorporated into response planning.

The emergency drills are conducted at varying scales and debrief reports are compiled following each exercise. There were two mock drills conducted in 2017.

In addition to the scheduled periodic review process, JRBM also uses desktop exercises and emergency drills as part of the consultation process to keep the plan current. Those involved in the exercises and debriefs provide feedback post drills. All feedback and information collected in the debrief is included in reviews of emergency procedure and related documentation.

8.0 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:

JRBM is in FULL COMPLIANCE with Standard of Practice 8.1 requiring an operation develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.

JRBM trains all personnel who may encounter cyanide in Cyanide Introduction and Awareness Training. Cyanide awareness is covered in the Induction for visitors as part of the Site operation information. Further detail is included in the Basic occupational health and safety (OHS) Induction which all personnel need to complete.

The training and induction procedure require a refresh training for cyanide introduction and awareness refresher training is periodically conducted. JRBM has established a two-year refresher cycle for the Cyanide Awareness Training Program. Additionally, any employees leaving the site for more than 10 days should attend the EHS Refreshment Training Program when returning to the site.

JRBM has an electronic database for managing training and a review of training records for all personnel identified in the Training Need Analysis. This matrix indicates training type, schedule and the job roles or responsibility required to participate.

Training records have been retained. JRBM has an electronic database that provides the training profiles for roles and holds training records. A review of training records for personnel across processing and maintenance revealed that records are maintained.

***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:

JRBM is in FULL COMPLIANCE with Standard of Practice 8.2 requiring an operation train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community and the environment.

JRBM train workers to perform their normal production tasks, including unloading, mixing, production and maintenance with minimum risk to worker health and safety and in a manner that prevents unplanned cyanide releases.

New starters complete a general induction that provides information on safety and the environment including hazard and risk assessment tools (J-SAFE Introduction). Practically, once process workers have completed the inductions they are teamed with an experience operator and provided on the job training. This is undertaken for at least three months until the new started is deemed competent by the Supervisor.

Personnel who work in the processing plant attend toolbox meeting to discuss potential hazards and controls required prior to conduct mixing activities referring to the Task Procedure. The training elements necessary for tasks involving cyanide are identified in training material.

Prior to performing work related with cyanide management, a toolbox meeting is conducted to discuss step by step task information contained in each procedure.

Employees involved in cyanide working activities must be found competent in each procedure prior to working unaccompanied. Supervisors or Foreman will supervise personnel to see whether they are able completing that task unaccompanied. Also, there is a training evaluation conducted to see whether employees aware the hazards and risks associated with cyanide handling. JRBM assigns appropriately qualified personnel to provide task training related to cyanide management activities.

Supervisors are also being trained on the JSA and TP related to cyanide management to later discuss with their employees in the toolbox meeting.

Refresher training on cyanide management is required every two years to ensure that employees continue to perform their jobs in a safe and environmentally protective manner. Induction program that include cyanide introduction and awareness refresher training is also conducted for employees leaving the site for more than 10 days.

JRBM evaluates the effectiveness of cyanide training by testing, observation or other means. The trainer conducts pre and post-test to assess the employees' level of knowledge with regards to cyanide awareness training. The tests are scored and evaluated post training.

Records are retained throughout an individual's employment documenting the training they receive. The records include the names of the employee and the trainer, the date of training, the topics covered and if the employee demonstrated an understanding of the training materials. A sample of training files and review of paper files confirmed that records are retained.

***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:

JRBM is in FULL COMPLIANCE with Standard of Practice 8.3 requiring an operation develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.

JRBM has developed JSAs and task procedures for response to cyanide spills during unloading, mixing and production. JRBM has also developed a CERP. All personnel working in the processing area attend the cyanide introduction and awareness training which includes information on what to do if cyanide is released. The Task Procedures are discussed in tool box meetings.

JRBM also conduct emergency drills with regards to response in cyanide releases. Evaluation is performed to include checking on whether ERT gives appropriate response and follows reporting procedure. JRBM also conducts problem identification and corrective action (PICA).

Site cyanide response personnel, including unloading, mixing, production and maintenance workers, are trained in decontamination and first aid procedures. They participate in routine drills to test and improve their response skills. The ERT are the primary responders and undertake regular skills training (emergency drills). They are equipped with emergency equipment. Company doctor and paramedic are the main resources providing First Aid in emergency.

The ERT has regular training in both the theory and practical aspects of emergency response. Basic first aid and firefighting are provided for ERT. Practical training is included in the emergency drills (mock exercises).

JRBM made off-site Emergency Responders familiar with the CERP and emergency response roles to the extent necessary. JRBM coordinates with local fire brigades that would conceivably be involved in a response. A contract with the Siloam Hospital in Bolaang Mongondow Selatan and a guarantee letter with Monobia Clinic for employees' medical support.

Refresher training for response to cyanide exposures and releases is regularly conducted. Cyanide awareness training that is completed every two years contains training on response to exposures and releases.

Simulated emergency drills are periodically conducted for training purposes (every two months). The drills cover both worker exposures and environmental releases. Six emergency drills have been conducted in 2017, two specifically addressed cyanide tank rupture and cyanide exposure.

Cyanide emergency drills are evaluated from a training perspective to determine if personnel have the knowledge and skills required for effective response. The debrief process considers the key strengths and shortcomings from each exercise and the outcomes and required actions. The debrief process considers the key strengths and shortcomings from each exercise and the outcomes and required actions. JRBM develops a problem identification and corrective actions (PICA) list that feed in to the review process. Learnings and corrective actions are undertaken and shared to employees.

Records are retained documenting the cyanide training, including the names of the employee and the trainer, the date of training and the topics. EHS department maintains training records in hard copy for the Emergency Response Team. A review of these training records showed that the records include names of the employee and the trainer, the date of training and the topics covered. The records also include any corrective actions required resulting from the evaluation post drills (PICA).

9.0 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:

JRBM is in FULL COMPLIANCE with Standard of Practice 9.1 requiring an operation to provide opportunity for stakeholders to communicate issues of concern regarding the management of cyanide.

JRBM conducts socialization with communities such as village head, local regulators, employees' family, customary leaders and communities from surrounding villages within mining area who are gathered under the Community Discussion Forum (FDM) of Bolaang Mongondow and Bolang Mongondow Selatan Regencies. JRBM is actively involved in a monthly meeting with FDM to present the cyanide awareness and information as well as addressing community feedback.

JRBM issued the 1st edition of Newsletter that contains information related to cyanide management and handling. The Newsletter is prepared in language that understandable and distributed to government officers and multiple level of stakeholders (such as village heads).

JRBM employs local people from nearby villages such as Bakan. Induction is mandatory for all employees and sub-contractors personnel as well as the visitors. The induction material is presented via presentation slides and/or video and contains information about cyanide.

JRBM holds morning toolbox meetings in which site personnel can raise issues regarding cyanide.

***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:

JRBM is in FULL COMPLIANCE with Standard of Practice 9.2 requiring an operation to initiate dialogue describing cyanide management procedures and responsively addressing identified concerns.

JRBM has created opportunities for the operation to interact with stakeholders and provide them with information regarding cyanide management practices and procedures. At an operational level, JRBM has developed the following opportunities to communicate to internal and external stakeholders:

- Cyanide awareness training for employees that may be at risk to exposure.
- Regular toolbox meetings where cyanide issues are discussed and raised by site personnel.
- Induction materials and video

- Presentation slides for community's socialization
- www.jresources.com
- JRBM Newsletter

The Newsletter, presentation slides and induction materials provide information with regards to what JRBM is doing to reduce the risks of cyanide exposure and how the operation prevents impacts of cyanide on the environment.

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

The operation is
- ☒ **in full compliance with** **Standard of Practice 9.3**
- ☐ in substantial compliance with **Standard of Practice 9.3**
- ☐ not in compliance with **Standard of Practice 9.3**

Summarise the basis for this Finding/Deficiencies Identified:

JRBM is in FULL COMPLIANCE with Standard of Practice 9.3 requiring an operation make appropriate operational and environmental information regarding cyanide to stakeholders.

JRBM has developed written descriptions of how their activities are conducted and how cyanide is managed. Based on the discussions with EHS Department, it was considered that the illiterate proportion of the local population did not constitute a significant percentage. Consequently, verbal dissemination of material was not considered warranted. The presentation material is prepared to include pictures, diagrams and supported with verbal communication to ensure messages are delivered.

JRBM conducts socialization and induction to give understanding of cyanide management. The JRBM Newsletter containing cyanide management information is distributed to local government and stakeholders.

Induction (via presentation slides and video) provides information about cyanide management for employees including local labours, sub-contractor personnel and visitors

JRBM has the mechanisms to make information publicly available on the cyanide release or exposure incidents, where applicable. No incident related to cyanide release or exposure is reported by JRBM to date.

10.0 IMPORTANT INFORMATION

Your attention is drawn to the document titled – “Important Information Relating to this Report”, which is included in Appendix A of this report. The statements presented in that document are intended to inform a reader of the report about its proper use. There are important limitations as to who can use the report and how it can be used. It is important that a reader of the report understands and has realistic expectations about those matters. The Important Information document does not alter the obligations Golder Associates has under the contract between it and its client.

PT J Resources Bolaang Mongondow (JRBM) _____ 28 August 2018
Name of Facility Signature of Lead Auditor Date

Signature Page

Golder Associates (PT Geotechnical & Environmental Services Indonesia)

Jaclyn Ennis-John
ICMI Lead Auditor/Technical Specialist

Frank Nijman
Environment Manager

JEJ/EWC_MW/hn

j:\env\2017 - environment\1776807 - pt j resources icmc audit indonesia\correspondence out\005-006 bakan dar and sar\178713026-006-r-rev0 sar bakan.docx

APPENDIX A

Important Information

The document ("Report") to which this page is attached and which this page forms a part of, has been issued by Golder Associates Pty Ltd ("Golder") subject to the important limitations and other qualifications set out below.

This Report constitutes or is part of services ("Services") provided by Golder to its client ("Client") under and subject to a contract between Golder and its Client ("Contract"). The contents of this page are not intended to and do not alter Golder's obligations (including any limits on those obligations) to its Client under the Contract.

This Report is provided for use solely by Golder's Client and persons acting on the Client's behalf, such as its professional advisers. Golder is responsible only to its Client for this Report. Golder has no responsibility to any other person who relies or makes decisions based upon this Report or who makes any other use of this Report. Golder accepts no responsibility for any loss or damage suffered by any person other than its Client as a result of any reliance upon any part of this Report, decisions made based upon this Report or any other use of it.

This Report has been prepared in the context of the circumstances and purposes referred to in, or derived from, the Contract and Golder accepts no responsibility for use of the Report, in whole or in part, in any other context or circumstance or for any other purpose.

The scope of Golder's Services and the period of time they relate to are determined by the Contract and are subject to restrictions and limitations set out in the Contract. If a service or other work is not expressly referred to in this Report, do not assume that it has been provided or performed. If a matter is not addressed in this Report, do not assume that any determination has been made by Golder in regards to it.

At any location relevant to the Services conditions may exist which were not detected by Golder, in particular due to the specific scope of the investigation Golder has been engaged to undertake. Conditions can only be verified at the exact location of any tests undertaken. Variations in conditions may occur between tested locations and there may be conditions which have not been revealed by the investigation and which have not therefore been taken into account in this Report.

Golder accepts no responsibility for and makes no representation as to the accuracy or completeness of the information provided to it by or on behalf of the Client or sourced from any third party. Golder has assumed that such information is correct unless otherwise stated and no responsibility is accepted by Golder for incomplete or inaccurate data supplied by its Client or any other person for whom Golder is not responsible. Golder has not taken account of matters that may have existed when the Report was prepared but which were only later disclosed to Golder.

Having regard to the matters referred to in the previous paragraphs on this page in particular, carrying out the Services has allowed Golder to form no more than an opinion as to the actual conditions at any relevant location. That opinion is necessarily constrained by the extent of the information collected by Golder or otherwise made available to Golder. Further, the passage of time may affect the accuracy, applicability or usefulness of the opinions, assessments or other information in this Report. This Report is based upon the information and other circumstances that existed and were known to Golder when the Services were performed and this Report was prepared. Golder has not considered the effect of any possible future developments including physical changes to any relevant location or changes to any laws or regulations relevant to such location.

Where permitted by the Contract, Golder may have retained subconsultants affiliated with Golder to provide some or all of the Services. However, it is Golder which remains solely responsible for the Services and there is no legal recourse against any of Golder's affiliated companies or the employees, officers or directors of any of them.

By date, or revision, the Report supersedes any prior report or other document issued by Golder dealing with any matter that is addressed in the Report.

Any uncertainty as to the extent to which this Report can be used or relied upon in any respect should be referred to Golder for clarification

golder.com