MARCH 2014

ICMC RECERTIFICATION SUMMARY AUDIT REPORT

Goldcorp – Red Lake Gold Mines, Ontario, Canada

Submitted to:
International Cyanide Management Institute
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RLGM – 1 pdf
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1.0 SUMMARY AUDIT REPORT FOR GOLD MINING OPERATIONS

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2.0 LOCATION DETAIL AND DESCRIPTION OF OPERATION

2.1 Mine Location

RLGM is located in Balmertown, Ontario, Canada (Figure 1). Mining, all underground, is carried out using three main mining methods - underground overhand cut and fill, underhand cut and fill, and longhole - allowing maximum ore extraction. The operation is supported by two mill processing facilities; the Red Lake Complex (RLC) and the Campbell Complex (CC), providing a total milling capacity of 3,000 tonnes per day, including crushing, processing, and pastefill plants.

Figure 1: Location Map of the Red Lake Gold Mines
2.2 Background

2.2.1 Red Lake Complex Mineral Processing

RLC currently has the capability to process 1,150 tonnes per day. The processing facilities consist of crushing, processing, and paste preparation. The crushing circuit is a two-stage process, which reduces underground ore from approximately 12 inches to 3/8 inch. The ore is fed into the jaw crusher and is classified using a sizing screen. Oversized material larger than 3/8 inch is further crushed using the cone crusher. The oversized ore then reports back to the screen for further classification, whereas the undersized ore is conveyed to the processing stages.

The processing stages consist of grinding, gravity concentrating, leaching with cyanide solution, carbon-in-pulp (CIP), carbon elution and reactivation, electrowinning, bullion smelting/refining, cyanide destruction, flotation, and concentrate handling.

The grinding circuit consists of a 1,200 HP ball mill in closed circuit with sizing cyclones, with the secondary cyclone underflow feeding a 400 HP vertimill. Coarse gold is recovered from grinding using three Knelson Concentrators. This gold is upgraded on a shaker table and smelted into bullion at the RLC refinery.

The overflow from the secondary cyclone is thickened and pumped into four leach tanks where gold is dissolved using a weak cyanide solution. The dissolved gold and slurry mixture then flows to eight CIP tanks that contain granular activated carbon particles that adsorb the gold in solution. The adsorbed gold is stripped from the carbon using a heated mild caustic solution that is pumped to two electrowinning cells. Dore is then produced in the refinery at the RLC.

After exiting the CIP tanks, all remaining cyanide in solution is destroyed via the Inco SO₂/Air treatment process, which oxidizes the cyanide component of the slurry and precipitates heavy metals. After the cyanide is destroyed, the slurry flows to the flotation circuit. This slurry has a concentrate of sulphides, which encapsulates the remaining recoverable gold and is separated from the rest of the gangue minerals. In the flotation circuit, chemicals are added to help the gold bearing sulphide minerals adhere to tiny bubbles of air that are added in small agitated tanks. The bubbles rise to the surface and collect in a froth layer which is removed from the surface with paddles. The concentrate is collected and any excess water is removed in the concentrate thickener. The concentrate is transferred at around 70 percent solids through a connecting pipeline, but if required it can be filtered to remove moisture and trucked to the concentrate storage area, where it will stay until reclaimed back into the process later. This concentrate is then processed in the CC pressure oxidation circuit (autoclave).
The tailings from the flotation circuit are directed to the Paste Plant from where the slurry is either discharged to the RLC Tailings Management Facility or prepared to be used as backfill underground. The tailings that are used underground are filtered using a disc filter to remove excess water. The filtered tailings are then mixed with cement, fly ash, and water to form a paste. Once the proper consistency is achieved, the paste is sent underground to the desired stope. Tailings sent to the RLC Tailings Management Facility are discharged via spigot at the Tailings Area 1. Next, water decants to Tailings Area 2, followed by the primary and secondary ponds. Lastly, water is pumped from the secondary pond to the treatment plant to remove metals before the water is discharged into Balmer Lake or returned to the RLC for re-use as process water.

Figure 2: Process Flowchart at Red Lake Complex

2.2.2 Campbell Complex Mineral Processing
The CC mill has the capability to process 1,850 tonnes per day. Processing facilities consist of crushing, grinding, gravity recovery, flotation, pressure oxidation, cyanide leach, carbon-in-leach (CIL), CIP recovery and paste preparation.

The crushing plant is a three-stage process which reduces underground ore size to approximately ½ inch in size. The ore is fed into a jaw crusher, which reports to a standard cone crusher. The ore is then classified using a double deck screen. Oversized ore is fed into a short head cone crusher to be crushed to the desired size and reports back to the screen for additional classification, whereas the crushed undersize ore is conveyed to the grinding circuit to be reduced further in size.
The grinding circuit is a two-stage process with an open circuit rod mill and a closed circuit ball mill with sizing cyclones. The coarse gold is recovered from the grinding circuit using two Knelson Concentrators. The gold is concentrated on a shaker table and sent to the refinery at the RLC where it is smelted into bullion.

Following grinding, the slurry is fed to the flotation circuit where a sulphide concentrate is produced. In the flotation circuit, chemicals are added to help the gold bearing sulphide minerals adhere to tiny bubbles of air that are added to the bottom of small agitated tanks. The bubbles rise to the surface and collect in a froth layer, which is removed from the surface with paddles. The concentrate is collected and any excess water is removed with concentrate thickener. This concentrate is then mixed with concentrate from RLC and passes into the pressure oxidation circuit (autoclave). The flotation tails pass on to the cyanide leach circuit for additional gold recovery.

In the pressure oxidation circuit, thickened flotation concentrate is contacted with weak acidic solution to convert any hydrocarbons into CO$_2$. This process takes place in five continuous stirred reactor tanks to ensure that this reaction is complete. It is very important that all CO$_2$ is removed as the CO$_2$ will rob the oxygen’s partial pressure, ultimately resulting in low autoclave kinetics. Once treated, the slurry is then pumped into a carbon steel, lead and acid brick lined autoclave where the concentrate will be exposed to extreme pressures (305 PSI) and high temperatures (varying depending on compartments). Under these conditions, the oxidation process converts the sulphides to sulphates and the arsenopyrite to scorodite (ferric arsenate). The oxidized slurry is pH adjusted using lime prior to being leached in the CIL circuit. The acidic tailings solution from the oxidation process is sent to the waste treatment circuit where it is first neutralized with final mill tailings, and then further with lime.

The oxide product from the autoclave circuit and the flotation tailings are leached in a weak cyanide solution for approximately 72 hours. Carbon is added to CIP 6 and transferred co-currently with the flow of slurry right up to CIL 1. The gold in solution is adsorbed onto the carbon and the loaded carbon is separated from the slurry using a screen. The gold is stripped from the carbon using a caustic solution. The carbon is then acid washed to remove calcium in the pores of the carbon, before being reactivated in a rotary kiln and recycled.

The leached tailings are then treated using the Inco SO$_2$/Air process which oxidizes the cyanide component of the slurry and precipitates heavy metals. After the cyanide is destroyed, the slurry is either discharged to the CC Tailings Management Facility or sent underground for use as backfill. Slurry that is to be sent underground is filtered before adding cement, fly ash and water to form a paste. Once the proper consistency is achieved, the paste is discharged underground by gravity to the desired stope. Otherwise, the combined tailings stream (flotation tailings plus oxide tailings) is mixed with the acidic...
solution from the pressure oxidation circuit and treated with lime at the waste treatment plant to precipitate metals and increase the pH prior to discharge to the main tailings pond.

In turn, all water that has accumulated in the main tailings pond is treated by pumping into the effluent treatment system from May through October. Once the water reaches effluent treatment, lime is added to adjust the pH further to ensure the removal of metals. From the effluent treatment system, the treated effluent is pumped to the settling pond. The settling pond also receives inflow of water from the primary clear water pond. In turn, runoff is received from the closed Balmer Tailings and seepage from the Main Tailings Pond. From the settling pond, water is filtered as it travels through a membrane to the polishing pond. Next, the polishing pond water is gravity filtered to the wetlands. The wetlands consist of various cells with cattails which attenuate metals in the water and remove nutrients. The remediated water is eventually discharged into Balmer Lake.
Figure 3: Process Flowchart at Campbell Complex
3.0 SUMMARY AUDIT REPORT

Auditors Findings

☑ in full compliance with

☐ in substantial compliance with

☐ not in compliance with

Red Lakes Gold Mine is: The International Cyanide Management Code

No significant cyanide incidents or cyanide exposure incidents were noted as occurring during the audit period.

Audit Company: Golder Associates, Inc.
Audit Team Leader: Kent Johnejack, Lead Auditor and Technical Specialist
Email: kjohnejack@golder.com

Name of Other Auditors

<table>
<thead>
<tr>
<th>Name, Position</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sophie Wheeler ICMI Pre-certified Lead Auditor (functioning as a second auditor)</td>
<td>Wheeler</td>
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</tbody>
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Dates of Audit

The Recertification Audit was undertaken within 4 days from September 23 to 26, 2013.

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

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

Red Lake Gold Mines
Name of Facility
Signature of Lead Auditor
March 5, 2014
Date
PRINCIPLE 1 – PRODUCTION
Encourage Responsible Cyanide Manufacturing by Purchasing from Manufacturers that Operate in a Safe and Environmentally Protective Manner

Standard of Practice 1.1: Purchase cyanide from manufacturers employing appropriate practices and procedures to limit exposure of their workforce to cyanide, and to prevent releases of cyanide to the environment

☑ in full compliance with

☐ in substantial compliance with

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation 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 contract between RLGM and DuPont, the cyanide producer, requires that the producer be Code compliant. DuPont was certified as Code compliant on June 13, 2006, recertified on December 1, 2009 and again on April 30, 2013.
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

Summarize the basis for this Finding/Deficiencies Identified:

The operation 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.

Miller Transporters Inc. (Miller) is the primary transporter for RLGM. Miller picks up the cyanide at the DuPont plant in Memphis and transports it by land directly to RLGM without the involvement of any other rail, land, or sea transporters. Miller was certified in October 22, 2007 and re-certified on April 07, 2011. RSB Logistics, Inc. (RSB) is a back-up transporter, but RLGM has not used RSB during the recertification period. RSB was certified on January 24, 2011. A copy of the ICMI Summary Certification Audit Reports for Miller and RSB were obtained from the ICMI website and reviewed to verify compliance.

The contract between Goldcorp and DuPont specifies that designated responsibilities extend to any subcontractors used by the producer, DuPont. Section 13(a) of the contract includes a provision requiring DuPont and DuPont’s production and transportation personnel, distributors and contract transporters to comply with all applicable Code requirements. A copy of the contract was reviewed to verify compliance.

Examples of bills of lading from 2011, 2012, and 2013 were reviewed to verify that the cyanide used at RLGM was produced at DuPont’s production facility in Memphis and transported to RLGM by Miller. Transportation of cyanide to the site is the responsibility of E.I DuPont de Nemours and Company under the cyanide supply contract. This contract requires that the cyanide is transported by code compliant haulers.
Standard of Practice 2.2: Require that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management

☒ in full compliance with

☐ in substantial compliance with

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation 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 contract between Goldcorp and DuPont requires that DuPont and its transportation personnel, distributors and contract transporters comply with the Code, performance goals, audit recommendations and certification requirements applicable to the transportation to RLGM including the specific compliance matters set out in the ICMI Cyanide Transportation Verification Protocol. The contract was reviewed to verify compliance.

Miller Transporters Inc. (Miller) is the primary transporter for RLGM. RSB Logistics, Inc. (RSB) is the back-up transporter. Both companies are signatories to the Code and are certified as fully compliant. Their certification and recertification reports were obtained from the ICMI website to verify compliance.

Examples of bills of lading from 2011, 2012, and 2013 were reviewed to verify that the cyanide used at the site was produced at DuPont’s production facility in Memphis and transported to the site by Miller.
PRINCIPLE 3 – HANDLING AND STORAGE
Protect Workers and the Environment during Cyanide Handling and Storage

Standard of Practice 3.1: Design and construct unloading, storage and mixing facilities consistent with sound, accepted engineering practices, quality control/quality assurance procedures, spill prevention and spill containment measures.

☑ in full compliance with
☐ in substantial compliance with Standard of Practice 3.1
☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Handling and Storage Practice 3.1, requiring that cyanide handling and storage facilities are designed and constructed consistent with sound, accepted engineering practices, quality assurance/quality control (QA/QC) procedures, spill prevention and spill containment measures.

RLGM receives solid cyanide in Flo-bins at a central storage area within a designated Quonset hut. The design and construction of this building were evaluated during the 2010 initial audit and found acceptable. During the 2013 site visit, the auditors observed that there have been no changes to the building and that the building was in good condition. Likewise, the design and construction of the mixing and storage facilities at the CC and RLC tanks were evaluated during the 2010 initial audit and found acceptable. During the 2013 site visit, the auditors observed that there have been no changes to the storage and mixing areas or equipment (with one exception) and that they were in good condition. The sole exception was a low concrete wall installed at the CC between the distribution tank and the adjacent lime tank; the design and construction were completed in accordance with sound engineering practices as documented in an as-built drawing stamped by professional engineer.

The central storage building for the Flo-bins at the CC is located inside the fenced and secured mine area and there are no offices in the vicinity. The temporary storage areas within in the CC Mill and the RLC Mill, as well as the mixing and storage tanks, are located away from mill offices and areas where staff may congregate. The central storage warehouse and the CC Mill are located approximately a mile from the nearest surface water body; the RLC mill is located within a bermed area approximately 200 feet from Balmer Creek.

The mixing and distribution tanks at the RLC Mill have level sensors, high level alarm indicators (lights and a siren), and automatic shut-off valves to prevent overfilling. Likewise, the mixing and distribution
tanks at the CC Mill also have level sensors high level alarm indicators (lights and a siren), and automatic shut-off valves to prevent overfilling. The auditor observed records to verify that monthly preventive maintenance and inspections were completed of these devices throughout the recertification period at both mills.

The mixing and distribution tanks at both the RLC Mill and CC Mill are located on concrete pads within concrete containments that contain spills and prevent seepage to the subsurface. These structures were evaluated during the 2010 initial audit. The auditors observed that the concrete was in good condition at both mills and had been recently repainted.

The secondary containments for the mixing and distribution tanks at both the RLC Mill and the CC Mill are constructed of reinforced concrete. At both mills, the mixing tanks are located at a higher elevation than the distribution tanks and have floor drains that would convey solutions from the mixing areas to the secondary containments for the distribution tanks. The secondary containments for the distribution tanks at both mills have sumps with pumps to return solutions to the process circuit. The auditors observed that the concrete was in good condition at both mills.

RLGM stores solid cyanide in a manner that prevents the build-up of HCN gas, minimizes the potential for contact with water, prohibits public access, and prevents mixing with incompatible materials. To prevent the build-up of HCN gas, the central storage warehouse is open at both ends to allow ventilation. The temporary storage areas at both mills are open to the mills themselves to allow for ventilation. To minimize the potential for contact with water, Flo-bins are stored on a concrete floor and under a roof at the central storage warehouse, the temporary storage area at the CC Mill, and the temporary storage area at the RLC Mill. To prohibit public access, all three storage areas are located within the fenced and secure mine area and are kept locked. All three storage areas are solely used for cyanide storage and the auditors verified that flow paths from cyanide storage areas would not mix with those of incompatible materials in the event of spills.

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

☐ in full compliance with
☐ in substantial compliance with
☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:
The operation is in full compliance with Handling and Storage 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.

RLGM has implemented procedures to prevent inappropriate reuse of cyanide containers and to control cleaning residue from cyanide containers. The “Cyanide Handling-Delivery” procedure requires managing the Flo-bins in the central storage warehouse with a first in-first out pattern to ensure that none are misplaced or used inappropriately. The auditors observed examples of two different log sheets from throughout the recertification period to confirm that full and empty Flo-bins were tracked according to the first in-first out approach. The “Mixing of Sodium Cyanide” procedures for both complexes require that after a mixing event, the operators check that the emptied Flo-bin slide gate is closed, the exterior is rinsed and free from residual cyanide, the cam-locks are in the closed position, and the security pins are in place. The auditors observed a cyanide mixing event at the both mills to verify that the procedures were followed.

Rinsing and disposing of drums, bags, and boxes is inapplicable because RLGM does not receive cyanide in these types of containers.

RLGM has implemented procedures to prevent releases and exposures during cyanide unloading, transfer, and mixing. The “Mixing of Sodium Cyanide” procedures for both complexes describe the steps for emptying the Flo-bins and mixing the cyanide into solution. The procedures are accompanied by checklists. Both the procedures and the checklists describe the required PPE and require observation by a second person either in the mix area or via video camera from the control room. The procedures and checklists also require that the mix areas be checked for residues after a mix event, as well as that residues, if any, be immediately cleaned up. The auditors observed mixing events at both complexes and reviewed examples of completed checklists from throughout the recertification period to confirm compliance. The “Cyanide Handling-Delivery” procedure requires the use of qualified forklift operators and describes the methods, including observation by a second person, for safe handling of the Flo-bins. The auditors observed a transfer event from the central storage warehouse to the temporary storage area at the CC Mill to verify that the procedure was followed. The “Cyanide Handling-Delivery” procedure also requires that Flo-bins not be stacked. The auditors did not observe any stacked Flo-bins at the central storage warehouse or either temporary storage area at the CC Mill and the RLC Mill.
PRINCIPLE 4 – OPERATIONS
Manage Cyanide Process Solutions and Waste Streams to Protect Human Health and the Environment

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

☑ in full compliance with

☐ in substantial compliance with Standard of Practice 4.1

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation 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.

RLGM consists of three complexes: the Campbell Complex (CC) and the Red Lake Complex (RLC), and the Cochenour Complex. Only the CC and RLC have cyanide facilities that are auditable under the Code. The Cochenour Complex consists of a new shaft and access facilities for the underground mine. It was under construction at the time of the site visit. No cyanide facilities exist or are currently planned at the Cochenour Complex.

RLGM has prepared an over-arching manual for their environmental management system. This system is consistent with ISO 14001, but RLGM does not anticipate pursuing actual certification. RLGM has developed and implemented written management plans and procedures for all cyanide facilities (0.5 mg/L WAD CN or greater) at the CC and RLC:

- Storage area
- Mix tanks
- Storage tanks
- Secondary containment
- Leach tanks
- CIP tanks
- Cyanide destruction plant
- Paste plant
- Effluent treatment plant
- Tailings pipelines and reclaim lines
Tailings dams and associated ponds

RLGM has developed plans and procedures describing the standard of practice necessary for the safe and environmentally sound operation of the cyanide facilities, including the specific measures needed for compliance with the Code and regulatory requirements. RLGM has developed and implemented inspection and preventive maintenance programs for all the cyanide facilities including: cyanide unloading, mixing and storage facilities; the mills; the cyanide destruction plants; the paste plant; the effluent plant and the tailings areas (including the all ponds and wetlands). RLGM uses the SAP system for identifying, assigning responsibility, scheduling and tracking the completion of the preventive maintenance activities and repairs. Specific PM programs have been developed for the key cyanide facilities and critical equipment.

RLGM has implemented a written procedure for evaluating changes to cyanide facilities throughout the recertification period. This procedure requires sign-off by the process, safety, maintenance, and environmental managers with respect to safety and environmental impacts. The auditors reviewed five change management worksheets from the recertification period to verify that the procedure is being followed.

RLGM has prepared various procedures and plans to address contingency actions for various scenarios. The procedure for Sodium Cyanide Emergency Response describes contingency procedures for: leaks and/or tank ruptures inside the mills; spills of solid cyanide during transportation; fires inside the mills; pipe/valve ruptures; cyanide destruct system failure; and power outages. The Surface Spill Response Plan contains contingency actions for similar scenarios, but also describes actions for overtopping of ponds, tailings impoundments, and uncontrolled seepage. The Operation, Maintenance, and Surveillance (OMS) Manuals for the CC and RLC Tailings Management Facilities contain sections that describe contingency actions for: pipeline leakage, rupture, or blockage; extreme runoff; freeboard control; movements or conditions affecting structural stability; and dam failure, overtopping, or breaching. The site closure plan addresses contingency procedures for site-wide temporary closure.

RLGM has prepared a written procedure that summarizes the types, frequencies, and responsible departments for inspections at the CC and RLC. Inspection frequencies are shift, daily, every 4 days, weekly, monthly, every 6 months, and annually depending on the type of facility or activity. Inspections include tanks, secondary containments, pipes, pumps, valves at the mills and pipelines, dams, water levels, freeboard, and wildlife at the tailings management facilities. Wildlife inspections are conducted daily. RLGM also commissions a professional engineer to perform annual non-destructive testing on tanks and vessels. The engineer-of-record also performs annual tailings reviews at both complexes.
RLGM staff documented inspections for all cyanide facilities throughout the recertification period. The inspection forms included the date, inspector’s name, and deficiencies (if any).

RLGM has implemented a maintenance program via the SAP software that includes both proactive (scheduled) maintenance and reactive (unscheduled) maintenance. The auditors observed hard copy and screen view examples of completed maintenance summaries throughout the recertification period. Starting in 2013, the SAP software has been configured to allow sorting for maintenance related to cyanide facilities. The auditors observed an example of this sorted list for the RLC Mill for 2013. The auditors also reviewed hard copy files that verify continuous maintenance of pH meters, HCN monitors, and level sensors throughout the recertification period. The auditors also randomly selected deficiencies noted on four different inspection forms to verify that notifications, work order generation, work order tracking, and completion are documented.

RLGM has provided emergency generators at the CC and RLC. The auditors observed these generators to verify they exist and are in good visual condition. The procedure for Sodium Cyanide Emergency Response contains two appendices that list the critical equipment that would be powered by the backup generators. The auditors reviewed examples of maintenance records and observed screen shots from SAP to verify that these generators were maintained throughout the recertification period.

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

☐ in full compliance with
☐ in substantial compliance with
☐ not in compliance with

**Standard of Practice 4.2**

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

The operation is in full compliance with Standard of Practice 4.2, requiring that the operation limit the use of cyanide to that optimal for economic recovery of gold so that the waste tailings material has as low a cyanide concentration as practical.

RLGM conducted an initial evaluation of cyanide addition rates at the CC Mill and the RLC Mill in 2010, as discussed in the 2010 initial certification report. RLGM updated that initial study in 2013 using their internal laboratory and an external consultant (SGS Lakefield). RLGM implements a manual strategy to control cyanide additions at both mills. However, RLGM evaluated an automatic strategy during the recertification period but decided not to implement it at this time. RLGM implements the manual strategy by measuring free and WAD cyanide every 6 and 4 hours at the CC Mill and the RLC Mill, respectively. In addition, RLGM conducts assays at both mills every 12 hours as part of the manual control strategy.
The auditors reviewed examples of completed operator’s logs from both mills, as well as assay spreadsheets, to verify compliance throughout the recertification period.

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

☑ in full compliance with

☐ in substantial compliance with Standard of Practice 4.3

☐ not in compliance with

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

The operation is in full compliance with Standard of Practice 4.3, requiring the operation to implement a comprehensive water management programme to protect against unintentional releases.

RLGM has implemented separate water balances for the CC and RLC Tailings Management Areas. Both water balance models are comprehensive and probabilistic. The models are comprehensive in that they include the appropriate factors and input values: tailings deposition rates; available storage volume based on annual bathymetric surveys; precipitation and evaporation; undiverted run-on; spring snowmelt; and treatment systems. The models do not include losses to seepage because it is more conservative with respect to overtopping to exclude such losses. The models also do not include power outages because the effects would be negligible given that the pumped inflow and outflow would simply stop and, in any case, those rates are low relative to the large solution storage volumes available. The models are probabilistic in that they address rainfall for multiple return periods (i.e., 5, 10, 20, 50, 100, and 200 years), wet and dry years, and the spring snowmelt for wet and dry years. In addition, selected extreme events are included: 200-year, 24-hour storm; 24-hour probable maximum precipitation (PMP); ½ 24-hour PMP; 10-day PMP; and 200-year snowmelt.

RLGM conducts daily inspections of the run-diversions, dam conditions, and pond water levels to implement the water balances at the CC and RLC Tailings Management Areas. The auditors reviewed examples of completed inspection forms from throughout the recertification period to verify compliance. The auditors also noted that the results of the annual topographic and bathymetric surveys were embedded in the spreadsheet models.

The design freeboard is specified in the Operation, Maintenance, and Surveillance (OMS) Manuals for each tailings management area. The required freeboard varies from 0.5 to 1.2 m depending on the pond. The auditors reviewed graphs of water levels and available freeboard for the entire recertification period for the ponds at the CC and RLC Tailings Management Areas. The required freeboard was maintained throughout the recertification period with one isolated exception in June 2011 due to a beaver dam.
RLGM obtains precipitation data from the official government station at the Red Lake Airport, some 10 km from the site. Evaporation data is obtained from the official government station at Pickle Lake, some 100 km from the site. As government stations, the quality of the data is high. Given the homogenous topography, vegetation, and land uses in northern Ontario, and the similar seasonal weather patterns across the region, the auditors concur with RLGM that these stations represent site conditions. RLGM updates the precipitation and evaporation data in the spreadsheet models on a monthly basis and adjusts operating flow rates as needed to maintain freeboard.

**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

☐ in substantial compliance with  Standard of Practice 4.4

☐ not in compliance with

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

The operation is in full compliance with Standard of Practice 4.4, requiring the operation implement measures to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions.

RLGM installed cyanide destruct plants at the RLC and CC in 2006 and 2010, respectively, to maintain concentrations of WAD cyanide less than 50 ppm in open waters at the CC and RLC Tailings Management Facilities. RLGM has also installed fencing to limit wildlife access in certain areas.

Because of the cyanide destruct circuits for the tailings at the CC Mill and the RLC Mill, concentrations of WAD cyanide in open waters at the CC and RLC Tailings Management Facilities are well below 50 ppm. For the open water at the CC Tailings Management Facility, WAD cyanide concentrations were less than 5 ppm. For the open water at the RLC Tailings Management Facility, WAD cyanide concentrations were less than 1 ppm. The auditors reviewed graphs of WAD cyanide concentrations for the recertification period for the cyanide facilities with open water at the CC and RLC to verify compliance.

RLGM staff stated that there were no wildlife mortalities during the recertification period even though moose, waterfowl, and beavers are commonly present around both tailings management facilities. Maintaining the concentration of WAD cyanide below 50 ppm has been effective in preventing wildlife mortality.

RLGM does not have a heap leach facility; therefore, management of solution ponding on a pad surface and overspray are inapplicable.
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
☐ in substantial compliance with Standard of Practice 4.5
☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

RLGM discharges seasonally from May to October directly to Balmer Lake from the wetlands at the CC Tailings Management Facility and from the water treatment plant at the RLC Tailings Management Facility. The auditors reviewed analytical data that showed concentrations of WAD cyanide for both direct discharges were less than 0.5 ppm throughout the recertification period.

Regulatory authorities have established a mixing zone for the direct discharges from the CC and RLC Tailings Management Facilities to Balmer Lake. Each facility has separate compliance points. The auditors reviewed analytical data that showed concentrations of free cyanide for at the points of compliance for both mixing zones were less than 0.022 ppm throughout the recertification period.

RLGM has the potential for indirect discharges to surface water from the CC and RLC Tailings Management Facilities. Due to a groundwater divide underlying the Main Tailings Pond, the CC Tailings Management Facility may indirectly discharge to the northeast to Balmer Lake and to the southwest to the McNeely Bay of Red Lake. The point of compliance in Balmer Lake is the same as for the direct discharge. There is a separate monitoring station in McNeely Bay for the groundwater pathway from the Main Tailings Pond. The RLC Tailings Management Facility may indirectly discharge to Balmer Lake from the adjacent Secondary Pond. The two points of compliance in Balmer Lake are the same as for the direct discharges. The auditors reviewed analytical data that showed concentrations of free cyanide at all of the monitoring locations for indirect discharges were less than 0.022 ppm throughout the recertification period. RLGM is not engaged in any remedial action due to indirect discharges of cyanide solutions.
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
☐ not in compliance with

Standard of Practice 4.6

Summarize the basis for this Finding/Deficiencies Identified:

The operation 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.

RLGM staff stated that the beneficial use of groundwater is for drinking water. The Province of Ontario has not established groundwater protection levels for any cyanide species for the RLC Tailings Management Facility. However, the Province of Ontario has established an alert level of 0.025 ppm for free cyanide in groundwater for the CC Tailings Management Facility.

The principal way that RLGM protects the beneficial use of groundwater is by operating SO₂/Air cyanide destruct plants at both the CC and RLC Mills. The outflow data from these plants show that they are effective in reducing concentrations of all WAD cyanide to less than 5 ppm, thus greatly reducing the potential for cyanide impacts to groundwater. Other measures to protect groundwater include constructing the tailings dams at both the CC and RLC Tailings Management Facilities with clay cores, and installing tailings pipelines in secondary containment.

The Province of Ontario has established an alert level of 0.025 ppm for free cyanide in groundwater for the CC Tailings Management Facility. RLGM monitors two wells as representative of groundwater flow paths from the Main Tailings Pond. Well MW-92-7 is located on the flow path to the north at the edge of Balmer Lake. Well GC30 is located on the flow path to the south at the edge of McNeely Bay on Red Lake. The data show that free cyanide was not detected at 0.005 ppm at either of these wells throughout the recertification period.

RLGM uses paste backfill from the CC and RLC Paste Plants for backfill in the underground workings. RLGM performed sampling in the underground workings three times during the recertification period. The data show a maximum of 0.098 ppm WAD cyanide in water and a maximum of 0.4 ppm HCN in air. The auditors concluded that these levels protect workers and groundwater.

RLGM has not caused cyanide concentrations in groundwater to exceed the applicable standards, nor is RLGM engaged in remediation of cyanide in groundwater.
Standard of Practice 4.7: Provide spill prevention or containment measures for process tanks and pipelines.

☒ in full compliance with
☐ in substantial compliance with
☐ not in compliance with

The operation is

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.7 requiring that the operation provide spill prevention or containment measures for process tanks and pipelines.

RLGM has provided spill containment measures for all mixing, distribution, and process solution tanks at the CC Mill and the RLC Mill, as accepted in the 2010 initial certification report. The auditors observed that the tank secondary containments at both mills have not changed since that time, with two exceptions. The secondary containment for the distribution tank at the CC Mill was modified to separate it from an adjacent lime solution tank. A concrete apron was added around the paste thickener at the CC Mill to better direct spills to the adjacent lined-containment ditch. The containments have all been properly sized, including the modification for the distribution tank at the CC Mill. The secondary containments at both mills report to sumps with pumps to return solutions to the circuit and/or the secondary containments have flow-through capability to other process areas that have sumps. The sump pumps have level sensors to automatically operate the pumps, which in turn are monitored from the control rooms. In any case, the secondary containments at both mills are designed and operated to preclude discharge to the environment, and as such written procedures for when and how to discharge are unnecessary. The auditors also observed that the tank secondary containments, sumps, and pumps at both mills were in good condition.

RLGM does not have any cyanide-related tanks without secondary containment. Nonetheless, RLGM has a procedure for responding to cyanide emergencies that includes methods for remediating contaminated soil.

RLGM has provided pipe-in-pipe or geomembrane-lined ditches as secondary containment for cyanide solution and tailings pipelines. The tailings pipeline from the RLC paste plant to the RCL tailings impoundment crosses over Balmer Creek in a sag. RLGM has constructed a tee to the stormwater pond adjacent to the pipeline as special containment in the event of tailings upsets near Balmer Creek.

The auditors observed that all cyanide-related tanks and pipelines are constructed of materials compatible with cyanide and high pH, such as mild steel, stainless steel, and HDPE.
Standard of Practice 4.8: Implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.

☑ in full compliance with

☐ in substantial compliance with

☐ not in compliance with

Standard of Practice 4.8

Summarize the basis for this Finding/Deficiencies Identified:

The operation 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.

RLGM provided evidence of construction quality assurance (CQA) programs during the 2010 initial certification audit for the cyanide facilities existing at that time. There have been four construction projects at cyanide facilities since that time: (a) late 2010 raise to the crest of the East End Dam, North Dam, Splitter Dyke 1, and Primary Dam at the RLC Tailings Management Facility; (b) 2011 raise to the crest of the Splitter Dyke 2 at the RLC Tailings Management Facility; (c) 2012 raises to the crests of the North, Northwest, West, South, and East Dams of the Main Tailings Pond at the CC Tailings Management Facility; and (d) a modification to the concrete secondary containment for the distribution tank at the CC Mill. RLGM engaged consultants to conduct the CQA programs for these projects. The programs for the Tailings Management Facilities at both complexes included full time oversight along with laboratory and field testing and preparation of as-built drawings. The program for the modification to the secondary containment consisted of visual inspection and preparation of an as-built drawing.

The CQA programs for construction projects at the CC and RLC Tailings Management Facilities included the suitability of borrow materials and the adequacy of earthworks construction. Laboratory testing consisted of index properties and compaction characteristics (i.e., Proctors). Fieldwork consisted of density nuclear density gage testing, monitoring of piezometers, and photographic documentation.

RLGM has retained design, as-built, and construction quality assurance records for both the CC and the RLC at the “Environmental Vault” at the CC. The auditor observed reports going back to the 1990’s and spot-checked that reports cited in the 2010 initial certification have been retained.

 Appropriately qualified personnel reviewed and approved the construction projects completed during the recertification period. The engineers of record from AMEC Environmental and Infrastructure reviewed the CQA results for the construction 2010, 2011, and 2012 projects at the CC and RLC Tailings Management Facilities. The as-built for the modification to the secondary containment for the distribution tank at the CC Mill was stamped by a professional engineer for Amstel Engineering Inc.
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

☐ in substantial compliance with

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation 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.

RLGM has developed written procedures for monitoring activities. There is an overall document for the environmental management system, followed by specific procedures for groundwater sampling, surface water sampling, and wildlife management. These procedures were developed by qualified RLGM staff with environmental science/engineering backgrounds and 10 to 20 years of experience. RLGM uses ALS Inc. for laboratory analysis; ALS maintained certification by the Canadian Association for Laboratory Accreditation throughout the recertification period for analysis of free, WAD, and total cyanide.

The RLGM Environmental Management System specifies the details of where, how, and when samples should be taken. Subsections describe sampling locations, sampling frequency, sampling methods, containerization, preservation, shipping and handling, chain-of-custody, and laboratory analysis for free, WAD, and total cyanide. Separate surface water and groundwater sampling procedures contain step-by-step photographic instructions for sampling procedures.

RLGM sampling staff note sampling conditions during groundwater and surface water sampling activities. The auditors reviewed field forms and log books to verify that weather, animal signs, anthropogenic influences, field parameters (e.g., pH, electrical conductivity, temperature), and flow rates (surface water only) were documented throughout the recertification period.

RLGM monitors both surface water and groundwater downgradient of the site for potential impacts from cyanide. RLGM monitors direct discharges to surface water at the WETOUT and G2 stations for the CC and RLC Tailings Management Facilities, respectively. RLGM also monitors the surface water in Balmer Lake (BL Mouth and L2) and McNeely Bay on Red Lake (McNeely). RLGM monitors groundwater at numerous wells around the site, but considers the Wells BH-4, -5, -6, and -7 to represent the groundwater flow path for the RLC Tailings Management Facility. Groundwater is monitored at Wells MW-92-7 and GC30 along the groundwater paths to north and south, respectively, from the CC Tailings Management Facility.
RLGM staff document wildlife activities and mortalities during daily inspections of the CC and RLC Tailings Management Facilities. Inspections occur throughout the year, even though the CC and RLC Tailings Management Facilities are inactive during the winter months. The auditors reviewed examples of completed inspection forms for the CC and RLC Tailings Management Facilities to verify that daily wildlife observations were recorded throughout the recertification period.

Groundwater and surface water monitoring are completed at frequencies adequate to characterize each medium. Groundwater is monitored quarterly, while surface water is monitored at variable frequencies from three times per week to quarterly depending on the location.
PRINCIPLE 5 – DECOMMISSIONING
Protect Communities and the Environment from Cyanide through Development and Implementation of Decommissioning Plans for Cyanide Facilities.

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

☐ in full compliance with
☐ in substantial compliance with
☐ not in compliance with

The operation is

Summarize the basis for this Finding/Deficiencies Identified:
The operation is in full compliance with Standard of Practice 5.1 requiring that the site plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife and livestock.

RLGM has a written closure plan that covers the RLC and CC Complexes. The plan includes all of the cyanide facilities at both complexes, including the mill, detox plant, paste plant, and tailings ponds. The plan also addresses the activities for disposition of residual cyanide, decontamination of cyanide equipment, and management of cyanide solutions. RLGM also has an operational procedure for decontamination that would be used during decommissioning activities. The plan contains a general schedule showing a 5-year decommissioning and demolition period. RLGM provided 2011 and 2013 versions of the plan as evidence that the plan is periodically reviewed and revised.

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

☐ in full compliance with
☐ in substantial compliance with
☐ not in compliance with

The operation is

Summarize the basis for this Finding/Deficiencies Identified:
The operation is in full compliance with the Standard of Practice 5.2 requiring that the site establish an assurance mechanism capable of fully funding cyanide related decommissioning activities.

The 2013 Closure Plan summarizes contains estimated costs for decommissioning and demolition at both the RLC and CC. The auditor confirmed by interview that the costs are based on third-party implementation. The labor rates were based on those of the onsite contractor and equipment rates were
based on the rates of four local earthworks contractors. RLGM provided 2011 and 2013 versions of the plan as evidence that the costs are periodically reviewed and revised.

The applicable regulatory agency (MNDM) has accepted two letters of credit (one for each complex) issued by the Bank of Nova Scotia on behalf of RLGM. The auditor confirmed that the aggregate financial assurance of approximately $22M CAD exceeds the approximate amount of $12M CAD for decommissioning and demolition of the cyanide facilities at both complexes.
PRINCIPLE 6 – WORKER SAFETY

Protect Workers’ Health and Safety from Exposure to Cyanide

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

☒ in full compliance with

☐ in substantial compliance with Standard of Practice 6.1

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

RLGM has over 20 procedures describing how cyanide-related tasks are to be performed to minimize worker exposure. The SOPs describe PPE requirements, operator responsibilities, procedures for using and handling cyanide, and documentation. In addition work orders for maintenance activities include details of cyanide safety instructions and requirements to test and write down HCN levels.

The procedures require, where necessary, the use of PPE. RLGM has signage for PPE requirements located at the entrances of process areas. RLGM’s cyanide task and general training programs also discuss PPE requirements.

Pre-work inspections are undertaken before every shift using a “WE CARE” card. These cards are filled in by employees before and during the shift and cover the work that is to be performed, contain a checklist on whether a permit to work is required, whether hazardous substances are to be used, and whether actions or corrections have been taken.

RLGM has implemented a procedure throughout the recertification period entitled “Procedure for Amending Cyanide Management and Handling Protocols” that is used to evaluate any proposed change or modification to any part of the cyanide process flow and/or any changes or modifications to any of the cyanide management controls related to the cyanide process being undertaken. The procedure requires that a full formal review be conducted to evaluate potential hazards and safety and environmental impacts associated with any proposed change. The review is conducted at a meeting with representatives from the Environmental, Maintenance, Mill, and Safety Departments in attendance.

RLGM solicits worker input in developing and evaluating health and safety procedures via direct communication to supervisors and during pre-shift safety meetings and monthly safety meetings. An Occupational Health & Safety representative who is a worker representative is involved in all reviews of
SOPs. The representative and supervisors ask for worker input during daily and monthly meetings. Golder reviewed records of safety meetings where cyanide related topics were discussed.

In addition Job Task Observations (JTOs) are undertaken by each supervisor at least twice a month. During a JTO a worker is observed performing a task such as acid wash preparation. A specific checklist that relates to the task is completed by the supervisor. During the task being observed the worker has the opportunity to comment on the suitability of the SOP and recommend any changes they feel would be appropriate. Approximately 26 JTOs per month have been undertaken to date in 2013.

**Standard of Practice 6.2:** Operate and monitor cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures.

☒ in full compliance with

☐ in substantial compliance with ☐ not in compliance with

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

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

RLGM has determined the appropriate pH for limiting the evolution of HCN gas during mixing and production activities. The pH is maintained at least at 12.5 for mixing activities and around 10 to 11.5 for production activities. The pH is measured by operators every 4 hours at various locations. In addition pH sensors are present at same locations and the pH levels are shown on monitors in the Control Rooms.

The pH is measured and noted on the pre-mix checklist prior to and after cyanide mixing. Daily operator logs from 2011 – 2013 were reviewed to verify that the pH was maintained as recommended.

RLGM has twelve fixed HCN meters in total. Fixed HCN meters alarm at 2.5 ppm (a buzzer sounds and a yellow light flashes) and at 4.7 ppm (a siren sounds and a red light flashes). The levels are set at 4.7 ppm to comply with legislative requirements in Ontario, as established within the Occupational Health and Safety Act (Revised Regulations of Ontario (R.R.O) 1990 Regulation 833) “Control of Exposure to Biological or Chemical Agents”. This regulation sets a ceiling exposure limit of 4.7 ppm for hydrogen cyanide. RLGM also has eleven portable HCN Dräger meters, which are required when conducting cyanide mixing activities, some maintenance and confined space work.
Hydrogen cyanide monitoring equipment is maintained, tested and calibrated as directed by the manufacturer, and the records are retained for at least 1 year. A selection of calibration records was reviewed for verification along with manufacturer’s calibration instruction documents.

Warning signs have been placed in areas where cyanide is used to alert workers that cyanide is present and that smoking and open flames are not allowed. ‘No eating or drinking signs’ are not present in these locations, but this requirement is covered in annual cyanide training.

Unloading, storage, mixing and process tanks and pipes containing cyanide are marked as containing cyanide solution and show flow direction. In addition, accessible tanks, pipes or pipe trays are painted with purple paint. The cyanide solution has a red dye added in order to help identify process solutions in an event of an emergency.

MSDSs and first aid procedures for cyanide are kept in each first aid kit, located in the CC process control and lunchrooms and at the RLC control room. In addition, signs describing cyanide first aid procedures and MSDSs are displayed in mixing areas in the cyanide warehouse and other process areas where workers can easily access them. The quality of information portrayed in notices is of a very high standard and coloured purple to denote that they relate to cyanide solutions, in line with the colour used throughout the plants. Verification was through visual inspection of the MSDSs and signs. The instructions and MSDSs are in English, the language of the workforce.

Safety showers and eyewash stations are inspected every shift rotation (approximately every 4 days) by process personnel. Auditors verified that the showers and eyewash stations are functional and that the pressure in the eyewash stations is adequate. In addition showers are checked as part of pre-work checklists for maintenance work involving cyanide and mixing operations.

Dry chemical fire extinguishers are located at strategic locations throughout RLGM and are maintained, inspected and tested on a regular basis.

RLGM has implemented a procedure entitled “Accident and Incident Investigation Policy” throughout the recertification period. This document details the procedures to be followed to investigate incidents or accidents including cyanide exposures. RLGM provided examples of completed investigations for cyanide related releases and exposures that allowed implementation of the general program of incident/accident investigation to be verified.

Ten incidents involving cyanide have occurred in the 3-year recertification period. The majority of these incidents were minor and none were considered significant. There were no programmatic issues with inspections or preventative maintenance during this period. The duration of each spill was short; in all
cases, the responses were rapid and effective, indicating good faith in controlling the incidents. Therefore, the auditors find RLGM to be fully compliant.

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

☑️ in full compliance with

☐ in substantial compliance with

☐ not in compliance with

**Standard of Practice 6.3**

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

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

RLGM provides the necessary equipment for response to cyanide exposure and the communication means to coordinate their use.

Amyl nitrite, water, oxygen, automated external defibrillators (AEDs) and a surface response vehicle are available at various locations at CC and RLC.

Inspections of first aid equipment are done on a shift or monthly depending on the location. During the site visit the amyl nitrite was observed to be stored according to manufacturer’s recommendations.

RLGM has a number of emergency plans and procedures detailing how to respond to emergencies including cyanide exposures.

RLGM has emergency equipment and personnel to respond to cyanide emergencies including first responders, a surface response team, on-site nurses, a surface response vehicle, a fire truck and first aid equipment. The auditors inspected the equipment during the audit.

The “Cyanide Antidote” procedure details the measures necessary to transport workers exposed to cyanide to the Red Lake Hospital. The hospital, which is 10 km from RLGM, will provide an evacuation service using its own ambulance. The contact number for the Red Lake Ambulance is provided in the procedure. RLGM will supply a cyanide antidote kit which contains sodium thiosulphate to be transported with the casualty.

RLGM has a formalised agreement with the local hospital, Red Lake Hospital, and this provider is aware of the potential for treating patients for cyanide exposure. RLGM is confident that the medical facility at Red Lake Hospital is adequate, has qualified staff, equipment and expertise to respond to cyanide...
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exposures. The hospital confirmed in a letter to the mine that it was aware that the mine uses cyanide and that they are prepared to manage any employee who has been exposed to cyanide. In addition, the hospital has a cyanide antidote kit provided by RLGM.

RLGM has conducted six mock drills during the recertification period. The scenarios include both exposure and release.
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

☐ in substantial compliance with ☐ not in compliance with Standard of Practice 7.1

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 7.1 which requires that the site prepare detailed emergency response plans for potential cyanide releases.

RLGM has developed several plans and procedures that address cyanide exposures and releases. These plans consider all reasonably foreseeable scenarios related to cyanide exposures and releases, including hydrogen cyanide gas generation, transportation accidents, releases during unloading, fires/explosions, rupture of vessels and piping, overtopping of ponds, power outages, rapid seepage, destruct system failure, and impoundment failure.

The cyanide producer (DuPont) and transporter (Miller or RSB) are responsible for spills and releases up to the time of offloading. However, RLGM is able to provide the first response to transportation accidents on the mine site, if required and asked to do so by DuPont staff.

Emergency response documents include procedures for clearing site personnel from the area of exposure, use of cyanide antidotes and first aid measures for cyanide exposure, decontamination procedures, control of releases at their source, and containment, assessment, mitigation and future prevention of releases.

The Municipality of Red Lake has an Emergency Plan that covers events such as clearing potentially affected communities from any areas of exposure. Staff from RLGM are involved in the update of this plan and its implementation. RLGM has a ‘special arrangement’ in providing knowledge, personnel and equipment, should the need arise in an emergency in the Red Lake area. The plan details the public warning system that is in place to ensure affected communities are evacuated.
Standard of Practice 7.2: Involve site personnel and stakeholders in the planning process.

☐ in full compliance with
☐ in substantial compliance with
☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:
The operation is in full compliance with Standard of Practice 7.2 which requires that the site involve site personnel and stakeholders in the planning process.

Worker input in developing and evaluating health and safety procedures is via direct communication between supervisors and operators and during pre-shift meetings and monthly safety meetings. An Occupational Health & Safety representative who is a worker representative is involved in all reviews of SOPs. Golder reviewed records of meetings where cyanide related topics were discussed.

Mill process workers, the surface response team and the on-site nurses have participated in cyanide related mock drills and subsequent evaluation of the drills.

The Red Lake District Fire Chief is the emergency response coordinator for the community and he is responsible for liaising with the community, through public town council meetings.

The Red Lake District Fire Chief has been consulted in the update of the Spill Response Plan and has been provided with the latest version of the plan. A letter from him was reviewed confirming that he has been provided with a copy of the October 2012 Surface Spill Plan.

The Red Lake Emergency Plan produced by the Municipality of Red Lake is discussed once a year at public meetings in Red Lake.

A copy of the “Surface Spill Response Plan” (2012) has been provided to the Municipality of Red Lake in August 2012. A letter dated March 1, 2013 from the fire chief confirming that they have a copy of the plan was reviewed.

The nurses, emergency medical technicians and the ambulance staff for the Red Lake Hospital as well as the Red Lake Fire Department and the Ontario Provincial Police received “Cyanide Awareness Training” from DuPont in May 2012 and June 2013.

The operation engages in consultation and communication with stakeholders to keep the Emergency Response Plan current. Employees at RLGM are volunteer firefighters and regularly communicate with Red Lake District Fire Chief who is the holder of the Municipality of Red Lake Emergency Plan.
addition, the Corporate Social Responsibility Manager is a member of the Red Lake Community Control Group and has a meeting with the Red Lake District Fire Chief every year to discuss and keep the emergency response plan current.

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

- [x] in full compliance with

**The operation is**

- [ ] in substantial compliance with
- [ ] not in compliance with

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

The operation is in full compliance with Standard of Practice 7.3 which requires that the site designate appropriate personnel and commit necessary equipment and resources for emergency response.

RLGM has designated appropriate staff equipment and other resources for emergency response. The “Surface Spill Response Plan” (Section 4.3) designates primary and alternate emergency response coordinators who have explicit authority to commit the resources necessary to implement the plans and procedures. It describes the duties and the level of authority of emergency response coordinators (The “Control Group”) for all site emergencies. The plan also includes training requirements for responders, call-out procedures, a call-out list with 24-hour phone numbers, a list of emergency response equipment and locations, and inspection procedures for emergency response equipment.

RLGM has confirmed that outside responders understand their roles in an emergency situation. In the event of an incident the Red Lake Hospital ambulance would be called upon to transport workers to hospital. The fire brigade would provide back up to the on-Site fire crew and the police would help in the event of an evacuation of the local area. The District Fire Chief has been consulted in the update of the Spill Response Plan and has been provided with the latest version of the plan. Golder has reviewed a letter from him confirming that he has been provided with a copy of the October 2012 Surface Spill Response Plan.

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

- [x] in full compliance with

**The operation is**

- [ ] in substantial compliance with
- [ ] not in compliance with

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

...
The operation is in full compliance with Standard of Practice 7.4 which requires that the site develop procedures for internal and external emergency notification and reporting.

The “Surface Spill Response Plan” and “SOP Emergency call out – notifying management” includes procedures and contact information for notifying Goldcorp management, the ERT, Government Agencies, Municipal Fire Department, the ambulance and hospital, local police, DuPont and community representatives.

The “Surface Spill Response Plan” contains procedures and contact information for notifying affected communities and the media. Notification of affected communities would be through the Municipal Fire Chief or designate using the Red Lake Municipal Emergency Plan as described in the plan.

**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.

- [x] in full compliance with

The operation is

☐ in substantial compliance with

☐ not in compliance with

**Standard of Practice 7.5**

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

The operation is in full compliance with Standard of Practice 7.5 which requires that the site incorporate in response plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals.

RLGM emergency plans specify specific remediation measures required for a range of solid and liquid cyanide releases, including tailings. These measures included detailed work procedures, clean up limits and instructions for the disposal of residuals.

Spilled cyanide solutions within the process plant will be returned to the process circuit. For spills of solutions outside secondary containment, emergency containment structures would be constructed, if necessary and possible, to minimize the extent of the release and prevent it from reaching natural drainages. Liquid or contaminated soils will be neutralized, as needed, with lime (liquid) and or soda ash to boost pH and minimize HCN gas generation.

The “Surface Spill Response Plan (Appendix F)” prohibits the use of chemicals (e.g., sodium hypochlorite, ferrous sulphate, or hydrogen peroxide) to treat cyanide released into surface waters.
The “Surface Spill Response Plan” requires that contaminated water and/or soils are monitored as necessary after a cyanide spill. The plan in the Appendix F, Section 16.3, describes procedures for water and soil sampling including methodologies, parameters, which laboratory to be used and possible sampling locations.

The public water supply for the Red Lake municipal area is unlikely to be affected by a release from the mine, as the intake is upgradient of RLGM. Nonetheless, RLGM would provide bottled water in the case of cyanide contamination.

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

- ☒ in full compliance with

**The operation is**

☐ in substantial compliance with

☐ not in compliance with

**Standard of Practice 7.6**

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

The operation is in full compliance with Standard of Practice 7.6, which requires that the site periodically evaluate response procedures and capabilities and revise them as needed.

The “Surface Spill Response Plan” is reviewed and revised annually. Verification was through interview with safety and environmental personnel and review of the “revision table” included in the front of the plan. The latest update of the plan was undertaken in October 2012 and one was about to take place. The revision table shows the plan was updated in July 2010, November 2011, September 2012, and October 2012.

RLGM plans require mock emergency drill to be conducted periodically. Six cyanide-related mock drills and three table top exercises related to sodium cyanide have been conducted since the initial audit.

RLGM has procedures in place to evaluate and revise its emergency response plans/procedures after a cyanide related emergency or following a mock drill, as necessary. The mock drill reports and table top exercise reports were reviewed. Following each mock drill an evaluation is undertaken that includes an assessment of the plans and procedures. These evaluations detail corrective actions, persons responsible and dates of when they should be completed and whether the action has been completed. The review of the June 2013 drill evaluation detailed that all actions had been completed.
PRINCIPLE 8 – TRAINING
Train Workers and Emergency Response Personnel to Manage Cyanide in a Safe and Environmentally Protective Manner

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

☐ in full compliance with

☐ in substantial compliance with Standard of Practice 8.1

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

Any employee, contractor or visitor to the Site is provided with induction training which consists of a 40 minute video entitled “Site Induction”. This training includes cyanide use, awareness, signage, storage, and reference to other cyanide courses.

RLGM has developed two levels of cyanide awareness training for employees and contractors depending on the potential level of cyanide exposure; Level 1 - General Awareness and Level 2 Advanced Cyanide Training.

Level 1 - General Awareness includes information on cyanide in mining, gold extraction, cyanide transportation including on the transportation route, cyanide facts and myths, cyanide production, hydrogen cyanide gas formation, areas throughout the mills where cyanide is used, HCN gas meters, exposure hazards, symptoms of cyanide exposure, exposure effects of HCN gas, RLGM’s cyanide related signage and cyanide antidote kit contents and locations.

Level 2 - Level 2 Advanced Cyanide Training is given to mill or maintenance employees who could be called upon to be a first responder to a cyanide release or incident. Level 2 training includes all the subjects in Level 1 training along with first aid procedures, spill response, cyanide solids spills, firefighting, toxicity, acute toxic effects, 24-hour response numbers.

Annual refresher cyanide training is given.

RLGM retains employee training records. Records for 2011, 2012, and 2013 were reviewed to verify compliance. The records reviewed included cyanide related training records and test results demonstrating an understanding of the training.
RLGM has a SAP database which details the course title and date of course for each employee and contractor and whether the employee passed any tests taken during training. Records of training for a number of employees working during the audit were checked.

**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.

- [x] in full compliance with

The operation is □ in substantial compliance with □ not in compliance with **Standard of Practice 8.2**

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

The operation is in full compliance with Standard of Practice 8.2 which requires that the site train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community and the environment.

All personnel in roles that involve the use of cyanide and cyanide management receive training on how to perform their assigned tasks with minimum risk to worker health and safety. Individual training is provided for each specific cyanide related task an operator will perform and includes cyanide standard operating procedures as required for their role.

Training elements for each specific job are identified in the training modules developed for each specific process area. These training elements involve “Common Core” and “Specialty” modules.

The Mill Common Core training includes mill induction, work safety, reagents handling, lock out/tag out, and a tour of both RLC and CC mills.

Speciality Core training includes conveyors, pumps operation manual sampling; mix and blend reagents, operate leach tanks and operate carbon stripe plant.

Verification was conducted through a review of task specific records for several cyanide operators and random interviews. Task specific training records for 2011, 2012, and 2013 were reviewed.

The training elements necessary for each job involving cyanide management are identified in the training materials. Training materials for Mill Orientation and Speciality training were reviewed.

Appropriately qualified personnel provide task training related to cyanide management activities. Supervisors providing the training have received Ministry of Training Colleges and Universities (MTCU) “Train-the-Trainer” training. To verify compliance the certificates from the “Train-the-Trainer Program”
provided by Norwest Training and Development to RLGM supervisors in 2011, 2012, and 2013 were reviewed.

All employees, contractors and summer students who are working with cyanide receive training prior to working with cyanide. Specifically, they receive induction training and Level 1 Cyanide Awareness training.

Refresher training on cyanide management is provided to ensure that employees continue to perform their jobs in a safe and environmentally protective manner. All employees attend an annual mandatory safety and training day. Forty-five minutes of the day is spent on cyanide training. Approximately 55 training days are taken to cover all employees with a maximum of 24 employees in each training session.

RLGM requires written tests to evaluate the effectiveness of cyanide training (Level 2). In addition, supervisors conduct job task observations at least twice a month. During a JTO a worker is observed performing a task such as acid wash preparation. A specific checklist that relates to the task is completed by the supervisor. Approximately 26 JTOs per month have been undertaken to date in 2013. Any area of the task that requires retraining is addressed during the JTO. A number of JTO sheets signed by both the worker and the supervisor were reviewed for a number of tasks involving the use of cyanide.

RLGM retains employee training records. The training records for 2011, 2012, and 2013 were reviewed to verify compliance. Records reviewed included cyanide related training records and test results demonstrating an understanding of the training.

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

- [x] in full compliance with
- [ ] in substantial compliance with
- [ ] not in compliance with

**Standard of Practice 8.3**

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

The operation is in full compliance with Standard of Practice 8.3 which requires that the site train appropriate workers and personnel to respond to exposures and environmental releases of cyanide.

All personnel responsible for unloading, mixing, production, and maintenance receive Level 2 Cyanide Awareness Training that includes first aid procedures and decontamination. Monthly safety meetings are used to reinforce training.
Annual refresher training for Level 2 Cyanide Awareness includes training in decontamination and first aid procedures. Cyanide response personnel also take part in both mock drills and table top exercises to put these skills to the test.

A number of interviews were carried out with responders to ensure the training they had received was effective. All interviewees were found to have a good knowledge of first aid and decontamination. Emergency Response coordinators at RLGM include members of the Surface Response Team, the security staff, the on-site nurses, all mill and maintenance operations personnel.

RLGM has its own capability for cyanide first aid, fire-fighting and HAZMAT. However, RLGM will rely on the Municipality of Red Lake fire brigades and spill control team in major fire and HAZMAT emergencies. In addition, RLGM also relies on the Red Lake Hospital for the treatment of patients for cyanide exposure.

A copy of the “Surface Spill Response Plan” has been provided to the Municipality of Red Lake during meetings between RLGM and municipality representatives at the Balmertown fire station.

RLGM employees receive annual refresher training that includes training on cyanide hazards and safety measures.

Following a mock drill an evaluation is undertaken and information on training deficiencies, if any, are detailed in the document and fed back to the training department.

Training records documenting the training received are retained throughout an individual's employment.
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

☐ in substantial compliance with

☐ not in compliance with

The operation is

Standard of Practice 9.1

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 9.1 which requires that the site Provide stakeholders the opportunity to communicate issues of concern.

RLGM provides the opportunity for stakeholders to communicate issues of concerns through in a number of ways. Concerns from members of the local community will be received at the gate house or they may use the suggestion box at the gate house. Activities are organized by RLGM for the general public such as the “Earth Day” and during the local “Norseman Festival”. The public can visit the Goldcorp website. RLGM regularly participates at first nation community meetings, as well as at meetings with communities, regulators, and external emergency agencies.

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

☑ in full compliance with

☐ in substantial compliance with

☐ not in compliance with

The operation is

Standard of Practice 9.2

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 9.2 which requires that the site initiate dialogue describing cyanide management procedures and actively address identified concerns.

RLGM interacts with stakeholders and provides them with information regarding cyanide management practices and procedures.

RLGM conducts community meetings which members of the general public and government leaders are encouraged to attend to discuss issues relating to the mining operations including the use of cyanide.

Activities organized by RLGM for the general public such as the “Earth Day” in April 2011 and 2012 enable easy contact with the Mine. Each July RLGM has a stand at the local “Norseman festival”. A pamphlet on Cyanide Code certification is available and distributed at these events. The pamphlet
includes information on the RLGM Code certification as well as emergency preparedness, process enhancements for reduced environmental impact and public consultation requirements.

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

☑ in full compliance with

☐ in substantial compliance with Standard of Practice 9.3

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

RLGM has produced written descriptions of the mine processes and the use of cyanide. A description of the mine processes and use of cyanide at both complexes is provided at Goldcorp website.

RLGM has developed a pamphlet on the Cyanide Code certification that is distributed during the Earth Day event, the Norseman Festival, Cultural Day Festival. The pamphlet includes information on RLGM’s Code certification including the installation of an INCO SO2 cyanide destruction circuit at CC.

The population is generally literate. RLGM provides information on cyanides in written format as described above as well as an oral form during meetings with stakeholders.

RLGM has not had any reportable release or exposure of cyanide on or off-site since the initial certification audit in 2010. Should there be a cyanide exposure or release procedures are in place for reporting to regulatory agencies, as required, within the corresponding regulatory timeframe. Spill reporting procedures are described in the “Surface Spill Response Plan” (2012). Regulatory entities would make the information on releases and exposures available to the public.
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