February 2014

INTERNATIONAL CYANIDE MANAGEMENT CODE RECERTIFICATION AUDIT

Barrick Australia Pacific Ltd Cowal Gold Mine Recertification Audit Summary Audit Report

Submitted to:

International Cyanide Management Institute (ICMI)
1400 I Street, NW Suite
550 Washington, DC 2005
UNITED STATES OF AMERICA

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REPORT

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Report Number. 137648026-003-R-Rev0

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Golder Associates

SUMMARY AUDIT REPORT
FOR OPERATIONAL GOLD MINES

Name of Mine:	Cowal Gold Mine
Name of Mine Owner:	Barrick Australia Pacific Ltd
Name of Mine Operator:	Barrick Gold of Australia
Name of Responsible Manager:	Alan Fearon, General Manager
Address:	Cowal Gold Mine PO Box 210 West Wyalong 2671
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LOCATION DETAIL AND DESCRIPTION OF OPERATION:

Globally, Barrick Gold Corporation has 27 operating mines, located in North America, South America, Australia-Pacific and Africa.

Barrick Gold Corporation's Australia-Pacific Business Unit is managed by Barrick Australia Pacific Limited (Barrick), which is headquartered in Perth, Western Australia and comprises three operating mines: the Kalgoorlie Consolidated Gold Mine JV, the Cowal gold mine in New South Wales; and the Porgera gold mine in Papua New Guinea.

The Cowal Gold Mine (Cowal) is located on the western shore of Lake Cowal, approximately 32 km northeast of West Wyalong in mid-western New South Wales. The mine commenced operations in 2005 with current approval to operate until 2019. Cowal is currently seeking to modify their Development Consent for an additional five years of operation.

The main components of Cowal are:

- An open pit which, on completion of mining, would measure approximately 1000 m by 850 m and 325 m deep (to increase with Development Consent modification approval)
- A processing plant to extract the gold from the mined ore
- Waste rock emplacements which would contain mined rock that has no commercial quantities of gold
- Two tailings storage facilities (TSF) which would contain the slurry residue from the processing plant
- A lake isolation system to separate the Project from Lake Cowal over the long term
- A 132 kV electricity transmission line from Temora to the Project (some 90 km in length)
- An access road (approximately 16 km) to the Project.

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The Cowal process plant treats sulphide ore and consists of primary crushing, crushed ore stockpiling, grinding, pebble recycle crushing, gravity concentration, intensive cyanide leaching (batch process), flotation, ultra-fine grinding and leaching, elution, electrowinning and smelting. The leach tailings are treated with Sodium Metabisulphate (SMBS) to destroy the cyanide to prescribed limits and then pumped to one of two tailings storage cells.

The processing plant was designed to ensure cyanide levels in the TSF would be a maximum of 30 mg/L and, for 90% of the time, would be below 20 mg/L measured as Weak Acid Dissociable (WAD) Cyanide.

Cyanide is delivered to site dry in 22 tonne isotainers of dry sodium cyanide pellets. The cyanide is transferred into the plant by sparging the tankers into the process plant holding tanks.

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SUMMARY AUDIT REPORT

AUDITORS FINDINGS

Cowal 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: Mike Woods, Exemplar Global (113792)

Email: mwoods@golder.com.au

Name and Signatures of Other Auditors:

Name	Position	Signature	Date
Mike Woods	Lead Auditor		17 February 2014
Russell Beazley	Technical Specialist		17 February 2014
Brenton Laslett	Auditor		17 February 2014

Dates of Audit:

The Recertification Audit was undertaken over three days (nine person-days) between 19 and 21 November 2013.

I attest that I meet the criteria for knowledge, experience and conflict of interest for Code Verification Audit Team Leader, established by the International Cyanide Management Institute and that all members of the audit team meet the applicable criteria established by the International Cyanide Management Institute for Code Verification Auditors.

I attest that this Summary Audit Report accurately describes the findings of the verification audit. I further attest that the verification audit was conducted in a professional manner in accordance with the International Cyanide Management Code's *Gold Mining Operations Verification Protocol* and using standard and accepted practices for health, safety and environmental audits.

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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:

Cowal 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.

The operation purchases its cyanide from Orica under a supply agreement dated January 1, 2009, which requires that supplied cyanide be manufactured at a facility certified under the Code.

Orica, the supplier of cyanide to the operation, sources cyanide from its Yarwun facility which was re-certified under the Code on 29 October 2013.

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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:

Cowal 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.

The operation purchases its cyanide from Orica under a written Supply Agreement that designates responsibility for the aspects of cyanide transportation required by the Code. The Supply Agreement establishes clear lines of responsibility for safety, security, release prevention, training and emergency response through reference to the Code and to the ICMI Cyanide Transportation Audit Protocol.

The supply agreement requires that the transporter comply with the Code.

Orica's Australian Supply Chain (for cyanide transport) was certified as compliant with the ICMC on 5 October 2010. A recertification audit was undertaken within the three year audit cycle and the audit report has been submitted to the ICMI for completeness review. The Auditor for Orica's Australian Supply Chain has stated that the audit report was submitted in Full Compliance.

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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:

Cowal 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.

The operation purchases its cyanide from Orica under a written Supply Agreement that designates responsibility for the aspects of cyanide transportation required by the Code. The Supply Agreement establishes clear lines of responsibility for safety, security, release prevention, training and emergency response through reference to the Code and to the ICMI Cyanide Transportation Audit Protocol.

The supply agreement requires that the transporter and its subcontractors comply with the Code.

Orica's Australian Supply Chain (for cyanide transport) was certified as compliant with the ICMC on 5 October 2010. A recertification audit was undertaken within the three year audit cycle and the audit report has been submitted to the ICMI for completeness review. The Auditor for Orica's Australian Supply Chain has stated that the audit report was submitted in Full Compliance.

The transport of cyanide from Orica's Yarwun production facility to Cowal is coordinated from the Yarwun production facility and uses a combination of road and rail, as indicated in the *International Cyanide Management Code Cyanide Supply Chain Audit Summary Audit Report* (2013):

- Road
  - Havouc Transport, Queensland
  - TMS, Dubbo, New South Wales
  - Toll Customised Solutions, New South Wales
- Rail operators
  - Aurizon Rail, Queensland
  - Pacific National Rail, New South Wales
  - Fletcher International, New South Wales

The operation provided delivery documents confirming delivery of cyanide by Orica via the above road and rail routes.

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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.**

The operation is

☒ **in full compliance with**

☐ in substantial compliance with **Standard of Practice 3.1**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

Cowal is in FULL COMPLIANCE with Standard of Practice 3.1, requiring that cyanide handling and storage facilities are designed and constructed consistent with sound, accepted engineering practices, QA/QC procedures, spill prevention and spill containment measures.

The cyanide handling and storage facilities have been built to the standards of the mine's cyanide manufacturer and supplier, Orica, in order to receive cyanide via isotainers. The facilities were inspected by an engineering consultant that concluded the unloading, mixing and storage facilities have been designed and constructed in accordance with sound engineering practices and jurisdictional rules. Furthermore, the facilities were inspected by Orica in 2012 and 2013 and deemed to be in full compliance with Orica's cyanide facility guidelines.

The unloading and storage areas are located away from people and surface waters. The nearest surface water body is Lake Cowal 1.0 km to the south-east, whilst all areas permanently occupied by the workforce are not in the vicinity of the facilities. Cowal has also conducted a qualitative risk assessment of the cyanide facilities in the unloading and storage areas in respect to potential for releases to surface water and/or human exposure. This assessment determined that the facilities and location of the compound provide such protection with the existing controls that no further risk reduction action is currently required. Cowal has also implemented a spill response procedure for cyanide solutions.

Cyanide from the sparge isotainer is unloaded on a concrete surface that can minimise seepage to the subsurface. The surface has also been designed and constructed to drain any unplanned spillage or hose up solution to the secondary containment that surrounds the cyanide mixing and storage tanks.

There are methods in place to prevent the overfilling of cyanide day (storage) tank and the cyanide (sparge) mixing tank. Both tanks have both been installed with level indicators that display on the distributed control system (DCS) in the plant control room. High and High-High level alarms are configured on each tank. Monthly preventative maintenance checks are conducted on the cyanide mixing and storage tank level instruments to manage their reliability.

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The cyanide storage and cyanide sparge mixing tanks are located on a concrete surface that can prevent seepage to the subsurface. As-built drawings show that the mixing and storage tanks have been installed on concrete ring beams with compacted fill placed in the annular space. The compacted fill has then been sealed with a concrete slab approximately 100 mm thick, which is in turn covered by a layer of bitumen approximately 12 mm thick. This design can prevent any potential leakage from reaching the natural subsurface.

Secondary containments for cyanide storage and mixing tanks (i.e. bunding and flooring) are constructed of concrete, which provides a competent barrier to leakage.

Cyanide is stored with adequate ventilation to prevent the build-up of HCN gas. Cyanide is delivered in solid briquette form in isotainers, where it is mixed via the sparging process and stored in the storage tanks. These tanks are installed outdoors (in the open) and both tanks are vented to atmosphere via vent pipes that extend 7 m above ground level.

The mixing and storage tanks are enclosed vessels installed on a competent foundation that ensures they stand above any ponded water under most circumstances and the tank vent designs are such that water ingress cannot occur under normal weather conditions.

The cyanide reagent area is contained within the secured boundaries of the processing plant and has additional fencing around the secondary containment. The fenced area is kept locked (unless unloading is occurring). The key is kept in the Shift Supervisors office within the permanently manned control room.

The cyanide unloading, mixing and storage area is located on the east side of the plant away from areas where acids, strong oxidisers and explosives are stored. No food products of any sort are kept within the reagent storage area or processing plant. Food is only stored in designated crib areas.

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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:

Cowal is in FULL COMPLIANCE with Standard of Practice 3.2 requiring that cyanide handling and storage facilities are operated using inspections, preventive maintenance and contingency plans to prevent or contain releases and control and respond to worker exposures.

Cyanide briquettes are delivered to site in Orica isotainers. The cyanide is sparged on-site by the delivery driver and returned to Orica on the same vehicle. These isotainers are specifically designed by Orica for transporting and sparging cyanide briquettes. As such, they are not used for any other purpose.

A procedure is in place and implemented to clean any cyanide residue from the outside of cyanide containers that are returned to the vendor and securely close them for shipment.

Procedures are in place and implemented to prevent exposures and releases during cyanide unloading and mixing activities. This is addressed in the site's *Cyanide Unloading, Mixing and Storage* and *Responding to Spill Containing Cyanide* procedures.

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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:

Cowal is in FULL COMPLIANCE with Standard of Practice 4.1, requiring that the operation implement management and operating systems designed to protect human health and the environment including contingency planning and inspection and preventive maintenance procedures.

The operation has written management plans and procedures that cover its cyanide facilities including unloading and storage, leaching, tailings management and cyanide destruction. These address the operational requirements of cyanide facilities including:

- Reagent unloading mixing and storage
- Leaching
- Tailings
- Cyanide treatment
- Decontamination of plant used with cyanide
- Cyanide spill response
- Response to high concentrations of hydrogen cyanide
- Water management
- Flora and fauna management

The operation has plans and procedures that identify the assumptions and parameters on which the facility design was based and applicable regulatory requirements as necessary to prevent or control cyanide releases and exposures consistent with applicable requirements. The original project design was approved by the New South Wales (NSW) Environmental Protection Authority (EPA), Department of Primary Industries (DPI) Mineral Resources, and the NSW Dams Safety Committee. Approval was subject to the development of some 29 Management Plans, including a *Cyanide Management Plan, Flora and Fauna Management Plan* and *Site Water Management Plan.* All were developed and approved by the relevant NSW regulatory departments.

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The operation has plans and 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. Water management procedures for key cyanide-containing storages have been developed to retain the storage capacity of these facilities. Operations and Maintenance Manuals have been prepared and implemented for the tailings storage facilities. A *Site Water Management Plan* has also been developed for the site. The *Cyanide Management Plan* includes prescriptions for the management of freeboard in the tailings storage facilities and the concentrations of cyanide permitted to be discharged to these facilities.

The operation has a procedure to identify when changes in a site's processes or operating practices may increase the potential for the release of cyanide and to incorporate the necessary release prevention measures. Up until the second quarter of 2013, Cowal was using a paper based Management of Change (MoC) system, based on a Barrick corporate MoC procedure. This required the change initiator to describe the change and indicate which Cowal Departments were stakeholders in need of consultation. Stakeholders were then required to answer a series of questions associated with their Departmental area in relation to the change and sign-off. A risk assessment is then undertaken involving interested parties and an action plan developed. In the second quarter of 2013, Barrick implemented a company wide online MoC system. This system is similar to the paper based system and requires a description of the change, assessment and sign-off by stakeholders, a risk assessment and development of an action plan. The man difference is that it the Environment and Health and Safety Department are automatically selected as requiring consultation and sign-off and that each action undertaken in the MoC process is tracked.

The operation has developed formal cyanide management documents that address contingency procedures for situations when there is an upset in the facility's water balance, inspections and monitoring identify a deviation from design or standards of practice (SOPs) and/or when a temporary closure or cessation of the operation may be necessary. Examples include procedures for:

- Water levels approaching freeboard limits.
- Identification of injured or dead birds at the TSF.
- Spill of cyanide slurry or solution
- WAD cyanide concentrations approaching the upper limits.
- HCN concentrations exceeding 4.7 ppm.

Inspection checklists and preventative maintenance activities have been developed to ensure the safe and environmentally sound operation of all cyanide facilities. These include operations inspection checklists for specific areas around the processing plant where cyanide solutions are handled as well as daily TSF inspections, which include wildlife monitoring.

Preventative maintenance (PM) inspections have been developed for all areas (not restricted to cyanide facilities) which are carried out on a daily, weekly, monthly, quarterly or annual basis depending on the nature of the inspection. These PMs are loaded into the sites maintenance system "Oracle" and are included for completion in the weekly maintenance plan. These inspections include cyanide area pumps (fortnightly), cyanide area pipework, cyanide detector calibration/inspection (monthly), bund inspections (quarterly), cyanide tank thickness testing (annually). The philosophy behind the scope and scheduling of preventive maintenance is described in the *Cyanide Maintenance Strategy*.

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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 documented. Records are maintained.

Preventive maintenance programmes are implemented and activities are documented to ensure that equipment and devices function as necessary for safe cyanide management. The overall approach to cyanide maintenance is documented in the *Cyanide Maintenance Strategy*. The Strategy outlines the asset management strategies for equipment within the process associated with cyanide handling, including preventative maintenance activities. These maintenance activities are programmed into Oracle.

Emergency power is not essential for prevention of unintentional releases and exposures in the event that primary power supply is interrupted. The processing plant site has been designed to prevent unintentional releases during a power outage, with secondary containment sufficiently sized to prevent process solutions from being released. However, the plant does have an uninterruptible power supply (UPS, i.e. batteries) that provides a secure power supply for essential areas of the plant. In addition, an emergency power generator is also available on-site.

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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:

Cowal conducts a programme to determine appropriate cyanide addition rates in the mill and evaluates and adjusts addition rates as necessary when ore types or processing practices change cyanide requirements.

Cowal has evaluated a number of control strategies including automatic free cyanide analysers and manual sampling methods. A Cyantific Instrument Free Cyanide Analyser measures free cyanide levels in Tanks 2 and 9 every five to ten minutes. Manual titrate sampling is also conducted three-hourly with a procedure to test more frequently if 10 ppm is recorded.

A daily releach test is also conducted to determine if increased cyanide addition rates would result in increased recovery. If no additional benefit is evident, it then allows for the cyanide addition rates to be lowered.

Monthly testwork is undertaken by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to assist in determining appropriate cyanide addition rates.

The dosage rate is reviewed by the site metallurgist in conjunction with testwork and may be altered to maintain a suitable level of free cyanide in the leach circuit. This control strategy has been loaded into the DCS and automatically adjusts the cyanide addition flow rate, depending on mill throughout. Total cyanide reagent consumption is reviewed on a daily basis to ensure any deviations from normal operation can be identified and corrected.

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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

Summarise the basis for this Finding/Deficiencies Identified:

Cowal is in FULL COMPLIANCE with Standard of Practice 4.3, requiring that the operation implement a comprehensive water management programme to protect against unintentional releases.

Cowal has developed a comprehensive, probabilistic water balance.

At the beginning of the recertification period, Cowal transitioned from a Code compliant water balance model to a newer model. This newer model was initially designed to support the feasibility study undertaken for an expansion of mining operations. It was decided that the newer model should be adopted for the operation proper as it was more user friendly. This new model considered the following factors:

- Ore production rate
- Tailings parameters
- Freeboards
- Crest and spillway elevations at the TSFs
- Water supply
- Catchment areas
- Pump rates
- Rainfall
- Evaporation.

However, pump failures/power outages and storm duration and return intervals were not considered within the model, until it was identified by the Auditor and updated during the field component of the audit. Since the completion of the field component of the audit, Cowal has run the model several times during the intervening 90 day period prior to the submission of the audit reports to the ICMI.

The new model is considered to be probabilistic. It allows the user to run simulations based on the 95th, 75th, 50th, 25th and 10th percentiles of the 100 year rainfall record and to assess the impact on water holding facilities within the site (i.e. TSFs and ponds). If the model user chooses to model a 95th percentile rainfall scenario, for example, the model will look up the 95th percentile rainfall year within the ranked 100 year records of rainfall. The rainfall from that year (and the corresponding month relevant to the beginning of the forward projection) will then be used for the forward projection, and the subsequent forward projected months will use subsequent rainfall from the records. The model therefore considers the variation in precipitation patterns, including extreme and seasonal variations.

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The Auditor considers Cowal to be in Full Compliance, despite the deficiency associated with pump failures/power outages and storm duration and return intervals, based on the following:

- Whilst the deficiency was present for the majority of the recertification period and was only picked up by the Auditor, as Cowal undergo recertification audits on an 18 month cycle rather than the typical three year cycle, the length of the deficiency was only 18 months.
- During these 18 months, there was no increase risk to the environment from overtopping, as Cowal had sufficient storage capacity to cope with storm events and pump/power failures. This was demonstrated in February 2012, when the site experienced the largest storm event since its initial ICMC certification, but had sufficient storage capacity and water management strategies in place to cope with the surge in water.
- Throughout the audit period, Cowal displayed good faith in meeting the intent of the Code. The operation had a water balance in place that was largely compliant and was running the model consistently on a three month basis.
- Once identified, the deficiency was corrected within two days and the Auditor considers the technical deficiency to be corrected.
- The operation has provided evidence of several runs of the water balance model during the 90 day intervening period between the audit and audit report submittal. The Auditor is satisfied that Cowal is operating its water balance as appropriate.
- Cowal has corrected the underlying or root cause of the deficiency (i.e. failure to recognise the Code water balance requirements). This has been achieved via an update of the water balance manual, which outlines the requirement for such a model under the Code and stipulates the aspects that it must consider.

Cowal's water balance model considers some of the following in a reasonable manner and as appropriate for the facilities and environment:

- Re the rates at which solutions are applied to leach pads and tailings – the water balance considers the production rate, ore processing times, ore moisture content, tailings density and settlement rates and area of wet tailings beach.
- Re a design storm duration and storm return interval that provides a sufficient degree of probability that overtopping of the pond or impoundment can be prevented during the operational life of the facility – the Water Balance Manual states that:

  The model considers a 1 in 100 year 72 hour rainfall (storm) event under a 95% rainfall scenario.
- Re the quality of existing precipitation and evaporation data in representing actual site conditions – the model uses local precipitation and evaporation records for model design parameters. The Bureau of Meteorology's West Wyalong weather station provides ongoing information. This information is supplemented with climatic data collected from an on-site weather station. The model is calibrated yearly by the model designers, using annual rainfall and evaporation data from these two sources.
- Re the amount of precipitation entering a pond or impoundment resulting from surface runoff from the upgradient watershed, including adjustments as necessary to account for difference in elevation and for infiltration of the runoff into the ground – catchment areas and catchment runoff coefficients are considered for all water containment areas. The TSFs are impoundment style facilities. As such, there is no upstream runoff that can impact on water storage at these facilities, other than from the internal sides of the embankment walls.

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- Re the effects of potential freezing and thawing conditions on the accumulation of precipitation within the facility and the upgradient watershed – freezing and thawing is not applicable to the climate at Cowal.
- Re the solution losses in addition to evaporation, such as the capacity of decant, drainage and recycling systems, allowable seepage to the subsurface, and allowable discharges to surface water – the model does take into account solution losses from evaporation. Seepage from ponds and TSFs are considered, as well as return water for reuse in the plant. There are no surface water discharges from Cowal.
- Re the effects of potential power outages or pump and other equipment failures on the drain down from a leach pad or the emergency removal of water from a facility – It has been estimated that power outages and/or pump failures would not be expected to last any longer than 12-24 hours as repairs would be undertaken in this time period. Back up diesel pumps are available should they be required. In addition, the site as an emergency generator. Regardless of the above circumstances, power outages can still be simulated within the water balance model and the operation typically runs a 48 hour pump outage scenario. The water balance model will indicate whether any ponds or impoundments would be likely to overtop.
- Re where solution is discharged to surface waters, the capacity and on-line availability of necessary treatment, destruction or regeneration systems – there are no surface water discharges from Cowal.
- Other aspects of a facility design that can affect the water balance – the water balance also considers water usage not associated with processing (e.g. water used for dust suppression) and pumping rates between water storages.

Cowal's operating procedures incorporate inspection and monitoring activities to implement the water balance and prevent overtopping of ponds and impoundments and unplanned discharge of cyanide solutions to the environment.

The TSF is inspected three times a day and weekly by Process Department personnel, daily, weekly and monthly by geotechnical personnel and annually by a consulting tailings engineer.

Ponds and impoundments are designed and operated with adequate freeboard above the maximum design storage capacity determined to be necessary from water balance calculations and by regulatory requirements. For each TSF, Cowal has implemented a 500 mm freeboard for slurry and a 1000 mm freeboard for supernatant water, which meets the 1 in 1000 year event of 216 mm. All site ponds and impoundments are operated with a solution freeboard of no less than 1 m of freeboard.

The operation does measure on-site precipitation, and compares results to design assumptions and revises operating practices as necessary. Actual rainfall measurements are taken on-site are forwarded to a consulting firm for review during the calibration runs of the water balance model to ensure that the model best reflects actual rainfall events.

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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:

Cowal is in FULL COMPLIANCE with Standard of Practice 4.4, requiring that the operation implement measures to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions.

The operation has implemented measures to restrict access by wildlife and livestock to all open waters where WAD cyanide exceeds 50 mg/L WAD cyanide. Cowal's development consent (Condition 5.3(a)) and Environmental Protection Licence 11912 require that the operation's tailings slurry cyanide levels do not exceed 20 mg/L WAD cyanide (90 percentile concentration limit), and 30 mg/L WAD cyanide (100 percentile concentration limit).

WAD cyanide results taken for the Southern TSF (the current TSF), Northern TSF, D5 - Emergency Storage Pond and D6 – Process Water Pond were viewed and all results meet the licence requirements. Even though there are no ponds that exceed 50 mg/L WAD cyanide, Cowal has installed fencing around the TSFs and at D6. A gate allows access for personnel to the TSF and is kept closed at all times. Personnel must request permission from "Mill Control' before entering and close gate after entering/exiting the area. The TSF fence is electric and has been constructed with 50 mm diameter mesh to a height of 2 m. From 0.5 m below ground level to 0.5 m above ground level, the mesh has a diameter of 20 mm. The fence has been buried to a depth of 0.5 m to prevent fauna digging and accessing the TSF under the fence. A fence has also been installed around D6.

Cowal has also installed bird scaring systems at D6 and the TSFs.

Maintaining a WAD cyanide concentration of 50 mg/L or less in open water has been shown to be effective in preventing significant wildlife mortality. Cowal has a wildlife monitoring programme in the form of twice daily TSF inspections that include inspection and recording of wildlife status and activity. A review of the wildlife monitoring records indicated that inspections were occurring as per the procedure. Fauna / Avifauna Incident Report Forms at Cowal were provided from March 2012 to July 2013. No fauna deaths were attributed to cyanide.

The operation does not use a heap leach process.

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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:

Cowal is in FULL COMPLIANCE with Standard of Practice 4.5, requiring that the operation implement measures to protect fish and wildlife from direct or indirect discharges of cyanide process solutions to surface water.

The Environmental Coordinator advised that there is no discharge to surface water from the site. The site visit and review of the site plan and aerial photograph also confirmed that there is no discharge to surface water. Cowal has also constructed a Lake Protection Wall to the requirements of the Development Consent. Cowal does not have an indirect discharge to surface water.

Groundwater modelling studies have been conducted and the TSF has been to designed to minimise seepage as much as possible. Monitoring around the TSF has indicated that the cyanide results have been below the laboratory limits of reporting with the exception of one result in 2012 at 0.008 WAD cyanide. Groundwater sampling is documented in the Annual Environmental Return. Underdrainage trenches within the TSFs collect seepage water, which is pumped back to into the TSF.

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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:

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

A beneficial use of groundwater has been defined by a regulatory body for Cowal by authorising the site to dewater the pit for use in the process plant. Cowal must provide monitoring results of designated groundwater bores to the Department of Environment, Climate Change and Water (DECCW) through the submittal of the monitoring results from groundwater bores in the Annual Environmental Return. These results do not stipulate WAD cyanide concentrations.

The saline nature of the groundwater precludes its use for stock, domestic or irrigation purposes.

A number of seepage control measures have been incorporated into the TSFs, including clay linings and underdrainage systems, to prevent the seepage of cyanide laden water.

Monitoring results show WAD cyanide levels in groundwater downgradient of the TSFs and process plant are below detection limits. As such, it can be surmised that there is no seepage from the operation entering the groundwater.

The operation does not use mill tailings as underground backfill.

Whilst a beneficial use, authorised by the regulator, exists, a point of compliance has not been defined.

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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:

Cowal is in FULL COMPLIANCE with Standard of Practice 4.7 requiring that the operation implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of groundwater.

Spill prevention or containment measures are provided for all cyanide unloading, storage, mixing and process solution tanks. The unloading area is a concrete pad with appropriate slope and kerbing to direct any spill to the storage containment area. The mixing, storage and process tanks have been designed and constructed such that they sit on a concrete ring beam with compacted fill in the centre. The compacted fill has been covered with a concrete slab (approximately 100 mm thick), which in turn is covered by a layer of bitumen (approximately 12 mm). This design prevents any potential leakage from migrating to the subsurface.

Secondary containments for cyanide unloading, storage, mixing and process tanks are sized to hold a volume greater than that of the largest tank within the containment and any piping draining back to the tank, and with additional capacity for the design storm event. The mixing and storage tanks are in a concrete bunded area, the volume of which is significantly more than 110% of the combined volume of the two storage tanks. The bunding surrounding the leach and adsorption tanks is capable of storing two of the largest leach tanks, therefore exceeds the volume required by the Code.

Procedures are in place and being implemented to prevent discharge to the environment of cyanide solution or cyanide-contaminated waters that are collected in the secondary containment areas. Secondary containment areas have been built with dedicated sump pumps and piping to redirect all such water back into the processing plant. The Process Storm Water Pond D5 has been designed such that all water collected in this pond is pumped back to the Process Water Pond D6 and subsequently reused in the processing plant.

There are no cyanide process tanks without secondary containment. However, procedures have been developed for remediation of any contaminated soil such that adverse impacts on groundwater are prevented.

Spill prevention or containment measures are provided for all cyanide solution pipelines to collect leaks and prevent releases to the environment. A majority of process solution pipelines (with exceptions only in two small areas where pipe racks traverse unsealed areas) have been installed in association with concreted secondary containment areas. The TSF pipeline is contained in a clay-lined bunded trench. Releases from the pipelines that traverse unsealed areas outside of concreted secondary containment areas would be captured within the processing plant drainage system and directed to the impervious D5 Storm water catchment pond.

There are no areas where cyanide pipelines present a risk to surface water. Licence conditions require that all water be retained on-site.

Cyanide tanks and pipelines are constructed of materials compatible with cyanide and high pH conditions. In 2007, engineering consultants were engaged by Barrick to inspect the cyanide facilities at Cowal. They undertook a thorough assessment of Cowal in relation to this question and found full compliance at that time.

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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

Summarise the basis for this Finding/Deficiencies Identified:

Cowal 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.

For the Certification Audit a report was prepared based on a review of the original construction quality programme and the then-current operations to provide assurance that operations could continue safely from a cyanide perspective. Since then, there have been a number of plant modifications and there has been evidence of wear and tear on processing equipment. Evidence was examined to verify that quality assurance and quality control programs are continuing to be applied to new construction and modification works, addressing the suitability of materials, their fabrication and installation. Examples examined during the audit covered a tailings storage expansion and the temporary replacement of the barren elute tank. From the documents kept, it was possible to verify that in each case the quality management work had been signed off by an appropriately qualified person, with different requirements applicable in each case.

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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:

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

Cowal has developed written standard procedures for monitoring activities. Cowal has implemented a range of management plans in accordance with its Development Consent. In addition to the management plans, Cowal has developed SOPs that are used to monitor and evaluate the effects of cyanide on wildlife, surface and groundwater quality.

Sampling and analytical procedures have been developed by appropriately qualified personnel.

The SOPs are maintained and reviewed by current employees within the Cowal Environmental Department. The most recent modifications were made by the Environmental Superintendent and approved by the Environmental Manager. In addition to this, the sampling and analytical protocols detailed comply with relevant management plans and Australian/New Zealand Standards.

The operation's procedures specify how and where samples should be taken, sample preservation techniques, chain of custody procedures, shipping instructions, and cyanide species to be analysed. Cyanide species to be analysed are detailed in the relevant procedure and in the management plans.

Sampling conditions (e.g. weather, livestock/wildlife activity, anthropogenic influences, etc.), and procedures are documented in writing at Cowal.

The completed field sheets used for groundwater sampling and TSF monitoring had sections which recorded information on sampling conditions, related to climatic conditions, time, equipment used, other influence (i.e. fauna). Surface and lake water field sheets have space to record last rainfall events and additional observations.

- Cowal currently monitors WAD cyanide in groundwater downgradient and upgradient of the TSFs and from bores surrounding the TSFs. The operation does not have a direct or indirect discharge to surface water. Sample frequencies, as approved by the regulator, are as follows:
- Twice daily slurry and decant water samples
- Quarterly groundwater samples
- Twice daily wildlife monitoring.

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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:

Cowal 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.

Cowal has developed a *Mine Closure Plan* (MCP) and a *Decommissioning and Decontamination Plan* (DDP). The DDP is relevant to the site and specifically details decommissioning activities such as:

- Decontamination of equipment
- Disposal of reagents
- Area specific plans.

An implementation schedule of the activities described in the DPP is presented as Figure 2 in Section 6 of the DDP. The schedule is divided into monthly units, 24 months prior to closure and continue for up to 24 months after closure.

The DDP is an appendix to Cowal's MCP, which details the review requirements. The DDP is reviewed as part of the MCP review. The MCP was last reviewed in December 2013 and no changes were made to the DDP (therefore the most recent version of the DDP being 2007). The annual review process shows that Cowal's decommissioning procedures have been reviewed with a sufficient frequency to reflect changes at Cowal.

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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:

Cowal 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.

A cost estimate for closure of the processing plant and associated infrastructure was first prepared In September 2005. These costs were recalculated in 2007, 2008 and 2011 through the BRCE model in accordance with Barrick's *Mine Closure Planning and Cost Estimation Guideline,* which outlines the approach to mine site reclamation, remediation and decommissioning. The Guideline states that closure costs will be based on third party rates and is consistent with the *Financial Accounting Standards Board Statement No. 143, Accounting for Obligations Associated with the Retirement of Long-lived Assets* (FAS 143).

The estimate was then recalculated again to reflect inflation in November 2013. Costs are updated to reflect any operational changes, but none regarding decommissioning have occurred.

Barrick's *Mine Closure Planning and Cost Estimation Guideline* states that mine closure costs should be reviewed and updated annually or when a "triggering event", such as significant changes to the mine plan, closure regulation, etc. occurs. The cyanide related decommissioning costs are included within the mine closure costs. Cowal has established a financial mechanism approved by applicable jurisdiction to cover the estimated costs for closure and decommissioning. Barrick renewed its bond on 30 April 2010 with the NSW Department of Industry and Investment to increase the amount held against Lease 1535, which reflects the cost of closure.

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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.**

The operation is

☒ **in full compliance with**

☐ in substantial compliance with **Standard of Practice 6.1**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

The operation has developed procedures describing how cyanide related tasks such unloading, mixing, plant operations, entry into confined spaces, and equipment decontamination prior to maintenance should be conducted to minimise worker exposure. The procedures identify the hazards associated with each task and the steps required to complete it safely, such as pre-work inspections and the use of personal protective equipment (PPE). These procedures are provided to relevant personnel, who are required to be assessed competent against each procedure before they can undertake them unsupervised.

The operation has procedures to review proposed process and operational changes and modifications for their potential impacts on worker health and safety, and incorporate the necessary worker protection measures. The MoC procedure is utilised for administrative, physical, operational or organisational changes that affect operating and/or maintenance activities, plant or equipment. The procedure requires that the appropriate Safety, Health and Environmental functional area representatives are consulted prior to the implementation of a change. Examples of changes provided to the Auditor followed the MoC procedure, with all changes assessed by environmental and health and safety personnel.

The operation does solicit and actively considers worker input in developing and evaluating health and safety procedures. Procedures are reviewed based on the criticality of the procedure. During the review process, employees and supervisors are given an opportunity to suggest changes. Employees are also able to comment on procedure validity during safety meetings, training/refresher training and the Supervisor's Task Observation Programme (STOP) programme.

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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

Summarise the basis for this Finding/Deficiencies Identified:

Cowal is in FULL COMPLIANCE with Standard of Practice 6.2 requiring the operation operate and monitor cyanide facilities to protect worker health and safety and periodically evaluates the effectiveness of health and safety measures.

Cowal has determined that a pH above 10 is appropriate for limiting the evolution of hydrogen cyanide (HCN) gas during mixing and production activities, respectively.

A pH level of 11.0 or greater is targeted during mixing. In the leach circuit, at tank 2, which is the first cyanide addition point, the pH target range is 10.3 – 10.8 and tank 3, which is the second cyanide addition point, has a target pH of 10. The pH is monitored by an online pH probe as well as manual checks (up to four times per shift) conducted by the Leach Operator. Online pH readings are displayed on the DCS and is alarmed should the pH drop below the set point.

Where the potential exists for significant cyanide exposure, the operation uses both fixed and personal monitoring devices to confirm that controls are adequate to limit worker exposure to HCN gas.

Ten fixed hydrogen cyanide analysers are in place in areas, which were determined to be at the highest risk of exceeding 10 ppm on an instantaneous basis. The locations were identified during a formal hazard and operability (HAZO)P study conducted during the design of the Cowal Gold Project. The fixed monitors are located at:

- Cyanide destruction
- Leach tank 1-3
- Leach tank 4-6
- Tailings hopper
- Float cell 1
- Carbon screen
- Elution column top
- Elution column base
- Gold room
- Cyanide unloading and mixing area.

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Personal monitors are also worn on site by people working in areas determine to be at higher risk of HCN evolution (e.g. Leach Circuit). Areas where personal HCN monitors are required are sign posted accordingly. Personnel are required to notify their supervisor when a HCN reading of 4.7 ppm or above is detected, and are not allowed to remain in that area for more than 8 hours continuously. Should a HCN reading of 10 ppm or greater be detected, then personnel are to immediately leave the area and notify their supervisor.

All fixed monitors are calibrated monthly by Cowal electricians, as per work orders generated as part of the site's preventative maintenance schedule. All portable monitors are calibrated every three months using a calibration docking station. If overdue for calibration, the alarm functionality will still work, even though the instantaneous reading is not displayed. At least one year's worth of calibration records were sighted by the Auditor for both the fixed and portable HCN monitors.

Warning signs have been placed in areas identified as being at high risk of being exposed to cyanide. The signs state that cyanide is present, and that smoking, open flame and eating and drinking are not permitted. Signage is present indicating the specific PPE that must be worn when entering the area. The specific PPE requirements when working with cyanide are also covered and explained during *the Process Plant Induction* package, which incorporates a *Cyanide Induction*. The training package also stipulates no smoking, eating and drinking areas.

Showers, low-pressure eyewash stations and dry-powder fire extinguishers are strategically located throughout the operation in the cyanide areas, and are maintained, inspected and tested on a regular basis. Showers and low-pressure eyewash stations within the process plant are maintained and tested on a fortnightly basis. Servicing and inspection of dry powder fire extinguishers is undertaken by a subcontractor and a quarterly preventative maintenance routine has been established to initiate a purchase order for the subcontractor. A review of the fire extinguishers noted the inspections were current.

Unloading, storage, process tanks and piping containing cyanide are identified to alert workers of their contents, and the direction of cyanide flow in pipes designated. Cyanide storage and mixing tanks are labelled with EIPs, indicating that liquid cyanide is stored within. Signage has been erected at all entry points into cyanide areas, alerting the person/s to treat all tanks and pipe work as being cyanide bearing until proven otherwise. All reagent strength pipes are painted lilac, labelled as containing cyanide and have the direction of flow indicated. Piping labels are also used on-site for other reagent lines, and water lines such as process water, raw water, reverse osmosis water and potable water. These labels include a direction arrow to indicate the direction of flow contained within the pipe.

Safety data sheets (SD)', first aid procedures and informational materials on cyanide safety were available in the language of the workforce (English) in areas where cyanide is managed. These are posted in the control room, emergency response centre, reagent yard and processing office. SDSs can also be accessed electronically by any employee with a Barrick computer login.

There is a system used for reporting and investigating incidents and an *Incident Investigation Procedure*. Once an incident has been observed, the incident report form is completed by the individual and their supervisor. The information is entered into the Risk Information Management System (RIMS) database where corrective actions are developed and tracked to ensure that the relevant personnel close them out. No worker exposures to cyanide were reported during the audit period.

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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:

Cowal is in FULL COMPLIANCE with Standard of Practice 6.3 requiring an operation develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.

Cowal has the necessary response and communication equipment readily available for use at cyanide unloading, storage and mixing locations, which includes:

- Closed circuit television in the mill
- Water
- Antidote kits
- Resuscitation and defibrillation equipment
- Trauma kits
- Ambulance.

Evidence was observed to show that Cowal does inspect its first aid equipment regularly to ensure that it is available when needed, and materials are stored and/or tested as directed by their manufacturer.

The operation has developed and implemented a site specific *Cyanide Emergency Procedure* (CEP) to respond to cyanide incidents, including the treatment of exposures.

The operation does have its own on-site capability to provide first aid or medical assistance to workers exposed to cyanide. Cowal is manned by a dedicated Emergency Response Officer (ERO) 24 hours a day seven days a week. There is also a fulltime Emergency Response Coordinator (ERC) working five days a week that is on call 24 hours a day seven days a week. The EROs and the ERC have emergency medical training. In addition, many on-site personnel have senior or advanced first aid training. A first aid room is manned 24 hours a day and is contains resuscitation and defibrillation equipment, as well as a cyanide antidote.

The operation has established set routes to transport patients to hospital and advised these to the West Wyalong Hospital and NSW Ambulance Service. In the event of a cyanide exposure incident, an ambulance is called to the site and depending on the circumstances, the operation may despatch its ambulance to transfer the patient at some point along the designated route.

The operation has made formalised arrangements with the West Wyalong Hospital to ensure it is aware of the potential need to treat patients for cyanide exposure. The operation issued a letter to the West Wyalong Acting Health Services Manager requesting that they acknowledge the receipt of two cyanide antidote kits and acknowledge the possibility that it may be required to treat persons affected by cyanide at their facility.

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The operation has actively worked with the West Wyalong Hospital to inform them about cyanide risks and provide the hospital with the necessary training and equipment to treat cyanide exposure cases.

Cowal has regularly conducted mock emergency drills to test response procedures for various cyanide exposure scenarios, and lessons learned from the drills are incorporated into response planning.

The operation has conducted numerous mock cyanide drills involving Emergency Response Team (ERT) response to cyanide exposures and spills. The ERC and EROs run frequent in-house training for ERT members in various aspects of emergency response. This includes specific cyanide scenario training, generic hazardous materials training and first aid.

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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:

Cowal is in FULL COMPLIANCE with Standard of Practice 7.1 requiring an operation develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.

Cowal has adopted a tiered approach to emergency response and management on site:

- *Crisis Management and Recovery Plan* (CMRP)
- *Emergency Response Plan* (ERP)
- *Cyanide Emergency Procedure*.

The CEP details the required response equipment, responsibilities and procedures for anticipated cyanide emergencies at Cowal. The intention of this document is to provide a single point of reference for all cyanide incidents on-site where emergency response is required.

The CEP and ERP consider the potential cyanide failure scenarios appropriate for the operation's site-specific environmental and operating circumstances. The CEP was designed around the Cyanide Code and consequently details specific response actions.

Solid cyanide briquettes are delivered to the site in sparge containers via road transport. Vehicle entry to the site is controlled and vehicles are escorted to the unloading area. Cowal has developed an ERP for transportation accidents within the site boundary.

In all cases involving a spill of cyanide, Orica is notified as a priority and no action is taken after containment of the spill without consultation with Orica. Specific transport route or vehicle design information relevant to the emergency would be provided by the consignor (Orica).

The ERP and CEP describe specific response actions (as appropriate for the anticipated emergency situations) such as clearing site personnel from the area of exposure, use of cyanide antidotes and first aid measures. Section 5.1 of the CEP details the process by which site personnel are evacuated to appropriate site muster points and subsequent removal of site personnel from Cowal if required. Cowal has also developed an Emergency Evacuation Plan which details the actions necessary for a site evacuation.

The CEP addresses the notification of potentially affected communities by means of activating the Crisis Management and Response (CMR) Team upon escalation of a potential incident. Section 5.19 of the CEP details the first aid procedure to be followed in the event of a cyanide exposure incident.

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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:

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

The operation has involved its workforce and stakeholders, including potentially affected communities, in the cyanide emergency response planning process. The ERP and CEP was initially developed with input from the site's Senior Metallurgist, Safety Coordinator, ERC and selected supervisors. Section 12.5 of the ERP (including the CEP) requires an annual review of the document, plus following emergencies or drills.

ERT members and invited external emergency services are provided with an opportunity to comment on the ERP and CEP during mock drill debriefs as part of a continual improvement process. The workforce is also consulted regarding cyanide use and emergency response procedures through regular Services Environmental, Safety and Health meetings.

Local emergency services are also consulted on aspects of the ERP and CEP during Local Emergency Management Committee (LEMC) meetings that Cowal personnel attend.

Cowal has a mutual aid agreement with the Bland Rural Fire Service and have close ties with the nearby North Parkes Mine. Regular drills and training sessions are held with these entities and other emergency services agencies. During debrief sessions, suggestions on improving emergency procedures can be made.

The ERP and CEP are updated annually. Consultation and communication with stakeholders regarding updates are conducted through the various committees and drills.

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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

Summarise the basis for this Finding/Deficiencies Identified:

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

The cyanide-related elements of the ERP:

- *Designate primary and alternate ERCs who have explicit authority to commit the resources necessary to implement the plan.*

  Section 3 'Definition of Terms' of the ERP details the responsibilities of each role title. It states that the ERC will take the role of Emergency Controller. There are a number of people who are trained in the role of Emergency Controller. Should the primary Emergency Controller not be available for the emergency situation (e.g. he/she is incapacitated by the emergency) the most senior staff member who is adequately trained will assume the role of Emergency Controller.

- *Identify emergency response teams.*

  Cowal operates four ERT teams, with one team on duty per shift. ERT team members and their contact details are listed in Appendix C *Emergency Response Team Contact and Currency Sheet* within the CEP.

- *Require appropriate training for emergency responders.*

  Section 12.4 of the ERP details the Training and Evaluation requirements. The training matrix for each of the ERTs (Mon-Fri and A Panel, B Panel, C Panel and D Panel) was sighted. The emergency response training includes cyanide awareness and responding to HAZMAT incidents together with fire, rescue and first aid. The training covers the elements necessary to respond to cyanide related incidents.

- *Include call-out procedures and 24-hour contact information for the coordinators and response team members.*

  Appendix 5 of the ERP details the emergency response contact telephone and fax numbers. Internal and external contacts are also included in Section 9 of the CEP, which includes all the contacts of each of the ERT members and the currency of their training.

- *Specify the duties and responsibilities of the coordinators and team members.*

  The roles and responsibilities of the various emergency responders are defined in Section 4 of the CEP.

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- *List emergency response equipment, including personal protection gear, available along transportation routes and/or on site.*

  The required emergency response equipment is detailed in Section 5.7 *PPE and Equipment for Cyanide Emergencies* of the CEP. Section 7.14 of the ERP details the type and location of emergency equipment kept at site.

- *Include procedures to inspect emergency response equipment to ensure its availability.*

  Cowal inspects their emergency response equipment regularly to ensure that it is available when needed, and materials are stored and/or tested as directed by their manufacturer. Cyanide response breathing apparatus and chemical suits are serviced as per equipment requirements.

- *Describe the role of outside responders, medical facilities and communities in the emergency response procedures.*

  Section 11 *Interaction with Emergency Services* and Section 12.1 *Public Relations and Debriefing* of the ERP detail communication requirements outside of Cowal.

Cowal has confirmed that outside entities included in the ERP are aware of their involvement and are included as necessary in mock drills or implementation exercises. The Cowal ERC is invited to attend the LEMC meetings, which are held on a quarterly basis. The ERC uses the LEMC forum to table the Cowal ERP and CEP for stakeholder comment.

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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

Summarise the basis for this Finding/Deficiencies Identified:

Cowal is in FULL COMPLIANCE with Standard of Practice 7.4 requiring the development of procedures for internal and external emergency notification and reporting.

The ERP and CEP include procedures and contact information for notifying management, regulatory agencies, outside response providers and medical facilities of the cyanide emergency.

Any formal notification to external agencies will be requested from the site Emergency Controller only with direct consultation with the CMRP Team Leader, Occupational Health and Safety (OHS) Coordinator or Safety, Training and Security Manager.

Section 8.2 *Notification of Authorities and Neighbours*, Section 11 *Interaction with Emergency Services* and Section 12.1 *Public Relations and Debriefing* of the ERP detail communication requirements outside of Cowal. Appendix 5 lists the contact details.

Section 9 Attachment 3 of the CEP also lists the contact details of external emergency contacts divided up into those who have a role in the plan and those that do not. The contact details of local landowners are also detailed.

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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.**

The operation is
- ☒ **in full compliance with**
- ☐ in substantial compliance with **Standard of Practice 7.5**
- ☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

Cowal is in FULL COMPLIANCE with Standard of Practice 7.5 requiring an operation develop procedures for internal and external emergency notification and reporting.

The CEP and related documents do describe specific remediation measures as appropriate for the likely cyanide release scenarios, such as:

- Recovery or neutralisation of solutions and solids
- Decontamination of soils and other contaminated media
- Management and/or disposal of spill clean-up debris.

The operation has assessed potential for impacts on drinking water concluded that cyanide related incidents on site would not threaten drinking water supplies. Accordingly, provision of an alternate drinking water supply is not deemed necessary.

Considerations are made within the CEP for ground remediation and neutralisation with ferrous sulphate for all relevant scenarios. As stated in the plan it is essential that the Environmental Manager or his/her delegate attends all cyanide related incidents for direct consultation in monitoring, clean up and disposal of all contaminated media. The CEP states for each neutralisation scenario that:

> *Under no circumstances shall Ferrous Sulphate & Sodium Hypochlorite be utilised for decontamination or remediation purposes when there is the risk of contaminating water sources.*

In Section 10.18 of the *Responding to Spills Containing Cyanide Procedure*, it is stated that that spills be reported to the Cowal Environmental Department so that the required samples are taken and monitoring of the area can be carried out to confirm there is no further contamination issues with the spill site.

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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

Summarise the basis for this Finding/Deficiencies Identified:

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

The operation does review and evaluate the cyanide related elements of its ERP for adequacy on a regular basis. Section 12.5 of the ERP (including the CEP) requires an annual review of the document, plus following emergencies or drills. The CEP has been reviewed five times since 2009, whilst the ERP has been reviewed six times since 2007.

Mock emergency drills are conducted periodically as part of the ERP evaluation process. The operation has conducted numerous mock cyanide drills involving ERT response to cyanide exposures and spills. Two full scale site evacuation drills have been conducted in the last two years.

The ERC and EROs also run weekly training for ERT members in various aspects of emergency response. This includes specific cyanide scenario training, generic hazardous materials training and first aid.

Provisions are in place to evaluate and revise the ERP and associated procedures after any cyanide related emergency requiring its implementation. The ERP states that it is reviewed annually and after each real emergency. To ensure the review occurs, the document is included in Cowal's document management system. No cyanide emergency has occurred to date.

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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.**

The operation is

☒ **in full compliance with**

☐ in substantial compliance with **Standard of Practice 8.1**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

Cowal is in FULL COMPLIANCE with Standard of Practice 8.1 requiring an operation train workers to understand the hazards associated with cyanide use.

The operation does train all personnel who may encounter cyanide in cyanide hazard recognition.

All personnel who are entering the processing area must undergo a Processing Induction (or be escorted by an inducted person) regardless of their work type. This includes an information session on the hazardous chemicals that are likely to be encountered on-site, including cyanide. In addition to this, all employees who are processing inducted undergo an Orica cyanide awareness presentation as a minimum requirement. That package addresses information on exposure routes, symptoms of poisoning, first aid and safe handling. Refresher training is conducted every 12 months.

All of these presentations include a competency-based assessment to be completed, signed and documented. All persons who are entering site but do not work in the processing area are subject to a Barrick Site Induction, which includes information on hazardous chemicals held on-site including cyanide to make people aware.

Cyanide hazard recognition and refresher training is conducted periodically.

Cyanide training records are retained. Training files are maintained for each employee, including hard copies of the assessments undertaken in each area of competency and the evaluation made of each assessment by the Trainer/Assessor.

Training records are also kept electronically in the RIMS training system, providing an overview of the training elements completed by each employee and when each element is due for a refresher.

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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

Summarise the basis for this Finding/Deficiencies Identified:

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

The operation trains 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.

The site has also developed a training package which contains reference material, training material and assessment material, which is used to test the competence of an operator in a particular area or on a particular task. Operations personnel complete the training and complete written assessment associated with each training element.

On the job training is delivered through a one on one session with either their Shift Supervisors or the Process Safety Training Coordinator. The basis of this training is following the SOP with the trainee, demonstrating the steps and explaining the hazards. Once the trainee understands the procedure they will complete a sign-off form and then begin completing the tasks under the supervision of the trainer. The forms carrying the signatures of the trainees and the assessor are stored in the personal training record file specific to each employee.

Training can also be delivered in a group environment during the scheduled training days (six per year). These training days cover refresher training and selected special topics.

All training records including procedures, JHA/FLRA and isolations are documented on-site in the RIMS training system and hard copies are kept in personal files in the training filing system.

The training elements necessary for each job involving cyanide management are identified in training materials.

Within the RIMS System, the training requirements for each job are identified in terms of training modules that must be completed before the employee is deemed fully competent in their role. A range of core modules are common to many jobs and other modules are specialised.

SOPs have been developed and are used as the basis to identify training requirements with respect to hazards and risks involved with completing the specific task. These procedures cover cyanide-related tasks such as the leach operator's collection, preparation and analysis of samples from the cyanide destruct process and cyanide unloading.

Appropriately qualified personnel provide task training related to cyanide management activities.

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The Processing Training Coordinator and five Shift Supervisors hold Certificate IV Trainer/Assessor qualifications and have significant experience in the processing plant. The Shift Supervisors are also actively involved in training and assessment, carrying out that role based on their significant experience in the mineral processing plant.

Employees are trained prior to working with cyanide.

Prior to working with cyanide, all employees must undergo:

- Site induction
- Area inductions (e.g. processing)
- Orica Cyanide Safety Guidelines and Assessment
- Cyanide Worker Package and Assessment.

All require a competency assessment to be completed, which is recorded electronically in the RIMS training system as well as hard copies in the site filing system.

Process employees must also sit the MinProc training programme, which gives an overview of the plant processes and requires them to pass an assessment.

Refresher training on cyanide management is provided to ensure that employees continue to perform their jobs in a safe and environmentally protective manner. Review and sign-off of procedures by employees and their supervisors in the processing area is undertaken annually. Such refreshers generally occur during six dedicated training days that have been allotted throughout each calendar year.

The operation evaluates the effectiveness of cyanide training by testing, observation or other means. The induction and training process is tested using written assessments. The answers to these assessments and any discrepancies are discussed with the trainee prior to being deemed competent. The operator training package also contains a competency based assessment.

Another method for evaluating the effectiveness of cyanide training is through the STOP programme. STOP focuses on recognising and reinforcing good safety behaviour and gaining commitment to change at-risk behaviour.

Records are retained throughout an individual's employment documenting the training they receive. The records do 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.

Records for all training (initial and refresher) conducted on-site are captured and recorded in the RIMS training system, with hard copies kept in the site filing system.

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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

Summarise the basis for this Finding/Deficiencies Identified:

Cowal is in FULL COMPLIANCE with Standard of Practice 8.3 requiring an operation train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.

Non-ERT members are not required to respond to cyanide incidents other than through raising of the alarm. The process for raising the alarm is covered in site wide and processing induction material, as well as being posted in the mill control room.

The ERC and EROs run frequent in-house training for ERT members in various aspects of emergency response. This includes specific cyanide scenario training, generic hazardous materials training and first aid. In addition, the ERC runs annual HAZMAT Rookie courses and conducts training for ERT competitions, which include various aspects of responding to cyanide incidents.

Cyanide emergency response personnel are trained in decontamination and first aid. They also take part in routine drill to test and improve their response skills. Process personnel do not provide a response to cyanide exposures or spills outside of bunded areas. In such events, the ERT is called out to respond.

EROs and ERT members do receive training in the procedures contained within the CEP. All members receive certified training in decontamination and first aid to a certificate level. In addition, ERT members undergo frequent in-house training in appropriate elements of the CEP, including equipment use, spill clean-up and decontamination and first aid.

The operation has made off-site emergency responders, such as community members, local responders and medical providers, familiar with those elements of the ERP related to cyanide. The Cowal ERC is invited to attend the LEMC meetings, which are held on a quarterly basis. The ERC uses the LEMC forum to table the Cowal ERP and CEP for stakeholder comment. Minutes of the meeting show that the plans were reviewed and accepted by state emergency services as a guide to follow if attending a site related cyanide incident.

All members receive certified training in decontamination and first aid to a certificate level. In addition, ERT members undergo frequent in-house training in appropriate elements of the CEP, including equipment use, spill clean-up and decontamination and first aid.

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Mock emergency drills are conducted periodically as part of the ERP evaluation process. They cover both worker exposure and environmental releases. The operation has conducted numerous mock cyanide drills involving ERT response to cyanide exposures and spills. The ERC and EROs also run regular training for ERT members in various aspects of emergency response. This includes specific cyanide scenario training, generic hazardous materials training and first aid.

Cyanide emergency drills are evaluated from a training perspective to determine if personnel have the knowledge and skills required for effective response. Training procedures are revised if deficiencies are identified. Following each mock drill or actual incident, the ERT document an *Emergency Response Debrief*. These briefs highlight any issues associated with the ERT response to an incident or drill, and what corrective actions are required to close out the issues.

ERT training attendance sheets, documenting the training, name of trainer and trainee, the date, topics covered and the how an understanding was demonstrated. The cyanide emergency response training undertaken by the ERT members is refreshed annually.

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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:

Cowal 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.

The operation provides the opportunity for stakeholders to communicate issues of concern regarding the management of cyanide through a number of mediums. Cowal has a Community Relations Manager with responsibility for the development and implementation of a communications system, which incorporates stakeholder engagement with respect to cyanide.

The corporate Barrick website directs people to a corporate email address (publicaffairsap@barrick.com) and provides additional information links for Barrick and the International Cyanide Management Institute (www.cyanidecode.org).

The internal information document *Cyanide Management External Consultation Processes* details the external communication methods available to stakeholders to communicate with Barrick, those that specifically related to cyanide include:

- Complaints line
- Barrick Cowal email address
- Family and community open days
- Site visits by members of the public

In addition to the above measures, Cowal has set up the Community Environment Monitoring Consultative Committee (CEMCC), which meets Requirement 8.7 of the Development Consent Conditions. This meeting is held quarterly and is used to discuss and ask questions relating to the site, and can include discussions on cyanide. Each meeting includes a report on cyanide monitoring results.

Cowal also release a newsletter that goes to every house in the three local shires called Cowal Update and an internal newsletter, the 'Babbler', which contain the complaints phone number and email address.

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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:

Cowal 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.

The operation provides opportunities for communication with its stakeholders regarding cyanide management practices. Cowal has a Community Relations Manager with responsibility for the development and implementation of a communications system, which incorporates stakeholder engagement with respect to cyanide.

The internal information document *Cyanide Management External Consultation Processes* details the external communication methods that specifically related to communication by Barrick regarding cyanide.

In addition to the above measures, Cowal has set up the CEMCC, which meets Requirement 8.7 of the Development Consent Conditions. This meeting is held quarterly, and is used to discuss and ask questions relating to the site, and can include discussions on cyanide. Every meeting contains cyanide monitoring results.

The CEMCC meetings consist of representatives from Barrick (at least two), local community members, representatives from Lake Cowal Land Holder Association, Bland Shire Council, Lachlan Shire Council and Forbes Shire Council, and an independent chair. These meetings provide another way for the surrounding community to ask questions and make comment. The decisions and outcomes of these meetings are published on the Bland Council Shire Website to keep the surrounding community informed.

Cowal also release a newsletter that goes to every house in the three local shires called Cowal Update and an internal newsletter, the 'Babbler', which can provide information regarding cyanide to the local community.

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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

Summarise the basis for this Finding/Deficiencies Identified:

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

Cowal has presented on the use of cyanide at the CEMCC meetings and continually updates the community about cyanide monitoring results. Management of cyanide is also communicated through the *Visitor Induction*, *Site Induction* and open days.

The operation does not know of any stakeholders that are illiterate. However, the operation ensures that the verbal information is disseminated through stakeholders via staff available at open days to questioning and through presentations at the CEMCC.

The operation has the mechanisms to make information publicly available on the cyanide release or exposure incidents, where applicable.

Incidents relating to spills and other similar unintentional releases are required to be reported under both internal and external regulatory reporting requirements.

As part of its Development Conditions, Cowal is required to generate an *Annual Environmental Return* to be submitted to the DECCW. The non-compliances reported in the *Annual Environmental Returns* are publicly available on the Cowal website.

Exposures resulting in hospitalisation or fatality are required to be reported to the DPI as part of the NSW *Mines Health and Safety Act 2004*. Severe incidents that would involve exposures or fatalities would be covered under the CMRP.

The CMRP defines the communication responsibility and procedures required for each level of incident. Section 13 defines the reporting levels required for an internal reporting event, Level 1: Unusual Event, Level 2: Alert, Level 3: Site Area Crisis and Level 4: General Disaster, all which can be related to cyanide spills and cover scenarios a) to d).

In addition to the regulatory reporting requirements, the CEMCC are presented with a quarterly overview of the sites performance, which includes site incidents such as injuries and spills, including cyanide incidents that are required to have either internal or external reporting.

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APPENDIX A

Limitations

LIMITATIONS

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