

SUMMARY AUDIT REPORT

for the December 2010
International Cyanide Management Code Audit



Prepared for:

Compañía Minera Mantos De Oro
and Kinross Gold Corporation

Submitted to:

International Cyanide Management Institute
888 16th Street, NW, Suite 303
Washington, D.C. 20006

FINAL

June 20, 2011

ENVIRON International Corp.

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SUMMARY AUDIT REPORT

Name of Operation: La Coipa Mine

Operation Owner: Kinross Gold Corporation

Mine Operator: Compañía Minera Mantos De Oro (MDO)

Name of Responsible Manager: Rolando Cubillos – Vice President/General Manager

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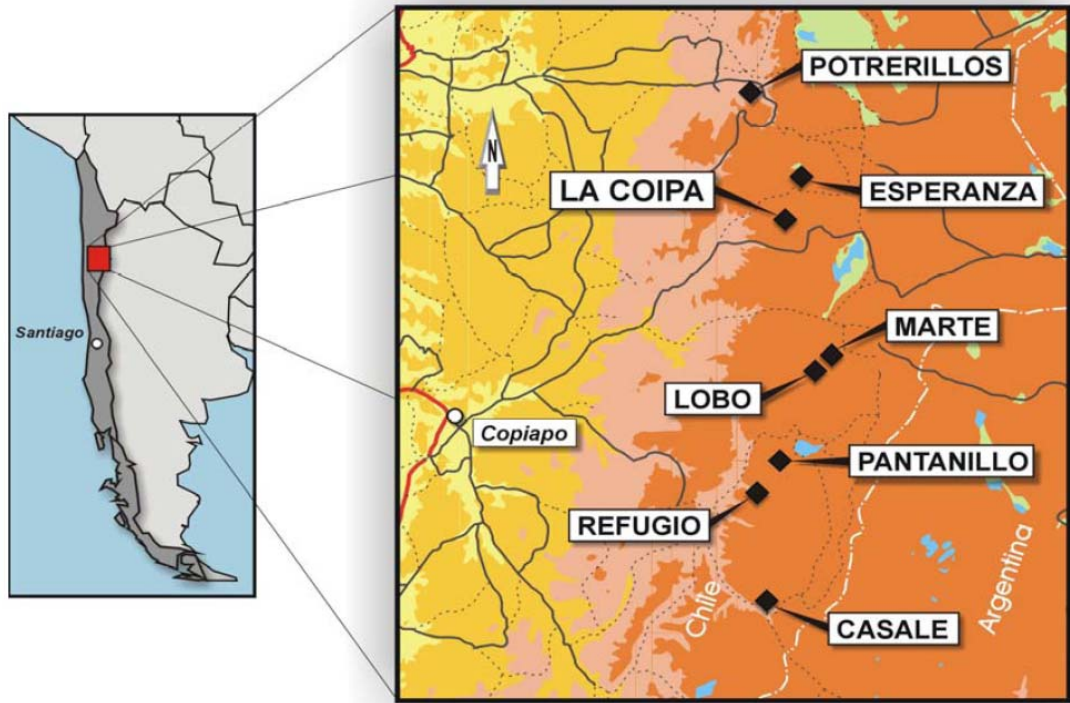
Location and Description of Operation:

The La Coipa open pit gold mine is located in the Maricunga mining district in the Atacama Region of northern Chile, approximately 1,000 kilometers north of Santiago and 140 kilometers northeast of Copiapó. Kinross Gold Corporation (Kinross) acquired a 50% ownership interest in La Coipa upon completion of the merger with TVX in January 2003, and then purchased the remaining 50% from Goldcorp Inc. in December 2007. Compañía Minera Mantos De Oro (MDO) is the Kinross operating company.

The current operation consists of four open pits, primary and secondary crushing plants, a mill, cyanide leach circuit, filtration plant and dry-stack tailings storage facility (TSF). Crushed ore is processed in a semi-autogenous grinding (SAG) mill followed by two ball mills. Following grinding, the slurry is thickened, and the thickened pulp (56% solid) is leached with cyanide in a series of eight carbon-in-leach (CIL) tanks. Pregnant solution from the leach circuit flows to the refinery, where a Merrill-Crowe process is used to extract the precious metals from solution, ultimately producing doré ingots as the final product. Underflow from the thickeners reports to the filtration plant for moisture removal and further thickening. Overland belt conveyers transport the final tailings (at approximately 20% moisture content) from the filtration plant to one of two deposition areas at the TSF, i.e., the main tailings pile (Rahco) or the auxiliary tailings pile (Rakito). The conveyors connect directly to a movable stacker system located at the main deposition area, where the tailings are deposited uniformly, in longitudinal strip piles and then spread and compacted by bulldozers.

The La Coipa operation is designed as a zero discharge facility, with no direct discharge to surface water. Since 2007, MDO has been operating a groundwater cutoff and collection/remediation system (Remediation Area) downgradient of the TSF, which functions to capture groundwater seepage from the TSF for treatment to reduce residual heavy metal concentrations and recycling back to the mineral separation process.

The location of the La Coipa project is shown in the following Figure:



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Auditors' Finding

The operation is: **in full compliance**
 ■ in substantial compliance * (see below)
 not in compliance



with the *International Cyanide Management Code*.

*The Corrective Action Plan to bring the operations currently noted as being in substantial compliance to full compliance status is attached (Attachment A). The Corrective Action Plan must be fully implemented within one year of the date of this audit.

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Audit Team Leader: John Lambert **e-mail:** jlambert@environcorp.com


Names and Signatures of other Auditors

Mark Montoya 
Glenn Mills 

Date(s) of Audit: December 13 – 17, 2011

I attest that I meet the criteria for knowledge, experience and conflict of interest for ICMC 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 ICMC Verification Auditors. I attest that this Detailed Audit Findings 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 ICMC Verification Protocol for Gold Mine Operations* and using standard and accepted practices for health, safety and environmental audits.

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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
 in substantial compliance
 not in compliance...with Standard of Practice 1.1

Discuss the basis for this Finding/Deficiencies Identified:

MDO purchases cyanide exclusively from E.I. du Pont de Nemours and Company (DuPont); MDO is identified as an “added party” under a 2008 contract originally established between Kinross’s Kupol mine and DuPont. Section 5 of the contract commits the Buyer and Seller (i.e., Kupol plus MDO as an added party) to maintaining ICMC certification and signatory status. The Kupol operation was certified to the ICMC in December, 2009. All cyanide purchased by MDO is manufactured in DuPont’s Memphis, Tennessee USA facility, which was recertified to the ICMC in December, 2009.

2. TRANSPORTATION Protect communities and the environment during cyanide transport.

Standards of Practice

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

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 2.1.

Discuss the basis for the Finding/Deficiencies Identified:

The current contract establishes DuPont’s responsibility for production and all aspects of transportation of cyanide to the MDO site. DuPont is contractually responsible for all

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aspects of cyanide safety and spill response during transport. The contractual requirements for ICMC compliance extend to DuPont's entire transportation chain which has been identified in correspondence with Kinross and MDO. DuPont's Chilean surface transportation contractor, Transportes Veresay Limitada (Veresay) delivers cyanide by truck convoy in steel intermodal containers from the Port of Antofagasto to a dedicated offloading facility next to a covered secure storage area adjacent to the Cyanidation Plant (Cyanide Mixing and Storage Facility). Cyanide is transported in steel intermodal containers that are sealed at the point of origin. Seals are broken upon receipt at MDO. Container labeling is in English and Spanish. MDO takes possession of the cyanide as individual plywood containers are removed from the intermodal container in an unloading bay adjacent to the storage area.

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
 in substantial compliance
 not in compliance...with Standard of Practice 2.2.

Discuss the basis for the Finding/Deficiencies Identified:

DuPont is contractually responsible for all aspects of cyanide transport. Contractual requirements for ICMC compliance extend to the following DuPont transportation contractors that could potentially be involved in shipments to Chile, all of which have been certified to the ICMC:

- Intermodal Cartage Company, Memphis, Tennessee (DuPont's Memphis production facility to railhead);
- Canadian National Railway (railhead to designated Port of Export, i.e., Jacksonville, Long Beach, Los Angeles, Miami, New Orleans, San Pedro, or Seattle);
- Various designated ocean carriers (American President Lines, Mediterranean Shipping Company, Hamburg Sud, Maersk, or Seaboard) to destination Port in Chile (Antofagasta); certified via audit of DuPont's Global Ocean Supply Chain: and,
- Transportes Veresay Ltd. (Port of Antofagasta to MDO).

Shipping papers provided by Transportes Veresay Ltd. to MDO only document chain of custody from the point that containers are (directly) offloaded from the ocean carrier in Antofagasta, to the point of delivery at MDO. Upstream chain of custody documentation prior to delivery to the Port of Antofagasta is not provided to MDO. However, all

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potential transporters involved in the transport of cyanide from DuPont's Memphis facility to MDO have been identified and are certified to the ICMC. Maintenance of chain of custody records within each other transportation segment is addressed as an element of each of the corresponding ICMC supply audit reports and was examined and found to be acceptable in each of the SARs posted for the noted audits.

3. HANDLING AND STORAGE Protect workers and the environment during cyanide handling and storage.

Standards of Practice

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

The operation is: in full compliance
 ■ in substantial compliance
 not in compliance...with Standard of Practice 3.1.

Discuss the basis for this Finding/Deficiencies Identified:

MDO receives sodium cyanide in solid briquette form, packaged in nylon super-sacks and standard plywood crates. The cyanide boxes are stored separately from incompatible materials on a large, roofed, concrete pad (i.e., the Solid Cyanide Storage Facility) located adjacent to the Cyanidation Plant (Cyanide Mixing and Storage Facility). MDO also stores a number of cyanide boxes in the Cyanidation Plant for ready access during mixing events.

Mixing (primary and reserve tanks) and storage tank are located within the Cyanidation Plant building. The cyanide storage tank is fitted with an electronic tank level indicator that can be monitored from a central control room, as well as a high-level alarm. Concrete secondary containments are provided for the mixing tanks and the cyanide solution storage tank. Subsequent to the field portion of the audit, but prior to the submittal of this report, multiple procedural and equipment upgrades and other corrective actions were complete, in order to better ensure that the facility meets sound and accepted engineering practices. These modifications and improvements included:

- A metal shroud or extension was installed on top of the hopper above the mixing tank to help center the super-sack as it is dropped on the cutter and any overspray from the rinsing operations;

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- A permanently plumbed combination emergency eyewash/shower assembly was installed on the mixing deck;
- The primary cyanide pump maintenance drain valves were replaced and are now fitted with safety pins to prevent inadvertent operation of the valves while the pump is in operation;
- Mixing procedures were modified to require three rinses of the super-sack interior and to emphasize prohibitions on manual shaking of the cut super-sack; and
- The hooks and safety clasps on the chain bridles used for lifting super-sacks were replaced.

These modifications were verified by review of photographic evidence of the updated hopper arrangement, replacement of piping system components associated with the cyanide mixing and storage tank discharge pump system, and by review of updated mixing procedures and associated training records.

As all mixing operations observed in the onsite portion of the audit were conducted by two operators using appropriate personal protective equipment, HCN alarms and mixing systems were functional, and secondary containments were adequately sized, it is the auditor's judgment that although the conditions leading to the noted corrections represented potential human health and safety and environmental risks, such risks were not immediate or substantial.

Adequate ventilation is provided in the open-air Solid Cyanide Storage Facility. Air extractors are installed on the mixing and dosing tanks located within the Cyanidation Plant; however, MDO must improve the ventilation within the building since cyanide is stored within the building in both solid and liquid form, because the cyanide mixing operation takes place on an elevated platform (i.e., on the second level) within the building, and because there are no exhaust fans. Please refer to Corrective Action Request (CAR) **MDO-ICMC-CAR-01** in Attachment A.

The cyanide unloading, storage and mixing areas are located near the center of the mill complex, several kilometers away from the man camp and over 40 kilometers distant from the nearest human habitation. There are no surface water features on or adjacent to the mine site; the mine is located in an extremely arid high desert climate. The only precipitation recorded at the site consists of very light snow; rainfall has never been recorded. The cyanide boxes and tanks within the Cyanidation Plant are adequately protected from potential contact with water. Considering the extremely dry climate at the La Coipa site, the open-air Solid Cyanide Storage Facility also serves to adequately minimize the potential for contact of solid cyanide with water.

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The fence enclosing the Solid Cyanide Storage Facility is posted with proper signage and secured by a locked gate. The main gate is posted with a sign restricting access to authorized personnel only. A separate ingress/egress point exists at the northwest corner of the pad, which is also secured by a lock and posted with a sign restricting access to authorized personnel only.

With completion of the above-noted modifications made within the Cyanidation Plant, all valves within the facility that allow direct access to reagent-grade cyanide solutions are now fitted with security devices to prevent inadvertent exposures to high-strength cyanide solution.

A stationary Hydrogen Cyanide (HCN) monitor is located inside the Cyanidation Plant on the upper level of the mix area, which continuously monitors HCN levels inside the facility. The monitor is equipped with a visual/audible alarm system with low-level and high-level triggers. MDO also monitors the HCN levels and alarm system remotely. As previously mentioned, the plant building, although not locked, is restricted (posted) to authorized personnel only. A chain barrier holding a restricted access sign serves to secure the overhead door entrance, while the door typically remains open. Only personnel with proper training are allowed to enter the facility. Therefore, based on these observations, no immediate or substantial risk to health, safety or the environment is deemed to exist during the period of time necessary to resolve CAR **MDO-ICMC-CAR-01**.

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

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 3.2.

Discuss the basis for this Finding/Deficiencies Identified:

Rinsed cyanide supersacks and plastic moisture barrier material are transported to a dedicated warehouse holding area for hazardous waste; disposal is contracted to a licensed hazardous waste hauling and disposal company. The plywood overpacks are crushed and burned in a designated burn area at the toe of the TSF and the wood residues covered by tailings after completion of the burn event.

A single “Cyanide Preparation” procedure governs all aspects of the mixing process, and has been updated as noted in Section 3.1. Subsequent to the field audit, MDO provided copies of procedures which address the safe operation of forklifts and the stacking of

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cyanide crates, as well as actions to be taken in the event that water accumulates in the warehouse. However, with the installation of a new roof over the briquette storage area, and given the low precipitation at the site and control measures recently established to manage solution overflows, accumulation of water in the warehouse area is highly unlikely. Copies of both procedures and associated training records were provided to the audit team for review.

During a mixing event, although the operators were observed to be wearing appropriate PPE, including tyvek coveralls, hard hats, full-face respirators, and rubber gloves and boots, the effectiveness of the seals on the full face respirators was questionable, as they were strapped on over the hood of the coveralls, and at least one operator had several days' beard growth. Appropriate retraining was subsequently required that focused on respirator fitting, hygiene, and seal test protocols for all mixing plant operators and all other MDO personnel working in areas for which respiratory protection against cyanide exposure is required. Records of re-training were provided and reviewed by the audit team prior to submittal of this report.

As all mixing operations observed in the onsite portion of the audit were conducted by two operators (using appropriate PPE that was functionally separate from the condition noted), emergency eyewashes and showers were available, and HCN alarms were functional, it is the auditor's judgment that although the conditions leading to the noted corrections represented potential human health and safety risks, such risks were neither immediate nor substantial.

4. OPERATIONS Manage cyanide process solutions and waste streams to protect human health and the environment.

Standards of Practice


4.1 Implement management and operating systems designed to protect human health and the environment including contingency planning and inspection and preventive maintenance procedures.

The operation is: in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 4.1.

Discuss the basis for the Finding/Deficiencies Identified:

The active cyanide facilities at the MDO operation include grinding mill, solid cyanide storage area; Cyanidation Plant (Cyanide Mixing and Storage Facility), cyanide leach circuit, pregnant solution tanks, barren solution tank, counter-current decantation (CCD) thickener tanks, clarifying cones, process tanks, filtration plant; overland belt conveyors

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(for tailings disposal); tailing storage facility, mill pond, refinery pond, emergency pond, concrete containments and associated pump/pipeline systems.

MDO has developed written management and operating plans and procedures for the cyanide facilities. The operating plans and procedures developed and implemented by MDO cover the safe operation and management of the facilities. In addition to the management and operating plans, procedure documents include a wide range of MDO departmental standard operating procedures (SOPs). Operating procedures specific to the cyanide facilities are managed as part of MDO's certified ISO 14001 Environmental Management System (EMS). The EMS includes processes for periodically assessing and improving the effectiveness of all environmental management practices, including management of cyanide.

The MDO plans and procedures identify the assumptions and parameters on which the facility design was based as well as applicable regulatory requirements. The La Coipa operation is not subject to regulatory requirements for operating process facilities (i.e., the mill, plant and pond systems), including requirements for maintaining freeboard in the ponds. Facility designs are based on operational requirements only. MDO uses the millennium (1,000-year, 24-hour) storm to forecast water management requirements.

The TSF is permitted under through the Department of Mining Industry. The "dry-stack" design was implemented to reduce the possibility of liquefaction since the area is seismically very active, and to prevent seepage from the tailings. Additionally, there were no suitable sites identified for construction of a dam for conventional tailings storage. The Filtration Plant is designed to dry the tailings to allow a tailings slope configuration that has a wide margin of safety for both static and earthquake conditions. Prior to transporting the tailings to the TSF, MDO adds Ferrous Sulfate to the final tailings at the filtration plant in order to neutralize the cyanide.

The operating plans and procedures describe the standard practices necessary for the safe and environmentally sound operation of the cyanide facilities. These include a procedure for managing process solutions and maintaining the associated containment facilities within the process areas (i.e., the containments, pumps, drains and valves) in good condition on a daily (per shift) basis, and for inspecting the available pond capacities monthly; a procedure for generating a monthly water balance and for corrective actions required for ensuring that adequate storage capacity is maintained in the Emergency Pond to retain process solutions during upset conditions; and a procedure for maintaining equilibrium of solutions within the general circuit of the process plant on an hourly basis. Routine inspections are conducted of the cyanide facilities. MDO has also implemented a comprehensive maintenance program, which includes preventative maintenance (PM) of the critical components of the active cyanide facilities.

Review, approval, revision, updated, and controlled distribution of MDO's suite of standard operating procedures is managed within the context of its ISO 14001

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environmental management system (EMS). For changes in process, equipment and/or infrastructure, MDO employs a Kinross Authorization for Expenditure (AFE) process for process or facility changes above \$50,000 in value. Pursuant to a directive from the General Manager, all AFEs require review and approval by the Environmental and Safety Superintendents. The environmental and health and safety reviews are guided by a detailed checklist, and include specific requirements for considering ICMC compliance requirements as part of the review. However, no provisions were currently made for ensuring environmental and health and safety reviews are conducted for work associated with process changes less than or equal to \$50,000 in value but which may nevertheless have or increase the likelihood of a cyanide release. Subsequent to the field audit, a combined (environmental and health and safety) management of change procedure was finalized to address changes valued <\$50,000. The current AFE process was retained for this purpose and incorporated by reference for all change actions ≥\$50,000 in value. Both the AFE- and internal project-level actions require generation of a change review form documenting the review, approval, and as necessary, specific EHS guidance or emphasis. See also Section 6.1.

Because the major portion of the corrective actions taken in preparing the site for ICMC registration and in resolving various action items requested by the audit team during the preparation of this report were funded and conducted using the AFE process (which involved routine reviews by environmental and health and safety management and specifically included ICMC considerations), it is the audit team's judgment that no immediate or substantial risks to human health or the environment were incurred in the time period in which the noted condition was resolved.

Operating procedures provide contingency measures to take in response to potential upsets in operational conditions. The water balance procedure and model includes a formal contingency procedure that provides clear guidance to address upset conditions (e.g., when the solution level in the Emergency Pond is above the maximum operating level identified by the water balance model). During periods of primary line power outages, crushing and milling equipment is shut down, and only critical equipment in the process circuit is operated, via diesel-powered emergency generators and procedures are in place for operating these during periods of primary power outages. The Operational Contingency Plan for the Water Remediation Plant provides procedures for continued operation and monitoring of the water treatment plant at the Remediation Area during force majeure events (i.e., uncontrollable events such as staff shortages, power outages, sabotage, etc.), and the *La Coipa Closure Plan Task* provides for ongoing groundwater quality monitoring following closure to ensure that, at the end of 30 years, groundwater is decontaminated.

With the exception of the contingency procedures for the water treatment plant and ongoing groundwater monitoring, MDO did not present contingency procedures, which provide actions to take in response to conditions of temporary closure or cessation of operations. Please refer to CAR **MDO-ICMC-CAR-02**. MDO's existing operating and

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monitoring procedures demonstrate its commitment to properly manage the La Coipa operation's cyanide facilities. Contingency measures are in place for responding to immediate, potential upsets in operational conditions. Therefore, no immediate or substantial risk to health, safety or the environment is deemed to exist during implementation of this CAR.

Operations personnel conduct daily general visual inspections of the process areas and tanks daily. The Maintenance Department generates weekly planning programs for both mechanical and electrical systems, which include inspections of tanks, pipes, valves and pumps, and related instrumentation. The Environmental Department and the Risk Prevention Department perform weekly and monthly inspections of the entire operation, respectively. Environmental inspections include pond levels, secondary containments, and observation of wildlife. The Metallurgy department conducts daily inspections of the Emergency Pond level for use in maintaining the water balance.

MDO uses an external contractor, managed by Plant Operations, to maintain topographic control and moisture consistency of the TSF. Although MDO does not currently have a program whereby a qualified engineer conducts periodic inspections of the TSF to ensure structural stability, stability assessments are performed ahead of facility expansions by qualified engineers. The most recent stability assessments were completed in 2004 and 2008, in advance of any planned expansions. Additionally, the University of Atacama performs monthly tests on the TSF material (e.g., density, granulometry) to verify that the compaction of the material meets the specifications designed to ensure stability.

Generally, major issues identified during all routine inspections requiring corrective action, are recorded on form *Inspección Operacional* for entry into the *Informe de Incidente* (Report of Incident) program, which is used to report and track all major incidents occurring on site through completion of corrective actions. Minor issues are photographed and communicated to appropriate personnel and then reported to the Maintenance Department, as necessary.

Operations personnel interviewed during this onsite verification audit indicated that general visual inspections of the process tanks for signs of corrosion and leakage are performed daily. The Maintenance Department also conducts routine visual inspections of process tanks. Additionally, MDO recently completed a comprehensive inspection of all (44) process tanks containing cyanide solution. The review, completed by an outside contractor, included performing ultrasonic thickness testing on the tanks according to the American Petroleum Institute (API) 650 standards and visually inspecting the associated support structures. The contractor rectified all deficiencies identified during the inspection and indicated that the tanks were certified as structurally competent for a period of five years.

Environmental personnel inspect the concrete secondary containments for structural integrity and available capacity as part of the weekly general inspections conducted by

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the Environmental Department. Representative inspection reports reviewed during this onsite verification audit demonstrated that containments with accumulated sediment/solution and damaged/deteriorated concrete are being identified and reported for corrective action. Nonetheless, during the onsite audit, several concrete containment walls were damaged and required repair. Additionally, the majority of containments had sediment and/or solution and slurry in them, preventing inspection of the containment floors.

Therefore, following the onsite audit, MDO initiated work to clean out and repair the containments. A summary of the work performed to repair damaged concrete is documented in a report prepared by the contractor titled, "Repair of Parapets and Concrete Slabs," dated April 4, 2011. Although the report documents the construction techniques and materials used to perform the repairs, additional documentation is necessary to demonstrate that all necessary repairs were made and to verify the current condition of all concrete secondary containments. Please refer to CAR **MDO-ICMC-CAR-03**. The secondary containments do not have drains that release to the receiving environment.

MDO has three, double-lined process ponds with leak detection systems (LDS). These ponds include the Refinery Pond, the Emergency Pond, and the Remediation Pond (a.k.a. Rahco Pond). In the weeks prior to this onsite verification audit, MDO began monitoring the LDS for these ponds. MDO has since provided LDS monitoring results for measurements taken during the months of December 2010 through April 2011. The results show continued leakage (i.e., solution collected in the LDS) in the Refinery Pond, the Remediation Pond and the Emergency Pond.

Consequently, MDO is currently emptying the pond system to investigate and repair the upper liners in accordance with procedure P-MA-007. Ultimately, MDO must complete the pond repairs and demonstrate that the liner systems and LDS for each pond are operating according to design (see CAR **MDO-ICMC-CAR-03**).

The Maintenance Department generates weekly planning programs for both mechanical and electrical systems, which include inspections of pipes, valves and pumps, and related instrumentation such as automatic tank level indicators. The solution level in the Emergency Pond is the primary control for maintaining the operational water balance. This pond level is continuously monitored online in the Refinery and Filtration Plant control rooms. Although not yet operational, MDO has plans to implement an alarm system to notify control room operators when allowable pond levels have been exceeded. Additionally, the Metallurgy department conducts daily inspections of the Emergency Pond level for use in maintaining the water balance. Due to the extremely dry conditions at the site, the La Coipa operation does not have surface water diversions or other stormwater controls other than a rock-filled (riprap) channel along the west edge of the TSF, which serves to channel snowmelt around the dry-stack facility. MDO

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Environmental personnel indicated that this channel is not inspected on a routine basis (see CAR **MDO-ICMC-CAR-03**).

During the facility inspection conducted by the auditors, certain deficiencies were observed with the elements listed under inspection requirements. Issues observed included secondary containments in poor condition and/or containing sediment/solution, formation of cyanide salts on equipment and facilities (primarily in the Cyanidation Plant) indicating leaking pumps and valves, and general housekeeping issues. Additionally, there was not a sufficient inspection/monitoring history of the LDS installed in the double-lined ponds to demonstrate that the ponds are being properly managed to protect seepage. For these reasons, there is concern that the inspection program is not sufficiently identifying deficiencies with the cyanide facilities in a proactive manner. Although the PM program is functioning well to keep the facilities and systems operational, the corrective maintenance, repair, and housekeeping components associated with issues identified during inspections was not apparent in all cases. Therefore, MDO must establish a formal and comprehensive inspection program that is effective in identifying repair needs, maintenance issues, and potential upset conditions for all cyanide process areas and facilities and must demonstrate its implementation over a reasonable period (see CAR **MDO-ICMC-CAR-03**).

Although not comprehensive at the time of this onsite audit, MDO has implemented a program for inspecting and maintaining its cyanide facilities on a routine basis and has identified those facilities currently requiring repair as well as deficiencies in the program that must be addressed under this CAR. Accordingly, MDO has established an AFE, a mechanism that secures and allocates money for implementation of the corrective measures. Furthermore, subsequent to the onsite audit and prior to completion of this final report, MDO provided photographic evidence demonstrating removal of cyanide salts from process pipes and equipment within the Cyanidation Plant and developed new inspection checklists for documenting routine inspections of cyanide facilities. MDO's existing operating and monitoring procedures and resulting water quality history, demonstrate that the La Coipa operation's cyanide facilities protect against cyanide exposures and releases to the environment. Therefore, based on these statements, no immediate or substantial risk to health, safety or the environment is deemed to exist during implementation of **MDO-ICMC-CAR-03**.

As discussed previously, major issues identified during all routine inspections requiring corrective action are recorded on an Operational Inspection form for entry into the Report of Incident program, which is used to report and track all major incidents occurring on site through completion of corrective actions. The Operational Inspection form includes the date and time of the inspection, the name of the inspector, a description of the deficiency, the required corrective action, and general observations. The Report of Incident form records the type and cause of incident, location, date and time, name of the investigator, associated costs and corrective actions. The corrective actions list the responsible parties, timeline for completion, and check-off for completion. MDO retains

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the Operational Inspection forms in hard copy format and the Reports of Incident in electronic format within the EMS database.

Minor issues identified during inspections are photographed and communicated to appropriate personnel and then reported to the Maintenance Department, as necessary. The auditor reviewed photographic documentation of various weekly inspections performed by the Environmental Department and the associated follow-up correspondence with Area Supervisors. Once issues identified by the Environmental Department have been resolved, the responsible Area Supervisor documents completion via e-mail.

The Environmental Department uses a checklist to document wildlife inspections at the ponds. For each pond, this checklist includes species observed, general observations (i.e., use of pond, distance from pond and behavior), climate, and mortalities. The name of the inspector and the date are also recorded. The solution level in the Emergency Pond is the primary control for maintaining the operational water balance. This pond level is continuously monitored online in the Refinery and Filtration Plant control rooms. The Metallurgy department records its daily inspections of the Emergency Pond level and Environmental personnel record weekly monitoring episodes of the leak detection systems at the double-lined ponds. Routine inspections performed by the Maintenance Department are documented and retained electronically on the SAP© software system used to manage the program. Maintenance records include weekly planning schedules and work orders.

MDO must review its current inspection program to ensure that all components of the cyanide facilities are being inspected on a routine basis and that the inspections are being properly documented. Aside from the reports for major incidents, maintenance records, the weekly LDS, facility and wildlife inspections performed by the Environmental Department, and evidence of online monitoring of the Emergency Pond solution level, MDO did not provide inspection checklists or logbook records during the onsite audit demonstrating that inspections of cyanide facilities are being conducted on a routine basis. As an example, although MDO personnel indicated that process tanks are inspected daily for signs of corrosion and leaks, there is no evidence of these inspections. Although, MDO developed and provided evidence of new inspection checklists subsequent to the onsite audit, the operation must demonstrate implementation of a comprehensive inspection program, which covers all necessary cyanide facilities and components. Inspections must appropriately document problem areas that require repair as well as completion of such repairs. All of these elements should be addressed in inspection forms that document any deficiencies observed, the resulting written work requests, and the nature of corrective actions taken. Please refer to CAR **MDO-ICMC-CAR-03**.

As discussed above, MDO has implemented a program for inspecting and maintaining its cyanide facilities on a routine basis. The corrective action required under this CAR

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serves to improve MDO's procedures for documenting these inspections. Therefore, no immediate or substantial risk to health, safety or the environment is deemed to exist during implementation of **MDO-ICMC-CAR-03**.

MDO has implemented a comprehensive maintenance program, which includes PM of the critical components of the active cyanide facilities. The PM schedule provides a listing of the equipment along with the planned schedule for maintenance. The PM system is managed using SAP© software, which automatically produces PM work orders on an established schedule. The SAP© system identifies future activities for regular PM and includes information on the task requirements and completion. The SAP© software is used to generate and retain all documentation for scheduled/programmed maintenance work. Corrective maintenance activities are documented by work orders, which are generated manually and electronically.

The La Coipa operation has five diesel-powered emergency generators (four in service and one on standby), which are used to power critical equipment during primary (line) power outages. Critical equipment operated during primary power outages includes tank agitators, the Leach Circuit, Filtration Plant, Refinery, pond systems, the groundwater remediation system, the Mill thickener and most pumps. MDO starts the generators and tests the electrical systems weekly and the generators are serviced based on hourly use (i.e., 250-hour and 500-hour schedules). Maintenance records for the emergency generators were reviewed and include a summary of PM guidelines for the generators, corresponding work orders, and the Power House inspection journal, which documents services performed on the emergency generators.

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

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 4.2.

Discuss the basis for this Finding/Deficiencies Identified:

MDO uses a consistent cyanide addition rate and does not vary the cyanide addition rates in the mill based on ore types or other process variables. An automatic titration system (TAC 2000) is used to regulate cyanide concentrations in leach solutions. MDO performs manual titrations every two hours to confirm cyanide concentrations in the leach tanks. Manual titration results are recorded on the Daily Report.

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4.3 Implement a comprehensive water management program to protect against unintentional releases.

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 4.3.

Discuss the basis for the Finding/Deficiencies Identified:

MDO has developed a comprehensive, probabilistic, water balance model, using Microsoft© Excel© software, which tracks water flow throughout the engineered water management facilities at the site. The water balance model considers inflows to and outflows from the process facilities, and accounts for the operating volume in the Emergency Pond and the design storm event. The model, which was designed by MDO personnel and implemented in October 2010, is maintained and updated monthly by the Metallurgy Department.

The La Coipa operation does not employ heap leach processing methods. Dewatered tailings are deposited in the dry-stack TSF at the planned rate of 700 tonnes per hour (tph). MDO inputs planned and actual milling rates into the water balance model monthly. MDO uses the millennium (1,000-year, 24-hour) storm to forecast water management requirements, although the water balance model can be used to evaluate conditions for variable storm events as well. The precipitation amount for the design storm event is 100 millimeters. As snow accumulation is negligible, the model does not consider freezing and thawing. Precipitation data is collected instantaneously at a meteorological station located next to the Emergency Pond and input monthly into the water balance model. Evaporation is calculated monthly as a percentage of the freshwater added to the process, water recycled from the remediation area, and the moisture entrained in the ore. Evaporation and the moisture content of the tailings are the only solution losses accounted for by the model. The groundwater collection and remediation facility (Remediation Area) located directly downgradient of the TSF, collects any seepage from the TSF and returns it to the process.

The model does not consider the effects of potential power outages and equipment failures. The La Coipa operation has five diesel-powered emergency generators, which are used to power critical equipment during primary power outages.

Operation procedures include the requirement to measure solution levels in the ponds, CIL tanks, and CCD thickeners at the end of each month. The Metallurgy department also conducts daily inspections of the Emergency Pond level for use in maintaining the water balance. This process inventory data consists of the measured levels at the start and end of each month. The Emergency Pond volume is calculated based on the total pond volume and the percent utilized. When the solution level in the Emergency Pond is

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above the maximum operating level identified by the water balance model, the procedure includes specific corrective actions for reducing the freshwater input to the system until the water levels are returned to normal operating conditions. Necessary adjustments are based on daily, weekly and random monitoring of solution inventories.

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

The operation is: in full compliance
 ■ in substantial compliance
 not in compliance...with Standard of Practice 4.4.

Discuss the basis for the Finding/Deficiencies Identified:

In addition to the concrete secondary containments provided at the milling and process areas, MDO relies on the lined pond system (i.e., the Mill Pond, the Refinery Pond, and the Emergency Pond) for secondary containment during large upset events. Due to recurrent upsets, past operating practice has been to store process solutions in these ponds long term, with WAD cyanide concentrations exceeding 50 milligrams per liter (mg/l). These ponds are surrounded by four-foot high wire mesh fencing to restrict access by terrestrial wildlife. However, at the time of this audit, netting, bird balls or other physical deterrent systems had not been implemented to protect avian wildlife. Additionally, sections of the fencing surrounding the process ponds were in need of repair. Please refer to CAR **MDO-ICMC-CAR-04**.

MDO recently commissioned an expert to assess the bird species in the area of the La Coipa operation. The study was conducted in October 2010 by an avian ecologist with specific expertise in Chilean birds. The findings of the assessment are presented in the report titled, “*Birds of Mina La Coipa, Atacama Region, Chile, and Assessment of Potential Interactions with Mine Procedures.*” The report concludes that birdlife in the area is relatively poor, both in terms of species richness and diversity, because of the extreme high-elevation, desert-zone location. Additionally, the La Coipa site does not appear to be on an important flight path for Andean water birds. Longer distance migrants, in particular sandpipers, are the major potential users of the solution ponds at the La Coipa operation. Ducks and other waterfowl, or flamingos are not expected to be drawn to the ponds.

During this onsite audit, the Mill Pond was completely dry, the Emergency Pond contained a small amount of solution, and the Refinery Pond was full. Prior to this onsite audit, MDO had begun emptying the Rahco Pond (i.e., pumping water to the Refinery Pond) to investigate and repair the upper liner. Due to process implications caused by the chemistry of the water being pumped from the Rahco Pond to the Refinery Pond, MDO

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had not yet begun returning solution stored in the Refinery Pond to the process, and consequently could not completely empty the Emergency Pond (i.e., pump the stored solution to the Refinery Pond).

Subsequent to this onsite audit, MDO revised its operating procedures to address timely cleanout of the Mill Pond and the Emergency Pond following process upsets (i.e., within 96 hours after conditions return to normal), so that these two ponds function only as temporary, secondary containment and not to store process solution long term. Additionally, MDO revised its wildlife monitoring procedure to increase the frequency of wildlife monitoring at these ponds following upset events, when the ponds contain solution. As a result, MDO has no current plans to implement physical deterrent systems at the Mill Pond or the Emergency Pond to protect avian wildlife.

The Refinery Pond system, which includes a lined pond and two concrete catchment basins designed to capture sediment from process overflow slurry prior to entering the pond, will continue to be used to store process solution containing WAD cyanide concentrations greater than 50 mg/l. Additionally, WAD cyanide concentrations in the water stored in the Remediation Pond (a.k.a. Rahco Pond) exceed 50 mg/l on a consistent basis. Therefore, MDO has committed to installing physical deterrent systems at these two ponds to protect avian wildlife (see CAR **MDO-ICMC-CAR-04**).

MDO has not yet installed the avian deterrent systems at the Refinery Pond and the Remediation Pond due to the ongoing efforts to empty the ponds and repair the liner systems (see Section 4.1 above). Nevertheless, MDO has made a good faith effort to address the deficiency described under this Standard of Practice by: 1) commissioning an avian ecologist with specific expertise in Chilean birds to assess the bird species in the area of the La Coipa operation in October 2010 (*Jaramillo, A., November 2010, Birds of Mina La Coipa, Atacama Region, Chile, and Assessment of Potential Interactions with Mine Procedures*); 2) revising its operating procedures to keep the Mill Pond and Emergency Pond dry, except immediately following upset events; 3) increasing its wildlife monitoring frequency (from weekly to daily) at these ponds following upset conditions, when the ponds contain solution; and 4) investigating and taking steps towards implementing avian deterrent systems, which consider the bird species identified at the La Coipa operation, the local environment (including habitat and climate), and the specific characteristics of the operation with special regard to the Refinery Pond and the Remediation Pond.

Observations of birdlife at the La Coipa operation are very rare and there has been only one cyanide-related bird mortality reported thus far. MDO has since removed the sedimentation that had created a small beach area at the Emergency Pond, which was thought to have contributed to this mortality event. These potential events are likely most probable during migratory periods, October through November for the southbound migration and March through April for the northbound migration (Jaramillo 2010). Therefore, based on the above statements, no immediate or substantial risk to health,

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safety or the environment is deemed to exist during implementation of this CAR; however, further assessment regarding the relative environmental impact of the noted CAR item will be made after the resolution of any interim actions or preparation of final CAR documentation.

4.5 Implement measures to protect fish and wildlife from direct and indirect discharges of cyanide process solutions to surface water.

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 4.5.

Discuss the basis for the Finding/Deficiencies Identified:

The operation does not have a direct discharge to surface water. MDO monitors surface water at four sampling locations downgradient from the operation; a natural spring (Afloramiento); a section of the intermittent stream (Quebrada La Coipa) downgradient from the spring; a surface water collection dam (Tranque) where surface water collected from the Quebrada La Coipa is allowed to infiltrate to groundwater; and at an infiltration area downgradient of the Remediation Area, where upgradient groundwater pumped around the Remediation Area (via a by-pass system) is discharged downgradient of the Remediation Area and allowed to infiltrate back into groundwater.

Although total cyanide concentrations measured in surface water over the period January through November 2010 indicated that the free cyanide concentration allowed by the ICMC for protection of aquatic life (i.e., 0.022 mg/l) was possibly exceeded during this period, there are no downgradient perennial streams or other surface waters located within the area of the operation. The Quebrada La Coipa is an ephemeral drainage, which flows only in response to direct precipitation and snowmelt. No fish or amphibians were observed at La Coipa by the biologist while on site, and previous reports do not list any fish or amphibians at the site to suggest that aquatic life are present.

There is not a regulatory numerical standard for cyanide in surface water, nor is there a designated beneficial use of surface water downgradient of the site. MDO monitors cyanide concentrations in surface water for reference only.

4.6 Implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of ground water.

The operation is: ■ in full compliance
 in substantial compliance

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not in compliance...with Standard of Practice 4.6.

Discuss the basis for the Finding/Deficiencies Identified:

The operation utilizes a system of concrete containment structures and synthetic-lined ponds for management of process solutions outside of process tanks, vessels and other facilities. With the exception of certain process pipelines (see Section 4.7 below), the overland conveyors to the TSF, and the TSF itself; the remaining process facilities are within concrete, secondary containment areas, many of which are interlinked and feed to the pond system. The ponds include the Mill Pond, the Refinery Pond (including two adjoining concrete catchment basins), the Emergency Pond, and the Remediation Pond (a.k.a. Rahco Pond). The Emergency Pond, Refinery Pond, and Remediation Pond (Rahco Pond) are double-lined with High Density Polyethylene (HDPE) and incorporate leak detection systems. The Mill Pond is single lined with HDPE and has a concrete ramp along the center portion of its bottom, which provides equipment access for sediment removal.

The TSF is an unlined, dry-stack facility. Additionally, MDO has been operating a groundwater remediation system (the Remediation Area) since 2007 to treat contaminated groundwater (seepage) downgradient of the TSF. Mercury is the primary contaminant; nonetheless, cyanide is also a constituent of concern. Two cutoff walls are installed along the drainage (Quebrada La Coipa), which parallels the downgradient toe of the TSF. Groundwater seepage from the TSF is captured between the cutoff walls and is pumped to the Remediation Pond (Rahco Pond and tank) for recycle to the Refinery Pond. Surface and groundwater outside of the TSF drainage basin is collected and pumped around the cutoff walls, via a by-pass system, and is injected into groundwater and/or discharged to an infiltration area downgradient of the Remediation Area.

Although the applicable regulatory numerical standard for cyanide in groundwater is 0.20 mg/l, measured as Total cyanide, the La Coipa operation is exempt from the regulatory numerical standard for cyanide in groundwater, based on its groundwater remediation system that is currently functioning to capture and treat contaminated groundwater downgradient of the TSF. As verification of this regulatory exemption, MDO provided documentation from the applicable regulatory agency (Superintendencia de Servicios Sanitarios), dated May 26, 2010, demonstrating that the La Coipa operation is not subject to compliance under the applicable regulatory numerical standard for cyanide in groundwater. Furthermore, there is no designated beneficial use of groundwater beneath or immediately downgradient of the operation's cyanide facilities.

4.7 Provide spill prevention or containment measures for process tanks and pipelines.

The operation is: in full compliance

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

Discuss the basis for the Finding/Deficiencies Identified:

With the exception of the Process Water Tank located next to the Remediation Pond (a.k.a. Rahco Pond) at the Remediation Area, all cyanide storage and process tanks at the La Coipa operation reside within concrete secondary containment, either inside process buildings (i.e., the Cyanidation Plant (Cyanide Mixing and Storage Facility), Mill, and Filtration Plant) or in bunded areas located outside. Many of the concrete containments are interlinked and feed to the synthetic-lined pond system, which provides supplemental containment. The Process Water Tank at the Rahco Pond is located directly adjacent to the lined pond and within the groundwater capture system (between the cutoff walls) at the Remediation Area. The tank sets on a continuous concrete foundation forming an impermeable barrier between the bottom of the tank and the ground. Any spillage from the tank would flow directly to the lined pond.

During the recent tank inspection program performed by MS Temple, 44 process tanks containing cyanide solution were identified. Twenty-four of the 44 process tanks have solid concrete pad-type foundations or are supported above concrete containment floors by steel structures. The remaining 20 cyanide process tanks have concrete ring-beam foundations with compacted structural fill in the center area topped with a sand leveling layer. The 20 ring-beam foundations are equipped with leak detection systems, which allow MDO to conduct routine monitoring according to their procedures in order to detect any leakage from the tank bottoms.

The process tanks containing high-strength cyanide solution (i.e., the mix tanks and storage tank) are provided with competent secondary containment. Cyanide Mix Tank No. 1 and the Cyanide Storage Tank have solid concrete, pad-type foundations. Cyanide Mix Tank No. 2 is supported above the concrete containment floor by a steel structure. The process tanks with ring-beam foundations contain solution with Free cyanide concentrations below 10,000 mg/l.

A review of the secondary containment capacities revealed that most of the individual concrete containments are undersized according to ICMC criteria. Therefore, the containments are hydraulically interlinked via a system of sumps and gravity-flow drains, which feed into the synthetic-lined pond system (i.e., the Mill Pond, the Refinery Pond, and the Emergency Pond). The interlinked system provides adequate containment during large upset events. The largest process tanks within the entire containment system are the eight CIL tanks. Under a worst-case scenario, assuming that all the concrete containments and Refinery Pond are completely full, the Emergency Pond would provide adequate capacity to contain the volume of all eight CIL tanks.

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The secondary containment provided for the process tanks located inside the Cyanidation Plant (i.e., the cyanide mixing and dosing tanks) is adequately sized to contain greater than 110% of the volume of the largest tank located within the containment. Therefore, this containment is not linked to other supplemental containment areas.

The operation has spill prevention and containment measures in place; however, MDO must update its formal procedures to respond better to spills collected in the concrete containments. Additionally, although MDO removes and transports the sediment collected in the containments to the TSF, in the past, the operation has temporarily placed the material on unlined areas prior to final disposal. Storing cyanide slurry or material outside of containment does not comply with the ICMC; therefore, all spilled process slurry/sludge and tailings must remain within containment prior to return to the process or the TSF. Please see **MDO-ICMC-CAR-05**.

MDO personnel interviewed during this onsite verification audit indicated that it has ceased the operational practice of temporarily storing process material on unlined areas prior to final disposal to the TSF, and that the area outside the Filtration Plant used in the past as a temporary storage area, had been cleaned up. Accordingly, MDO has begun constructing a concrete-lined area outside the Filtration Plant for temporary storage of process material that is removed from containments. These measures, coupled with MDO's existing operating and monitoring procedures and resulting water quality history, provide justification that no immediate or substantial risk to health, safety or the environment is deemed to exist during implementation of this CAR.

MDO's procedure for responding to process solution spills to soil classifies spills in three categories (Minor, Moderate and Major) according to the characteristics and conditions of the discharge, taking into consideration economic, operational and environmental issues. Major spills are addressed by the MDO Emergency Brigade, according to the Handbook of Integral Emergency Brigade. This procedure provides corrective actions for containing, characterizing, and cleaning up spills; and includes steps for remediation of contaminated soil following cleanup activities.

Prior to this onsite verification audit, the operation identified those single containment pipelines in the process area (buried and overhead), which may be problematic and require containment or spill prevention measures. These include pipelines buried at significant depth over a significant length and those crossing overhead within areas of high activity and outside of secondary containment. Prior to submittal of this final report, MDO installed pipe-in-pipe systems for the problematic buried pipelines and channel tray containment systems for all the overhead process solution pipelines, which cross outside secondary containment. The auditor has requested clarification regarding the pipeline system between the Rahco Pond and the Refinery Pond, which is located outside the Remediation Area groundwater capture zone in order to determine the need for spill prevention or containment measures. Additionally, further photographic evidence and clarification is required regarding the pipe-in-pipe systems recently installed, to verify the

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method and/or measures implemented to detect and collect leakage from these buried pipelines. Please refer to CAR **MDO-ICMC-CAR-06**.

MDO has established an AFE for implementation of secondary containment systems for the buried pipelines, and has since implemented the systems on problematic pipes. Additionally, the pipelines between the Rahco Pond and the Refinery Pond are above ground and are routinely inspected by MDO personnel. These measures, coupled with MDO's existing operating, inspection, spill remediation and monitoring procedures and resulting water quality history, provide justification that no immediate or substantial risk to health, safety or the environment is deemed to exist during implementation of this CAR.

Based on the onsite review conducted during this verification audit, the La Coipa does not have any perennial or ephemeral surface water bodies that require special protection needs for pipelines over and above the containment measures already taken or that may be further implemented to address CAR **MDO-ICMC-CAR-06**.

All cyanide process tanks and pipelines are constructed with materials compatible with high pH cyanide solutions. These include carbon steel ANSI 150-pound class pipelines, API 650 steel tanks and HDPE pipelines.

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
 ■ in substantial compliance
 not in compliance...with Standard of Practice 4.8.

Describe the basis for the Finding/Deficiencies Identified:

The major cyanide installations at the La Coipa operation include the Mill, Filtration Plant, CIL circuit, Cyanidation Plant (Cyanide Mixing and Storage Facility), Solid Cyanide Storage Facility, and the associated ponds (i.e., Mill Pond, Refinery Pond, Emergency Pond, and Remediation Pond), process tanks, pipelines, concrete containments, and supports, foundations and piping related to these facilities.

During this onsite verification audit, MDO provided QA/QC documentation for modifications made in 2008 to the liner systems at the Refinery Pond and the Emergency Pond and for the newly constructed roof system at the Solid Cyanide Storage Facility. However, MDO could not provide evidence of the QA/QC programs implemented during construction of the remaining cyanide facilities. It appeared that design documentation

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and drawings were available for the major facilities and modifications; however, it was not apparent if formal QA/QC documentation had been prepared and/or archived.

For those facilities where original QA/QC documentation is unavailable (i.e., those other than the Refinery Pond, the Emergency Pond, and the Solid Cyanide Storage Facility), MDO elected to commission qualified persons to perform engineering evaluations and to certify the physical integrity of the facilities.

Geotechnical evaluations of the TSF were completed in 2004 and 2008, to assess the structural integrity of the facility in relation to the latest facility expansions. In 2010, MDO performed detailed inspections of all cyanide process tanks. The inspections included performing thickness testing on the tanks according to the API 650 standards, and visually inspecting the support structures. A metallurgical engineer and inspection expert conducted the tank inspections and performed all the necessary repairs and/or modifications to address deficiencies identified by the inspections. The auditor reviewed the MS Templo report during this onsite verification audit and confirmed that all 44 process tanks in contact with cyanide and supporting structures had been inspected and certified.

MDO also performed comprehensive inspections to assess the physical integrity of the structural components (i.e., pillars and beams) of the process buildings as well as the cyanide process facilities (i.e., related equipment, piping systems, containments, pumps, filters, etc.) within the various process areas. The building and process areas inspected include the Mill, Cyanidation Plant, CIL Plant, Filtration Plant, CCD Plant, Refinery and Clarification. The contractor that performed the inspections identified non-conformities, which MDO must address. Please refer to CAR **MDO-ICMC-CAR-07**.

Additionally, for the remaining facilities (i.e., those not covered by the above-described evaluations and those where the original QA/QC documentation is unavailable), MDO must perform engineering evaluations by a qualified person to certify the physical integrity of those facilities (see CAR **MDO-ICMC-CAR-07**). Generally, these include the Mill Pond, the Remediation Pond and the overland conveyors used to transport tailings from the Filtration Plant to the TSF.

The field observations made by the audit team during this onsite verification audit and the engineering inspections subsequently performed by qualified persons, support that the facilities could continue to operate from a containment perspective without posing an immediate or substantial risk to health, safety or the environment during implementation of the CAR. Additionally, as discussed in sections 4.5 and 4.6 above, groundwater and surface water monitoring data reviewed demonstrate that the facilities, as currently operated, are protective of the environment. Therefore, based on these statements, no immediate or substantial risk to health, safety or the environment is deemed to exist during implementation of this CAR.

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4.9 Implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface and ground water quality.

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 4.9.

Describe the basis for the Finding/Deficiencies Identified:

MDO has prepared and implemented written monitoring procedures to evaluate the effects of cyanide use on wildlife, surface water and groundwater quality. The procedures were developed by qualified MDO personnel using regulatory protocols and input from an outside consulting firm. Sampling procedures specify how and where samples should be taken, sample preservation techniques, chain of custody procedures, shipping instructions, and cyanide species to be analyzed. The current Environmental Manager is responsible for administering and managing the protocols provided in the procedures and is appropriately qualified.

Water monitoring at the La Coipa operation is performed by an outside contractor and groundwater and surface water samples are shipped to outside laboratories for analyses. The La Coipa operation uses one principal laboratory for analyses and two other laboratories for QA/QC verification. Water quality samples obtained from the ponds are analyzed by the La Coipa onsite laboratory.

Field log sheets document sample locations and time, purge volume/time and levels (for groundwater samples), pH, conductivity, temperature, analyses to be performed, container type/size, general observations, and laboratory to which samples are sent.

MDO conducts groundwater monitoring at 60 wells. All 60 wells are sampled quarterly and 10 of the 60 wells are sampled monthly. MDO conducts surface water monitoring at six locations monthly. Additionally, surface water at the Infiltration Area, downgradient of the Remediation Area, is sampled every two weeks. MDO conducts weekly monitoring of each LDS installed in the double-lined ponds (i.e., Refinery Pond, Emergency Pond, and Remediation Pond).

The operation has implemented a weekly wildlife monitoring program that is undertaken by the Environmental Department. Additionally, since MDO has no current plans to implement physical deterrent systems at the Mill Pond and the Emergency Pond to protect avian wildlife, subsequent to this onsite audit, MDO revised its wildlife monitoring procedure to increase the wildlife monitoring frequency (from weekly to daily) at these two ponds following upset conditions (when the ponds contain solution). Pursuant to CAR **MDO-ICMC-CAR-04** discussed in Section 4.4 above, MDO must also

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revise its wildlife monitoring program to assess the ongoing success of the new protective measures that are implemented at the Refinery Pond and Remediation Pond.

A checklist is used to document wildlife inspections at the ponds. For each pond, this checklist includes the day of observation, species observed, general observations (i.e., use of pond, distance from pond and behavior), climate, and mortalities. Photographs are taken when possible. The results are analyzed and the information sent to the process areas involved. Deviations are entered into the Loss Control system, which records the type and cause of incident, location, date and time, name of the investigator, associated costs and corrective actions. The corrective actions list the responsible parties, timeline for completion, and check-off for completion. Autopsies are not undertaken on wildlife mortalities.

5. DECOMMISSIONING Protect communities and the environment from cyanide through development and implementation of decommissioning plans for cyanide facilities.

Standards of Practice

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

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of 5.1.

Describe the basis for the Finding/Deficiencies Identified:

MDO has developed a closure plan in compliance with its governing operational permit entitled “Technical Report: Closure Plan and Abandonment Tasks” The plan is updated on an annual basis and includes conceptual procedures at a level of detail adequate to support the development and annual update of MDO’s current best estimate of actual decommissioning and closure costs. During the closure phase of the project, MDO will, develop or modify existing EHS management procedures to implement or support specific decommissioning and closure actions specified in the latest approved version of the Closure Plan.

The Closure Plan presents specific closure tasks in a logical sequence, i.e., the general order in which planned actions will be completed. MDO will develop a more definitive schedule to be included in the annual Closure Plan update submitted in the year prior to commencing mine decommissioning and closure actions. Review of the worksheets backing up the current Asset Retirement Obligation (ARO) estimate for MDO

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demonstrates the same general sequencing of decommissioning/closure events, including those that specifically involve cyanide infrastructure.

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

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 5.2.

Describe the basis for this Finding/Deficiencies Identified:

Chilean regulations do not require a financial guarantee to cover the costs of decommissioning and closure of cyanide facilities. MDO is required by Kinross’s corporate policy to prepare an ARO estimate on at least an annual basis; discussions with MDO management confirmed that the third-party closure costs prepared to support their ARO estimate will form the basis of the next update of the “Technical Report: Closure Plan and Abandonment Tasks” document. The ARO estimate addresses decommissioning and closure cost for the entire mine, including all cyanide infrastructure.

Discussions with MDO and Kinross corporate management and review of Kinross’s corporate EHS policy documents indicate that closure costs are required to be estimated and updated at least annually or in response to all material changes in mine operations. Cyanide-related changes are deemed to be “material”, in all cases. Chilean regulations do not require a financial guarantee to cover the costs of decommissioning and closure of cyanide facilities.

Kinross’s corporate “Internal Code for Self-Insurance of Decommissioning and Closure Liabilities” specifically addresses ICMC requirements for self-insurance, self-guarantee, and financial strength, and applies to Kinross properties in Chile as well as other national jurisdictions that do not impose specific financial assurance requirements. The corporate standard defines specific mathematical assumptions that are used to calculate the amount of the required financial reserve, and requires that each mine demonstrate the existence of substantial assets to address cyanide facility decommissioning. All properties are required to have reasonable ratios of assets to liabilities, net working capital significantly greater than the sum of all cyanide-related decommissioning activities (as represented in the periodically updated and independently audited ARO), a high level of tangible net worth, and assets substantially greater than the total estimated costs of cyanide-related decommissioning activities. Review of a recent internal Kinross memorandum indicates that cyanide-specific costs are calculated conservatively, as the ARO costs used for the

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financial assurance calculation include a number of decommissioning costs that are technically unrelated to the management of cyanide.

Kinross's internal code also requires an annual audit of the financial assurance figure by an independent financial auditor in accordance with Section 9100 of the Canadian Institute of Chartered Accountants (CICA) Handbook. Records review indicates that a certified financial auditor from the audit firm KPMG was retained to perform this audit; KPMG provided a signed version of a January 2011 report that is specific to the La Coipa mine, acknowledges the acceptability of Kinross's financial assurance reserve calculations, and confirms the presence of sufficient financial resources to implement the decommissioning plan using the stated approach.

6. WORKER SAFETY Protect workers' health and safety from exposure to cyanide.

Standards 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
 in substantial compliance
 not in compliance...with Standard of Practice 6.1.

Describe the basis for the Finding/Deficiencies Identified:

MDO has developed documented procedures for all operating tasks associated with the storage and handling of cyanide including delivery and unloading, cyanide mixing, equipment decontamination prior to maintenance, plant operations, and confined space entry. These procedures are controlled through MDO's ISO 14001 Environmental Management System. The procedures are available through the intranet with the original approved and signed documents maintained by the Environmental Department.

These procedures describe risks associated with specific work tasks and the precautions, safety equipment required to safely complete the tasks. As appropriate for the work task, procedures also require pre-work shower and eye wash checks, location of antidote kits, and operation of extractor fans. In addition, a task risk assessment "ART Generacia Planta" must be completed for all job tasks. This ART procedure includes a detailed pre-work check and assessment of PPE and other safety equipment requirements, and is completed for both routine and non-routine work assignments.

Review, approval, revision, updated, and controlled distribution of MDO's suite of standard operating procedures is managed within the context of its ISO 14001 environmental management system (EMS). For changes in process, equipment and/or

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infrastructure, MDO employs a Kinross Authorization for Expenditure (AFE) process for process or facility changes above \$50,000 in value. Pursuant to a directive from the General Manager, all AFEs require review and approval by the Environmental and Safety Superintendents. The environmental and health and safety reviews are guided by a detailed checklist, and include specific requirements for considering ICMC compliance requirements as part of the review. MDO currently had a 2008 working draft of a combined (environmental and health and safety) management of change procedure to manage changes that are less than \$50,000 but it had not yet been implemented. Subsequent to the field audit, this procedure was finalized and implemented to address changes valued <\$50,000 related to the use or management of cyanide. The current AFE process was retained for all change actions \geq \$50,000 in value. Both the AFE- and internal project-level actions require generation of a change review form documenting the review, approval, and as necessary, specific EHS guidance or emphasis. See also Section 4.1.

In addition to the ART risk reviews completed by workers before undertaking a task, workers also participate in an annual all-day workshop to review workplace risks associated with the operation. During the workshop the operation process is reviewed in detail and worker input is solicited on all process changes or plant modifications over the previous year and the potential hazards and the controls required to reduce hazards. The hazards and controls associated with each task are then reviewed by the Safety Department and operating procedures are modified as required based on the outcome of the meeting.

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
 ■ in substantial compliance
 not in compliance...with Standard of Practice 6.2.

Describe the basis for the Finding/Deficiencies Identified:

MDO has established an operational standard for pH of 11.5. Lime is added as required to the reclaim solution at the SAG to control pH and prevent the generation of HCN and the pH is monitored using an in-line pH meter located in the thickener tank.

MDO has installed 10 Draeger Polytron 7000 fixed ambient monitors in locations where there is a significant risk of HCN generation. The HCN readout from each monitor is displayed on control room consoles in the mill, leach plant and filtration plant. The monitors in the grinding mill and filtration plant were set to alarm at 3.5 ppm HCN (warning level) and 4.7 ppm (plant evacuation level). The alarm in the mix plant is set to trigger at 4.7 ppm. Chilean regulation does not permit workers to remain in a work area

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if HCN levels are 4.7 ppm or more. In addition to the fixed HCN monitors, MDO currently has three portable GasAlert CN monitors for use during work tasks when there is a potential for exposure to HCN gas. The portable monitors are used during operational and maintenance tasks when there is a potential for exposure to HCN gas. Subsequent to the field component of the audit, MDO purchased an additional six portable HCN monitors and modified procedures to require all operators to use portal monitors while working in the filtration plant. This added safety measure ensures workers are aware to evacuate a work area when HCN levels are 4.7 ppm or more as per Chilean regulation.

A full face respirator equipped with combined filter (includes protection for HCN and particulates) is used during mix operations. However, as discussed in Section 3.2, some workers, including a cyanide mix operator, were observed with facial hair and/or improper respirator strap positioning, or placement of respirator over a woolen cap; practices that prevent or impede the establishment of an adequate seal between skin and respirator. Training records were subsequently provided by MDO to confirm that that respirator refresher training had been completed

The fixed and portable monitors are calibrated weekly by Segurycel, the supplier of the units and maintenance contractor. Records of calibration are maintained in a logbook completed by Segurycel and kept in the Safety Superintendent's office. Segurycel tracks the performance of the sensors and replaces them as required. Because of the harsh conditions (altitude and climate) the sensors are replaced more frequently than the manufacturer's life expectancy of 2 years for these sensors. Since the field audit Segurycel has started to provide MDO with calibration certificates for the fixed and portable units.

In addition to training provided to workers on cyanide hazards, signage was observed at the entrance to the mill, filtration plant and cyanide mix plant that provides information on cyanide; effects of exposure; and the precautions, required protective personal equipment and safe operating practices. There was also separate signage that prohibited eating, smoking and drinking inside these buildings. Also posted at the entrances to the mill, filtration plant and mix area were "*Aspectos Legales*" signs that displayed the legal limits of toxic substances that may be present in the workplace. Except for an outdated sign posted at the mix plant entrance, which was subsequently removed, these specify a maximum permissible concentration of HCN gas of 4.7 ppm.

At the time of the audit adequate cyanide hazardous warning signage was not observed in some areas although it was understood that MDO was in the process of improving signage around the site. Signage was not observed on fencing around Mill pond, Refinery Pond, Emergency Pond and Remediation (Rahco) Pond; on conveyors that transport cyanide containing tailings; and at the access road entrance to tailing storage area. Signage was also not observed on the CIL tanks, thickeners and other vessels that contain cyanide solutions and on pipe bridges where cyanide pipelines were not well identified. Subsequent to the field component of the verification audit MDO provided

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photographic evidence to confirm that cyanide warning signage had been placed in these areas and that cyanide piping had been color coded, labeled and identified with flow direction arrows. As all workers complete site induction training and cyanide hazard awareness training, it is the auditor's judgment that although the conditions leading to the noted corrections represented potential human health and safety and environmental risks, such risks were not immediate or substantial

Shower/eyewash units were observed in the mill, filtration plant and mix plant. In addition there were a number of self-containing eyewash units. The shower/eyewash units in the mix room and ground floor of the mill were not equipped with a quick release valves but are operated by a small valve handle. Water for the unit on the upper floor of the filtration plant is supplied by a small over head tank and fed by gravity. No shower/eyewash units were located on the ground floor of the filtration plant, the upper deck of the mix plant, or on the deck above the CIL tanks. Please see CAR **MDO-ICMC-CAR-08**.

The shower/eyewashes are inspected weekly by operators. In addition, they are inspected monthly during management inspections. Inspection of the self-contained eyewash units includes checking operation and level of the water. There is currently no process for periodically replacing the water in the eyewash reservoir. Please see CAR **MDO-ICMC-CAR-08**.


As operators working in these areas have been trained in cyanide awareness training, were wearing appropriate personal protective equipment (Tyvek coveralls, goggles and gloves), and alternative shower/eyewash facilities were available elsewhere in the plant, it is the auditor's judgment that although the conditions leading to the noted corrections represent a potential risk to human health and safety, this risk is not deemed to be immediate and substantial during the period of time necessary to resolve this CAR.

Portable dry powder or non-acidic sodium bi-carbonate fire extinguishers are located at strategic locations throughout the cyanide process areas. These are checked monthly by the Safety Department and maintained annually by Eurocomercial Ltd, an outside contractor.

Cyanide warning and flow direction signage was observed on piping in the mill and feed lines above the CIL tanks and on the mix tanks in the cyanide preparation room. However, no signage was observed on the CIL tanks, thickeners and other vessels that contain cyanide solutions. Also, there were areas e.g., pipe bridges, where cyanide pipelines were not well identified. We understand that the placement of signage was in process at the time of the audit.

The "Right to Know" program (*Decreto Supremo No. 40, Art No. 21*), is the primary hazardous materials information system used to inform workers at the mine. Workers are trained in cyanide hazard recognition during induction training and annual cyanide

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hazard training. Signage has been placed at strategic locations that provide information on the characteristics and hazards of cyanide; effects of exposure to various levels of cyanide; the symptoms of cyanide exposure; and the precautions, protective personal equipment, and safe practices required to be followed. Signage is in Spanish, the predominantly used language at the mine.

Workers are trained in cyanide first aid and initiate emergency response procedures but are not expected to provide medical first aid during an emergency that involves cyanide exposure. Medical first aid would be applied by the emergency response team that can be on the scene within minutes of the call.

MDO has an incident reporting and investigation procedure in which all incidents, including cyanide related incidents are investigated. The procedure includes investigation, root cause analysis, and implementation of corrective action which may include change to procedures. The procedure also requires that contractor incidents follow the same investigation process. There has been no worker exposure incident related to cyanide at the site, however, five cyanide spill related incidents have occurred in the past 2 years. Except for one spill which was caused by a pipe breakage during excavation works, the spills were caused by plant upsets resulting from clogged or frozen valves or pumps. Records indicate actions were taken to prevent /minimize future occurrences through repair/replacement of faulty equipment; provision of improved secondary containment systems; review with operators, and retraining of workers.

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

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 6.3.

Describe the basis for this Finding/Deficiencies Identified:

MDO has developed plans and procedures for responding to cyanide leaks and spills. All members of the emergency brigade are trained in cyanide first aid and application of amyl nitrite. Emergency response equipment stations, located at strategic areas of the site, contain self-contained breathing apparatus and a refrigerator with amyl-nitrite antidote stored as recommended by the manufacturer. The emergency response stations are inspected monthly by the safety department. In the event of emergency, workers are equipped with radios for use in the field and plant. There are also telephones in each control room and a loud speaker system for communication within the plant. Medical oxygen is kept at the medical clinic and will be taken by the paramedic to the scene of an emergency.

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MDO contracts Mutual de Seguridad (“Mutual”) to provide clinical and emergency response services at the site. The clinic has three Mutual paramedics onsite during the week and two on weekends. The clinic is located close to the process plant allowing quick response to a medical emergency including cyanide at the plant.

In the event that a patient needs to be evacuated to a hospital, there are two ambulances on site; one owned by Mutual and the other by MDO. The site is about 2 hrs drive to Copiapo. MDO may also arrange emergency air evacuation.

Exercises are conducted by the emergency response team on a bi-monthly schedule to train, practice and evaluate responsiveness of the team responding to mine emergencies. Mock drill exercises are also periodically undertaken to test the emergency response plan. Recent drills have included simulating incidents involving worker exposures from cyanide spills and HCN releases.

7. EMERGENCY RESPONSE Protect communities and the environment through the development of emergency response strategies and capabilities.

Standards of Practice

7.1 Prepare detailed emergency response plans for potential cyanide releases.

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 7.1.

Describe the basis for the Finding/Deficiencies Identified:

MDO has developed a general Emergency Response Plan that addresses response procedures for various types of emergencies, including fire, mine rescue, hazardous spills and natural disasters and has a trained emergency response team to respond to these types of emergencies. In developing the emergency response plan, MDO considered potential cyanide failure scenarios including release of cyanide during transportation, handling of solid cyanide in containers; release of HCN gas during cyanide mixing and lixiviation and filtration processes; cyanide releases from overtopping of ponds, pump failures and pipe, valve and tank ruptures; and releases during plant upsets and power failures. Because of the remoteness of the mine the probability that an onsite emergency, even a catastrophic one, would impact a community is considered low. There is also no aquatic life water body proximate to the mine. The mine produces dry tailings so a catastrophic failure of a tailings impoundment is not a concern.

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MDO has installed a cut-off wall and seepage collection and treatment system down valley from the plant site and dry tailing storage facility that provides an effective control for potential emergencies that could involve uncontrolled seepage.

Although responsibility for transportation of cyanide is with DuPont and its transporters, MDO would provide assistance as requested in the event of an accident. MDO is an integral part of the APELL (Awareness and Preparedness for Emergencies at the Local Level) program established by industry and community /government emergency departments to respond to technical accidents and emergencies in the region.

The Emergency Response Plan provides specific response actions including communication to report the emergency, shutdown/isolation procedures, location of designated emergency collection points, emergency management team roles and responsibilities and emergency contact lists. The process control rooms in each building are on a separate outside air supply allowing the control room operator to remain at his post to perform an emergency shutdown as required. All the other onsite emergency actions are performed by the emergency response brigade and paramedic team under the director of the Brigade Commander. The emergency response plan and associated procedures provide instruction on response to emergencies including cyanide spills and HCN releases, and administration of first aid in the event of cyanide exposure.

7.2 Involve site personnel and stakeholders in the planning process.

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 7.2.

Describe the basis for the Finding/Deficiencies Identified:

The emergency brigade team is comprised of 35 supervisors and a member of Industrial Protection. Every two years workers and supervisors from each process area attend a workshop to review the risks and potential emergency situations associated with each operation task in their area, and to assess the adequacy of the controls in place to minimize risk. The results of the workshops for each area are reviewed by the emergency brigade for emergency planning and update, as required, of the emergency response plan. MDO participates in monthly (APELL) meetings with stakeholder industry groups and government departments for the region to discuss transportation of dangerous goods, procedures to communicate with communities, provision of training, planning of simulations and engagement of companies during an emergency call-out. There are no indigenous groups or effected communities as the nearest human habitation consists of one small family group located near the road to the mine, about 40 km to the southwest.

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MDO has a good relationship with the Copiapo Fire Department. The department provides periodic training at the mine site to the emergency response team. As part of the APELL program, the Copiapo Fire Department and other outside agencies would be available to provide emergency assistance to MDO if needed. Mutual de Seguridad paramedics based at the mine participate in emergency simulations. If there is a need to involve the local hospital, Mutual has on-going communication with doctors at the local hospital in Copiapo. The hospital staff is therefore well prepared to respond to an emergency request, provide advice and to receive a patient exposed to cyanide.

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

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 7.3.

Describe the basis for the Finding/Deficiencies Identified:

The ERP designates the primary and alternate brigade commanders and emergency coordinators for each shift. They have the explicit authority to commit the resources necessary to implement the plan. The general manager retains the authority to release the brigade to respond to emergencies outside of the MDO property. There are 35 emergency brigade members made up of MDO supervisors and someone from Industrial Protection. The ERP defines minimum training requirements to become a brigade team member and MDO provides ongoing training to brigade members through in house bi-monthly scenario training and externally provided workshops and training courses. The ERP specifies the duties and responsibilities of the coordinators and team members, provides 24 hr contact information; and lists the contents of each emergency response station kit. Emergency equipment is checked bi-monthly and after each training scenario by the emergency brigade. The role of outside responders is limited to clinic nurse and paramedic (Mutual) roles. Although their role is not specifically defined in the ERP, they are an integral part of any emergency and respond as a member of the emergency brigade.

Because of the remoteness of the site, MDO has developed the capacity (i.e., skills, materials and equipment) to respond to all probable emergencies at the site. Mutual paramedics man a clinic 24 hr/day at the mine site. In the unlikely event that additional backup is required MDO assistance would be provided by the Copiapo Fire Department. Although no direct formal agreement has been set up between MDO and the Copiapo Fire Department, there is regular communication through emergency training programs that the Fire Department offers, and the APELL program in which MDO and the Fire Department are named responders.

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

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 7.4.

Describe the basis for the Finding/Deficiencies Identified:

The ERP provides procedures for notifying management and defines their roles and responsibilities to communicate to management, regulatory agencies and outside responders and includes contact lists of MDO managers and government and emergency response agencies.

Because of the remoteness of the operation the probability for a cyanide incident impacting a community is considered extremely low. However, in the event that of such an incident, MDO would initiate its Crisis Management Plan. This plan sets out procedures for communicating with communities and media during potential or actual emergencies which categorized as green, yellow and red depending on severity. Response to an off-site emergency would be through APELL.

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

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 7.5.

Describe the basis for the Finding/Deficiencies Identified:

The ERP addresses actions to be taken in the event of a spill of cyanide in solid or liquid form. The procedure includes instruction for containing the spill through use of earthen dams, covering drains to prevent ingress into sewer systems; collecting and drumming of solid cyanide; recovering cyanide solutions through pumping; excavating and neutralizing contaminated soil; and disposing of recovered cyanide materials either through reintroduction into the process or disposal of neutralized and stabilized solid waste to the tailing area. The use of this sodium hypochlorite, as well as ferrous sulphate and hydrogen peroxide are prohibited where there is a potential for these chemicals to impact surface water. There are no requirements to provide an alternate drinking water supply, as there are no communities located in the proximity of the mine and MDO uses bottled drinking water.

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MDO has procedures for evaluating an impacted area through sampling and analysis for cyanide and pH concentrations. The procedures include sampling methodology and method of analysis. In general excavation of impacted soil is continued until there is no visible or analytical evidence of cyanide present, and the procedures call for over excavation to ensure that all impacted soil is addressed and the use of sodium hypochlorite, as appropriate, to neutralize any residual cyanide.

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

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 7.6.

Describe the basis for the Finding/Deficiencies Identified:

The ERP is reviewed at least every two years as part of MDO’s management system review process. The plan is a controlled document and maintained by the Environmental Coordinator responsible for management system document control. In addition, the adequacy of an emergency response is reviewed as part of incident investigation and during the evaluation following a mock drill and modified accordingly. The ERP has been updated three times since August 2008.

Exercises are conducted by the emergency response team on a bi-monthly schedule to train, practice and evaluate responsiveness of the team to mine emergencies. These exercises simulate various emergencies including fire, mine rescue, hazardous materials including cyanide related simulations. In addition, mock drill simulations are undertaken to test the effective of the ERP. These include cyanide related simulations. In June 2007 a mock drill simulation was undertaken to respond to a truck accident in which cyanide was spilled. In November 2010 a mock drill simulation was undertaken to respond to an increase in HCN levels in the filtration plant. The simulations were evaluated for effectiveness and recommendations were proposed and implemented to address any deficiencies noted. Where appropriate, these recommendations would include modifications to the ERP.

8. TRAINING Train workers and emergency response personnel to manage cyanide in a safe and environmentally protective manner.

Standards of Practice

8.1 Train workers to understand the hazards associated with cyanide use.

The operation is: ■ in full compliance

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in substantial compliance
not in compliance...with Standard of Practice 8.1.

Describe the basis for the Finding/Deficiencies Identified:

All MDO workers and contractors receive induction training prior to being permitted on the mine site. This is provided by Mutual, a training contractor retained by MDO. This training includes general site hazards, PPE requirements, emergency response and a basic introduction on cyanide hazard recognition. All new employees that work in the plant undertake further induction training provided by the Safety Department. This training addresses plant specific hazards and cyanide awareness training which includes characteristics of cyanide, precautions to prevent exposure including PPE, symptoms of cyanide exposure, first aid, and emergency response. In addition to the induction training provided by Mutual and the Safety Department, the Environmental Coordinator also provides environmental induction and annual refresher training that addresses hazardous materials management, spill prevention and emergency response. Cyanide is included within these topics.

Cyanide hazard refresher training is conducted by all workers and management, including contractors that work in the plant. Cyanide training and refresher training records completed by the Safety Department are retained by the Safety Superintendent. The Environmental Department also retains records for annual environmental refresher training that includes cyanide hazard awareness and spill response.


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
 in substantial compliance
 not in compliance...with Standard of Practice 8.2.

Describe the basis for the Finding/Deficiencies Identified:

Operational procedures and cyanide management procedures collectively form the basis for the training program. The training program follows the regulatory requirements of *Decreto Supremo D.S 40 Art 21*, in which employers are obliged to inform employees of the risks in the workplace, also known as “*Derecho a Saber*” or employee right-to-know. Training in operational procedure requirements is provided by experienced supervisors. On-the-job supervision continues until the supervisor is satisfied that the worker can safely perform the requested work, at which point the training record is countersigned. Training requirements associated with the operational procedures applicable to each area/process in the plant that must be completed to the satisfaction of the supervisor

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before a worker is allowed to work unsupervised in that area or process. New employees and contractors undertake written tests after completing induction training. The tests have a multiple choice structure and the pass mark is 80%. Additional instruction is given if this mark is not achieved.

Cyanide hazard refresher training is conducted by all workers and management, including contractors that work in the plant. This training includes cyanide hazard recognition, precautions when working around cyanide, exposure symptoms, and appropriate emergency response actions. In addition, MDO has a task observation program to assess worker competence and ensure that standard operating procedures are followed and performed in a safe and environmentally protective manner. Unsatisfactory performance would result in additional task observation and/or training.

Training records are retained throughout an individual's employment. Records are in the form of signoff sheets; that include the training topic(s), trainers name and signature; date of training, sign-off by each attendee. The course materials are either PowerPoint presentations, as in the case of induction training and cyanide hazard and refresher training, or the actual standard operating procedures in the case of task training.

8.3 Train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 8.3.

Describe the basis for the Finding/Deficiencies Identified:

Cyanide unloading, mixing, production and maintenance personnel are trained in the requirements of operational procedures as well as relevant cyanide management procedures, including emergency response procedures. A worker is trained to isolate and abandon the area, warn others to do the same and go to the designated emergency collection point. The emergency brigade and paramedics are responsible for rescue and first aid. Control room operators receive additional task training in emergency response procedures to respond to cyanide releases. The control room is on a separate air supply which allows control room operators to remain in the control room to carry out these procedures.

The emergency brigade is comprised of volunteer supervisors and shift supervisors that are experienced in plant operations. At a minimum, members of the brigade are required to have completed training in four areas: fire, hazard materials, high altitude and confined space rescue, and first aid. In addition members undertake simulation training provided by three experienced MDO emergency responders, as well as other emergency

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response training provided onsite by external trainers, or through attendance of courses offsite. Simulation training includes at least one hazmat emergency response annually. A simulation of an overturned cyanide truck and cyanide spill was completed in July 2007 and a simulation of a HCN release in the filtration plant was undertaken in November 2010. Paramedics have also been trained in cyanide exposure recognition and first aid through a course provide by DuPont.

Because of the remoteness of the site, MDO has developed the capacity (i.e., medical aid and response skills, materials and equipment) on site to respond to all probable emergencies. In the unlikely event of a large fire the Copiapo Fire Department can be called upon for assistance if required. Mock drill simulations are periodically undertaken that cover both worker exposure and environmental releases. Two simulations have been completed in the past three years that have involved cyanide release and worker exposure. Procedures for conducting mock drills require evaluation of drill results and development of appropriate action plans for each drill. Records reviewed for drills undertaken in June 3007 and November 2010 indicate that action plans had been developed that directed specific improvements, including training-related actions.

Records of cyanide training and refresher training are retained. These records provide the date of training, the name of the trainer, length of training, and the signatures of attendees. Records are also retained of other training completed by the emergency brigade including the basic training requirements to become a brigade member, records of courses attended, and records of mock drills.

9. DIALOGUE Engage in public consultation and disclosure.

Standards of Practice

9.1 Provide stakeholders the opportunity to communicate issues of concern.

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 9.1.

Describe the basis for the Finding/Deficiencies Identified:

The most significant stakeholders in the MDO operation are employees, contractors, and their families. There are no indigenous groups or communities within many kilometers of the mine site; the nearest human habitation consists of one small family group located about 40 km to the southwest. Periodic occupational health and safety meetings provide an appropriate venue for workers and contractors to communicate specific issues of concern. Risk management, paramedic, environmental, and occupational health and

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safety contact information is also provided to all staff and contractors via a bound, pocket-size Cyanide Code Quick-Reference Manual, which collectively represent opportunities for communication on any issues involving the management of cyanide.

9.2 Initiate dialogue describing cyanide management procedures and responsively address identified concerns.

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 9.2.

Describe the basis for the Finding/Deficiencies Identified:

The most significant stakeholders in the MDO operation are employees, contractors, and their families. During induction training, workers and contractors receive copies of the Cyanide Code Quick-Reference Manual that summarizes the use of cyanide in gold mining, its potential environmental and health and safety effects, and appropriate responses to a cyanide emergency. MDO also produces a quarterly internal magazine for its workforce and other interested parties that provide a ready method of communicating specific information on cyanide and cyanide management.

9.3 Make appropriate operational and environmental information regarding cyanide available to stakeholders.

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 9.3.

Describe the basis for the Finding/Deficiencies Identified:

MDO has prepared a pocket-sized ready reference manual [see Section 9.2.1] describing the use of cyanide that is issued to all workers and contractors. However, at the time of the field audit the information is not routinely made available in response to potential inquiries from other stakeholders. As Copiapo is the nearest community to the mine, MDO was requested to authorize distribution of copies of the manual at the Copiapo office in response to any specific requests for information about MDO's use of cyanide that may be received from members of the lay public or other external stakeholders. Subsequent to the field audit, MDO created an appropriate brochure and distributed to all MDO personnel; an additional 100 copies were sent to the Copiapó for public distribution, if requested. Additionally, a descriptive article was written for inclusion in

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the corporate newsletter for the month of May. This action was verified by review of the completed brochure and associated correspondence.

There have been no on or off-site cyanide releases or exposure incidents in the life of the mine; were they to occur, communications with the public would be managed by MDO's communications officer and Kinross corporate management in accordance with the Local Crisis Management Plan. There have also been no cyanide releases on or off the mine site requiring reporting under applicable regulations or that have caused applicable limits for cyanide to be exceeded.

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Attachment A: Corrective Action Plan

The Corrective Action Plan to bring the operation currently noted as being in substantial compliance to full compliance status is documented as a series of twenty Corrective Action Request (CAR) documents (attached):

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