

SUMMARY AUDIT REPORT

for the September 2014
International Cyanide Management Code Certification Audit



Prepared for:

Agnico Eagle Mines Limited – Meadowbank Mine

Submitted to:

International Cyanide Management Institute
1400 I Street, NW, Suite 550
Washington, DC 20005, USA

FINAL

15 May 2015



ENVIRON EC (Canada), Inc.

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SUMMARY AUDIT REPORT

Name of Mine: Meadowbank Mine

Name of Mine Owner: Agnico Eagle Mines Limited

Name of Mine Operator: Agnico Eagle Mines Limited

Name of Responsible Manager: Jean Beliveau, General Manager

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Location details and description of operation:

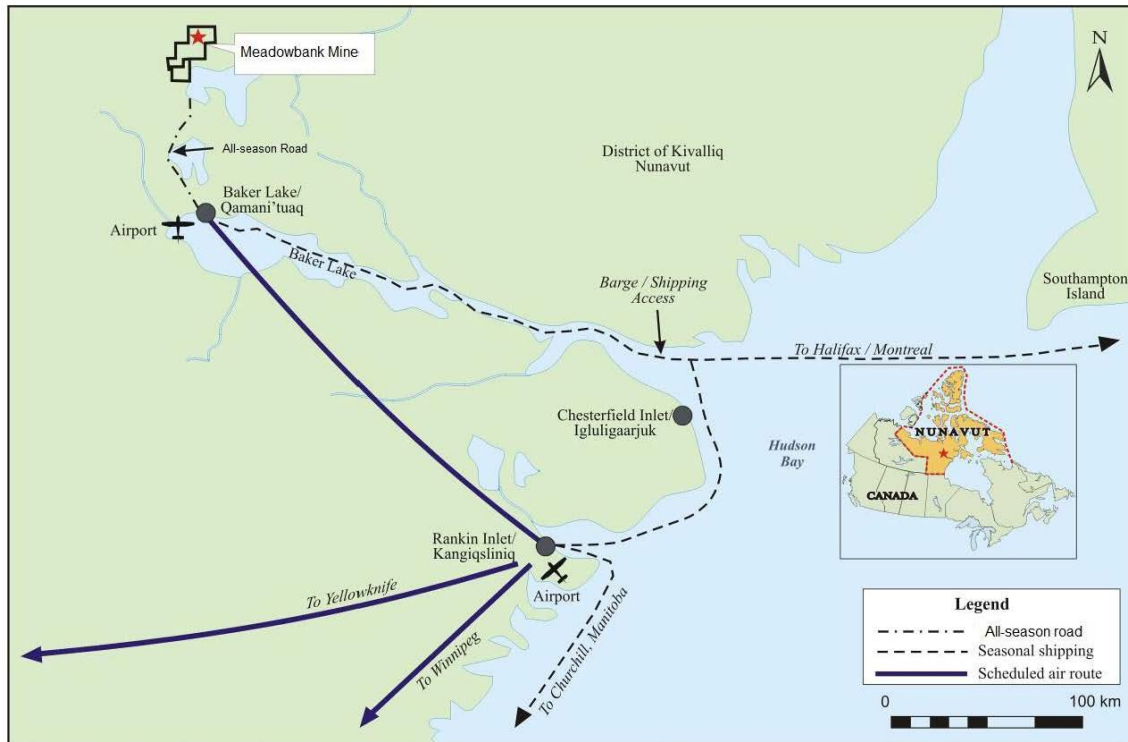
The Meadowbank mine is located in the Kivalliq region of Nunavut, about 300 kilometres west of Hudson Bay and 110 kilometres by road north of Baker Lake, the nearest community. Agnico-Eagle Mining Limited, Meadowbank (AEM) conducts surface mining from a series of three pits all within 7 kilometres of the processing plant. Mine commissioning and first gold production began in early 2010. The mine is expected to produce 430,000 ounces of gold in 2014, and an average of 380,000 ounces of gold per year from 2015 through 2016, with current mine life through 2017.

The 11,000 t/day gold processing plant at Meadowbank uses conventional technology adjusted to the Arctic climate. Ore is crushed and milled to 80% passing 60µm to 80µm. The ball mill operates in a closed circuit with cyclones. About 30% of the cyclone underflow reports via a gravity concentrator to an intensive cyanidation unit (ICU) in which the gravity recovered gold is intensively leached in a concentrated cyanide solution. Gold in pregnant solution from this process is recovered by electrowinning and smelted into doré bars. The cyclone overflow is thickened prior to flowing into a pre-aeration and leaching circuit consisting of three pre-aeration tanks and six cyanide leach tanks. The leached slurry is directed to a carbon-in-pulp circuit of seven tanks in series. The recovered gold in solution is stripped by electrowinning, followed by smelting and the production of doré bars.

The CIP tailings are thickened to recover cyanide from the process solution, and then treated using the standard SO₂/air process or sodium metabisulphite to destroy residual

cyanide. The tailings are pumped to the permanent tailings storage facility (TSF), which is designed for zero discharge. The water is reclaimed for re-use in the mill. The TSF consists of a North Cell and a South Cell. Tailings have been deposited in the North Cell since the start of operation and deposition in this cell scheduled for completion in 2015. Construction of the Central Dike for the South Cell was near completion at the time of the field audit and deposition in the South Cell is scheduled to begin in late 2014.

Figure 1: Location of Meadowbank Mine, Nunavut Territory, Canada



The general site area consists of low, rolling hills with numerous lakes. The topography in the immediate vicinity is generally flat, with relief on the order of 10 m to 12 m near the main deposit areas, and as high as 60 m locally. Elevations vary from about 133 masl (metres above sea level) along the lake shorelines to about 200 masl. The mine location is in the tundra region of the central sub-Arctic, and is considered to have an arid arctic climate with temperatures ranging from +5°C to -40°C in the winter (from October to May) and from -5°C to +25°C throughout the summer (from June to September). The area is sparsely populated with the Hamlet of Baker Lake, the nearest community, having a population of about 1,100 and located approximately 70 km from the mine. AEM depends on the annual, warm-weather sealift from the Port of Bécancour, in Montreal, Quebec by Ocean vessel and tug barge from Hudson Bay to Baker Lake for transportation of bulk supplies and heavy equipment. An all-weather road links Baker Lake to the mine site. An on-site airstrip is used for shipping food and goods and for transporting employees, who work on a fly-in, fly-out basis.

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Auditors' Finding

The operation is: in full compliance
 ■ in substantial compliance
 not in compliance

Audit Company: **ENVIRON EC (Canada), Inc.**
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Audit Team Leader: Jean-Marc Léger
 e-mail: jmleger@alphard.com

Names and Signatures of Other Auditors

John Lambert (Mining
Technical Expert)



Date(s) of Audit: August 26, 2014 – September 3, 2014

I attest that I meet the criteria for knowledge, experience and conflict of interest for Code Verification Audit Team Leader, established by the International Cyanide Management Institute and that all members of the audit team meet the applicable criteria established by the *International Cyanide Management Institute* for Code Verification Auditors. I attest that this Summary Audit Report (SAR) 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 latest version of the *International Cyanide Management Code 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 who 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:

AEM purchases cyanide only from the E.I. DuPont de Nemours and Company, Inc. (DuPont) as set out in the Supply Contract between AEM and DuPont, dated 1 January 2014. The Contract requires that DuPont to comply with the Cyanide Code and all Certification Requirements. Supply Contract also specifies that producer and transporters must be certified before the first delivery.

DuPont manufactures cyanide at its production plant located in Memphis, Tennessee. Based on information posted on the International Cyanide Management Institute website, this operation is certified to the Code and was last recertified on 30 April 2013.

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:

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DuPont is responsible for transport and delivery of the cyanide from their production plant in Memphis to the Port of Bécancour. This transportation route is certified to the Code and was last recertified on 27 November 2012. The Cyanide Supply Contract states that DuPont releases title on delivery of the cyanide at the Port of Bécancour. DuPont supplies cyanide as solid briquettes packed bag-in-box in one tonne plywood Intermodal Bulk Containers (IBC) loaded into sealed C-Cans, 20 boxes per container. DuPont is responsible for ensuring that the packaging and labeling meets all shipping requirements.

AEM takes possession of the cyanide and manages the transport of the Agnico-Eagle Meadow Bank Supply Chain (AEMSC) to the Mine site using the following contracting services:

- Stevedoring services at the Port of Bécancour is contracted to Terminaux Portuaires du Quebec (TPQ)
- The marine shipping portion of the route between the Port of Bécancour, Quebec, and Baker Lake, Nunavut is contracted to Nunavut Sealink & Supply Inc. /Désagagnes Transarctik Inc. (NSSI/DTI)
- The road transport between Baker Lake and Meadowbank Mine is contracted to Arctic Fuel Services (AFS).

The ICMC certification audit of the AEMSC was completed at the same time as the mine certification audit. ICMI have advised that certification of the Meadowbank Supply Chain will be announced simultaneously with the certification of the Meadowbank Mine.

NSSI/DTI is responsible for selecting the marine route based on weather and other potential hazards and for abiding by the requirements pertaining to the Nunavut Impact Review Board (NIRB) conditions of shipping along the inlet between Chesterfield Inlet and Baker Lake. Route selection between Baker Lake and the Mine is limited to a 130 Km All Weather Private Access Road (AWPR).

AEM has retained TPQ for stevedoring services, including unloading trucks, vessel loading, and any interim storage needs at the Port of Bécancour. NSSI/DTI is responsible for lightering cargo between the ship and tug barge near the mouth of Chesterfield Inlet and for unloading cargo from the tug barge at the Baker Lake Marshalling Yard. AFS is responsible for loading of trucks and transport of goods between Baker Lake and the Mine. Unloading at the mine is undertaken by AEM staff using AEM equipment.

The NSSI/DTI and AFS contracts stipulate that carriers will comply with all applicable laws, regulations and standards and that systems are in place for ensuring health, safety security and the environment, and equipment is maintained and have an emergency response plan. The AFS contract also includes requirements for complying with AEM's

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procedures on general mine safety, and for use of the use of the AWPR between Baker Lake and the mine. Where the contracts permit use of subcontractors the designated responsibilities extending to any subcontractors is clearly addressed.

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:

AEM contract's with DuPont for shipment of cyanide between DuPont's production plant in Memphis and the Port of Bécancour, in Montreal, Quebec. The Supply Contract requires that DuPont only engage Code certified distributors and contract transporters.

The DuPont supply route between the Memphis plant and the Port of Bécancour is certified under the Code. Cyanide is transported in intermodal shipping containers by rail between the Memphis plant and DuPont's Pointe Claire Distribution Centre (PCDC) operated by the Huron Services Group and located in Montreal, Quebec. The cyanide is trucked by TONA Transport (TONA), a Huron Services Group company, to the Port of Bécancour. The supply route between the Memphis plant and PCDC is part of DuPont's US/Canada rail/barge supply chain which was last recertified on 27 February 2014. The supply chain between PCDC and Port of Bécancour is part of DuPont's Canada Supply Chain which was recertified on 27 January 2013. This information is provided in the following documents posted on the ICMI web site:

The transportation of cyanide between the Port of Bécancour and the mine site is undertaken by AEMSC. The AEMSC ICMC certification audit of the supply chain was completed at the same time as the mine certification audit. The transportation audit found the AEMSC to be in substantial compliance with the Code. For the Meadowbank Mine to be in fully compliance with this requirement of the Code, AEM must provide evidence that the AEMSC is also in full compliance with the Code. **Please see Attachment A, Corrective Action Request (CAR) AEM-ICMC-CAR-01.** ICMI have advised that certification of the Meadowbank Supply Chain will be announced simultaneously with the certification of the Meadowbank Mine.

Cyanide shipping records that identify all elements of the supply chain are available. These include packing lists and shipping manifests generated by DuPont at PCDC; Inventory of Dangerous Cargo lists, IMO DG Dangerous Cargo Declaration documentation, and bar codes generated for each C-Can container by TPQ; and Fuel

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and Freight Haulage records generated by AFS. The Inventory of Dangerous Cargo is in electronic form and transport of individual C-Cans is tracked electronically between the Port of Bécancour and the Mine site using the assigned bar code.

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:

The cyanide mixing/storage facility consists of a mixing tank and storage tank situated within a concrete containment. Hatch Ltd. designed the mixing/storage facility and although AEM has design drawings for the facility on file no QA/QC documentation was available. In January 2014 Stavibel Engineering Services was retained by AEM to review the integrity and capacity of the Reagent/CIP containment basins. The review found that the capacity of the containment basin for the cyanide mixing/storage tanks was less than 110% of the largest tank. Also sealant in joints around the perimeter of concrete bases within the containment was found to be in poor condition or absent. A program was in place at the time of the field component of the code verification audit to repair joint seals and expand the containment capacity. To be fully compliant with this requirement of the Code, AEM must provide a evidence confirming that the containments volumes are 110% of the largest tank, seals have been repaired and concluding that the facility's continued operation within established parameters will protect against cyanide exposures and releases. **Please see Attachment A, CAR AEM-ICMC-CAR-02.** Based on the age of the facility (2010), and AEM's in place preventative maintenance program and operating procedures, controls are in place to prevent major equipment leaks and operating spills. Therefore in the auditors' judgment the current containment configurations do not represent a substantial or immediate risk to the environment or the health and safety of the workforce during the period the capacity modifications are being planned and executed.

At the time of the field component of the audit shipping containers were stored at the warehouse container compound, separated from incompatible materials. This location is

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susceptible to localized water ponding in the short freshet and summer period and there has been an occasion in the past when an incompatible material was unknowingly stored next to the cyanide. The containers are transferred as cyanide is needed at the mill to a location just outside the mixing/storage area and the IBC boxes unloaded using a forklift. The IBC boxes are stacked on dedicated metal shelving inside the plant near to the mixing/storage plant and away from incompatible materials. Subsequent to the field component of the audit AEM constructed a dedicated storage pad for sealed cyanide containers at the "Overpad" compound. The pad is bermed and constructed of a porous layer of gravel-sized waste rock to allow rain and snow melt to infiltrate within the rock pad and prevent the formation of puddles. The pad is designed such that in the event of a spill, briquettes would remain on the surface allowing easy cleanup. Any water that may be impacted at the over pad, would be trapped above the underlying frozen ground within the waste rock layer, allowing recovery of the impacted water if there was ever a spill. All cyanide containers were moved to this dedicated pad prior to submission of this DAFR. Throughout the winter and after freshet next spring AEM will monitor this storage area. In the spring AEM will perform a risk assessment and evaluate if modifications are required to the pad design. To be fully compliant with this requirement of the Code, AEM must provide a report signed by an engineer concluding that the storage pad's continued operation within established parameters will protect against cyanide exposures and releases. **Please see Attachment A, CAR AEM-ICMC-CAR-03.** As cyanide is transported and stored in supersacks that are packed in moisture protective plastic in IBC boxes, in sealed C-Cans and the storage pad is underlain by permafrost, it is auditors' judgment, that the current storage practices do not represent a substantial or immediate risk to the environment or the health and safety of the workforce.

Cyanide is delivered as solid briquettes are stored in C-Cans in a dedicated area of the warehouse "Overpad" compound that is located several hundred metres south of workshops, camp areas, offices and other locations where people congregate. The mine is located in an isolated region where the nearest community is Baker lake, located approximately 80 km away.

The nearest surface water body is Third Portage Lake, located approximately 300 m south. The potential for impacting the lake is considered low as the cyanide is stored in sealed containers that are located on a raised permeable pad that is designed to prevent puddling and surface run-off. The storage area is also bounded by an earth berm and underlain by permafrost that would inhibit the potential for migration of potentially impacted water.

Procedures are in place to prevent overfilling of cyanide storage tanks. The procedure requires close communication between the control room and mix operator during a mix. The mix and storage tanks levels can be monitored in the control room. The tanks are

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also fitted with high level alarms that activate in the control room; and a strobe alarm light in the mix plant to alert operators directly in the event of a potential overflow.

Cyanide mixing and storage tanks are located inside the mill building in a fully bermed concrete containment basin. The capacity of the containment basin for the cyanide was found to be less than the 110% volume of the largest tank. Sealant in joints around the perimeter of concrete bases within the containment was also found to be in poor condition or absent. A program was in place at the time of the field component of the code verification audit to repair joint seals and expand the containment capacity. **Please refer to CAR AEM-ICMC-CAR-02.**

Solid cyanide briquettes are stored in locked and sealed shipping containers that are stored on a dedicated pad in the warehouse Overpad compound, located away from incompatible materials. Although erection of security fencing is not permitted in Nunavut, admission to the compound prohibited without authorization. There is a locked gate on the access road to the compound to restrict unauthorized entry and containers are stored door to door to prevent unauthorized access. As cyanide needed for the operation containers are moved to the mill and prior after opening are allowed to ventilate for 15 to 30 minutes to dissipate any hydrogen cyanide gas prior to emptying.

The unloaded IBC boxes are stacked on dedicated metal shelving inside the mill next to the mixing/storage plant; separate from incompatible materials. The racks are located close to the mill door in an area of good ventilation. There is also an extraction fan that is used during mixing operations to prevent the build-up of hydrogen cyanide gas. There is also an HCN detector located in this area of the mill.

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:

The plywood boxes are not permitted to be used for other purposes and are not returned to the vendor. Empty cyanide boxes and bags were being disposed of in a permitted onsite landfill. Procedure requires the bags to be triple-rinsed using an automatic spray device in the interior of the mixing hopper, prior to disposal. The rinse water is entirely contained and drains into the mixing tank. Inspection of the landfill revealed that the cyanide waste was not being segregated from other wastes or covered promptly. Also

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no cyanide warning signage was posted regarding the presence of cyanide waste. Following the field component of the certification audit a dedicated burn pad was set up in a remote location of the mine site and a new procedure implemented that requires the cyanide waste to be burnt daily at the burn pad. The burn pad is signed with “authorized persons only”, “cyanide warning” and personal protective equipment (PPE), hygiene and first aid instruction.

A mixing procedure has been developed to prevent exposures and releases during cyanide unloading and mixing activities. The mixing procedure details required PPE, and the steps to be performed during the procedure; potential risks associated with the procedure; and photographs illustrating the various tasks. Prior to a mix, operators are required to complete a Work Card which includes a pre-inspection checklist that includes items such a safety showers, PPE, fire extinguishers, clear access, signage, lighting etc.

The mixing procedure specifies the use of leather gloves during removal of the plywood box covers; use of a chemical and water proof suit, and use of a full face respirator. During the observed mix procedure, operators were observed using Tyvek® coveralls unsuitable for protection against liquid chemicals and an inappropriate respirator dust cartridge. Subsequent to the field component of the certification audit AEM completed a risk assessment which concluded that PPE requirements should be modified to require mix operators to use a TyChem® coverall and 3M 7093 filter to provide additional protection.

After the mix operation residual cyanide dust was observed on the upper deck and undissolved cyanide and cyanide salts were observed around the joins and edges of the hopper box. The auditors recommended that the mixing procedure be modified to require the mix plant to be washed down after each mix to remove all residual cyanide. A modified mix procedure and training records were provided showing these changes had been implemented.

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:

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The active cyanide facilities at the AEM operation include the cyanide storage area; grind circuit; intensive cyanidation unit; reagent cyanide mix and storage tanks; pre-aeration tanks (2); leach circuit (9 leach tanks); carbon-in-pulp circuit (7 tanks); pregnant and barren solutions tanks; cyanide recovery thickener; cyanide destruction circuit (2 tanks); tailings pump box; reclaim water tank; tailings storage facility (TSF); tailings delivery, distribution, and reclaim water pipelines; and associated pumps, piping and secondary containments.

The design and operation of the mine is regulated under the terms and conditions of the *Nunavut Water Board Type A Water Licence – No. 2AM-MEA0815*. This licence sets out requirements for construction and operation of mine site facilities, including the tailing storage facility (TSF), and for water and waste management, and effluent discharge quality. The licence has requirements for implementation of operating plans, periodic recalibration of the water balance, provision of financial security and schedules for various required site monitoring and regulatory reporting.

AEM has developed written management and operating plans and procedures for the cyanide facilities. The operating plans and procedures developed and implemented by AEM cover safe operation and management of the facilities. The primary plans for design and operation of the facility include: Tailings Deposition Plan; Water Management Plan; Tailings Storage Facility Operation, Maintenance and Surveillance Manual (Tailings Manual); and control plans for operation of the mill.

The Tailings Depositional Plan and TSF Manual provide design and operating criteria for operation of the TSF. The Water Management Plan design criteria and assumptions for water management and the water balance. The mill control plans provide criteria for airflow and oxygen concentrations in the pre-aeration tanks, pH and cyanide concentration limits through the leach circuit, and pH and reagent addition in the destruct plant to achieve a 15 mg/L weak acid dissociable (WAD) cyanide concentration in tailings discharged to the TSF, to ensure protection of wildlife.

Daily shift inspections are undertaken for each area of the plant. In addition AEM has a Work Card procedure in which a detailed area inspection is undertaken by every worker prior to performing a task in that area. These inspections are supplemented by planned inspections by the Health and Safety department. Daily inspections are undertaken of active deposition areas of the TSF and tailings line, and monthly or bimonthly inspections are undertaken of non-deposition areas. Annual integrity inspections of earthwork structures are also performed by an external geotechnical engineer. Instrumentation monitoring is undertaken to monitor stability and deformation of earthwork structures. Bathymetric surveys are also undertaken in July, August and September each year. Although tailings discharges are maintained well below 50 mg/L WAD cyanide, AEM maintains a wildlife mortality inspection and reporting program,

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which is a responsibility of all employees. No wildlife mortalities contributed to cyanide have been reported since the operation began.

At the time of the onsite audit management of changes or modifications to the site's process and operations were generally being undertaken in an informal manner through discussions and tracking during staff meetings, or using validation request process which includes a risk evaluation and approval process. However, the process had not been universally implemented, did not include a formal process to include the environmental and H&S departments in the approval process, and a written procedure to describe and formalize the process had yet to be developed.

Subsequent to the onsite audit AEM developed a draft management of change procedure that will provide a formal management of change process which will be coordinated and monitored by a Management of Change Coordinator. Where a change is deemed minor the change owner may sign-off on the approval for the change. All other changes go through review and approval by various department heads, including the safety and environment departments, before the change is approved. To be fully compliant with this requirement of the Code, AEM must provide evidence that the MOC procedure has been finalized and implemented. **Please see Attachment A, CAR AEM-ICMC-CAR-04.** Because changes and modifications are generally being captured by the existing evaluation and approval process, in the auditors' judgment that there is currently no substantial or immediate risk to the environment or the health and safety of the workforce, while this procedure is being finalized and implemented.

Contingency plans are in place to address non-standard operating situations or emergencies. These include, action plans for responding to various levels of abnormal situations at the TSF including seepage, slope instability, internal erosion, cracking, settlement and sinks and overtopping; and control plans for addressing process upsets in the mill. There is also an action plan for temporary shutdown and long-term temporary cessation of operations. The plan includes specific procedures related to the management of cyanide during a temporary closure including management and monitoring of the tailings facilities, purging and triple rinsing cyanide lines and tanks and ensuring integrity reagent cyanide container storage.

Based on discussion with the Mill Manager, daily inspections include inspections of holding tanks, piping, valves and other equipment for leaks and corrosion, and inspection of the integrity and capacity of containment structures. During the audit house-keeping was observed to be good, no corrosion, leaks or salt buildup was evident, lock-outs were in place on critical valves, and containment areas were free of equipment, debris and slurry that could compromise containment capacity. These observations were suggestive of an effective inspection and maintenance program. Nevertheless, the inspection and Work Card records although providing evidence that inspections were being undertaken did not provide sufficient detail to document that

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those inspections always covered all items. The auditors recommended that the checklist on the Daily Reports be expanded to include all items to be inspected and an inspection procedure be developed to provide guidance on expectations for each of the items to be inspected. Subsequent to the field component of the certification audit AEM developed and implemented an inspection procedure that includes detailed instruction and guidance on performing facility inspections.

The Maintenance Department has a preventive maintenance (PM) program for all equipment. Maintenance is planned through and work orders tracked using J.D Edwards software. Planned inspection and maintenance of cyanide tanks is undertaken during semi-annual shutdowns. The cyanide mix /storage tanks are emptied, cleaned and inspected semi-annually. The Maintenance Manager also indicated that the leach and CIP tanks are epoxy lined and therefore corrosion was not considered an issue. Nevertheless the CIP tanks are able to be inspected at least monthly as each tank is emptied in rotation, approximately one tank every two days, as a normal operating procedure which allowing inspection of the interior.

Inspection records include the date of the inspection, name of the inspector and any observed deficiencies. The Work Card checklist includes the same information as well as the task to be completed, identified hazards, signature of the supervisor and time task was completed. Corrective actions required by inspections in the process plant typically result in a PM work order, which documents the individual requesting the PM action, date requested, a discussion of the work required, and status. Work orders are entered into the JD Edwards PM system and record copies of specific actions can be generated as required. All inspection records are maintained in hard copy and through the online Interlex document control system.

Power at the mine site is supplied by a 29-MW diesel electric power generation plant with heat recovery and an onsite fuel storage (5.6 million litres) and distribution system. In normal operation the power plant uses four generators and with seven generators available, so the plant provides sufficient power and back-up that loss of power for critical equipment is not considered an issue. The generators are on a preventative maintenance program as with all other equipment at the site.

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:

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Cyanide is added to the leach circuit at rates to maintain free cyanide concentrations in the circuit within set points established to maximize gold extraction while optimizing the use of cyanide. Cyanide addition is controlled automatically using a Titrolyzer ADI 2016 cyanide controller. The use and addition of cyanide is carefully monitored and daily reports are compiled which summarize critical design and key performance indicators including leach tank cyanide concentrations, cyanide consumption and gold recovery. The report is reviewed during the daily

The feed from CIP circuit passes through a tails thickener which separates water (overflow) from the tail slurry prior to the cyanide destruct plant. Cyanide addition is therefore minimized by recycling unused cyanide present in thickener overflow back into the process as reclaim water.

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:

The Meadowbank Mine is required, as a condition of the Nunavut Water Board Type A Licence No. 2AM-MEA0815, to maintain and periodically recalibrate a water balance and water quality model. A probabilistic and modular water balance model that allows testing different scenarios by adjusting water flows, volumes and environmental site conditions was developed for the site in 2012 using GoldSim software. The water balance model considers the whole mine site including the tailings management facility, and describes water management during the active life of the mine, flooding activities and post closure. The model computes runoff values for the different mine drainage areas and performs flow routing computations through the system. The mine is located in an arid arctic environment in which there is a negative water balance. of excess water supply.

The water balance model is updated monthly using data inputs of flow measurements, pond elevations, and precipitation records. The model considers the rate at which tailings are delivered; addition of fresh water pumped for use in the process; precipitation; the accumulation of snow and ice during the winter months and its release during the spring freshet which occurs in June; and run-on generated by precipitation within the capture area of the TSF. The assumptions on tailings dry density and ice/porewater entrapment ratio are adjusted based on bathymetric survey data. An annual evapotranspiration of 80 mm is used. The TSF is operated as a closed system with zero discharge. The dam and dike structures were designed to limit seepage and permafrost beneath the TSF limits infiltration. With exception of evaporation, which

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occurs during a few months in the summer water removal from the TSF is assumed to be limited to reclaim water pumped back to the mill.

The water balance model does not consider the effects of potential power outages or pump and other equipment failures. In the event of a power failure, the milling and process circuits cease and water inputs stop. Pumping of tailings from the plant to the TSF also ceases; therefore, no additional tailings enter the TSF.

AEM performs comprehensive inspections of the TSF. In addition to routine daily inspections of active deposition areas and tailings line, detailed inspections of the TSF and perimeter containment structures and water control structures are undertaken at least monthly (biweekly in the summer months) and after unusual climate events or seismic. The TSF inspections cover (amongst other items), reclaim water elevation, tailing deposition, reclaim barge, reclaim road condition; reclaim water location, wildlife; beach levels. The perimeter containment structures and water control structures inspections cover structure integrity of downstream slopes, downstream berms, upstream berms, crest surfaces, dike/dam instrumentation for seepage; liner damage, snow and ice, instrumentation damage etc.

The TSF is designed and operated to accommodate the runoff from a spring flood or freshet (corresponding to a the June melt of a 1:100yr snowfall and rainfall accumulated over the basin from the period October to May) in excess of the maximum operating volume, while maintaining a 2 m freeboard before the possibility of a spill to the receiving environment.

The initial water balance model was calibrated using 61 years of meteorological data collected at Baker Lake A station between 1946 and 2011. This station is located approximately 80-km from Meadowbank mine which is subject to a similar Arctic climate. In 2013 Meadowbank installed a weather station at the mine site close to the Nova Camp to compare the precipitation assumed for the facility design. Approximately 1 year of data (precipitation, snowfall, temperature and wind speed) have been collected to date and will be used to recalibrate the water balance when sufficient data becomes available.

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:

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There are no open water ponds, ditches or impoundments at Meadowbank in which WAD cyanide is greater than 50 mg/L. Tailings are thickened to recover cyanide from the process solution, and then treated using the standard SO₂/air process or sodium metabisulfite to destroy residual cyanide prior to discharge to the TSF. The cyanide destruct plant is operated to obtain a WAD cyanide concentration of 15 mg/L in tailings discharge from the plant.

A composite sample of the tailings output is analyzed every 12 hrs. Records are available since operations started. For the past year (August 2013 to August 2014) the analysis results show, with few exceptions, that WAD cyanide concentrations in the tailings discharge were below 25 mg/l, with monthly averages of between 7.6 mg/L and 28.1 mg/L. Samples are also collected weekly from the reclaim pond. Analysis results reviewed for 2014 show WAD cyanide concentrations of between 3 mg/L and 20 mg/L. There appears to be an upward trend in concentration during the winter months when the pond is frozen and a decrease in the summer when the pond is ice free and natural degradation of cyanide occurs. The results are well below the 50 mg/L WAD cyanide concentration limit for protection of wildlife.

Although WAD Cyanide is maintained below 50 mg/L in the TSF and there are no other open surface water process ponds or ditches that contain cyanide solutions, AEM maintains a wildlife monitoring program. All employees are trained as part of general induction to monitor wildlife and report mortalities to security or environment. Wildlife sighting is also included as an item on the TSF inspection checklists. There have been no wildlife mortalities associated with cyanide reported since operations began.

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:

AEM's TSF is designed and operated to have zero discharge to the environment. AEM therefore does not directly discharge any cyanide process solutions to surface water.

The operation has identified two potential indirect discharges to surface water. Although the design of the TSF and rock fill dam to limit seepage has generally been effective, a coloured seepage was observed in July 2013 on the northwest side of the Portage Waste Rock Storage Facility seeping through the road perimeter into Lake NP-2, a natural fish-bearing water body. Detectable concentrations of cyanide in the seepage

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water indicated the seep originated from the supernatant tailings water. To avoid further impact to Lake NP-2 a till plug and a sump was designed and constructed by AEM to prevent further seepage discharging to Lake NP-2. In addition a sump to allow collection pumping of seepage to the TSF has been implemented. A surface water monitoring program was initiated to sample Lake NP-2, and downstream lakes NP-1 and Dogleg Lake. Analysis results for July 2014 show WAD and free cyanide concentrations in the seepage to be 0.448 mg/L and 0.019 mg/L, respectively. WAD and free cyanide concentrations were at or below detection levels of 0.005 mg/L in NP-1, NP-2 and Dogleg lakes.

On November 4, 2013, seepage was observed coming through the road embankment in front of the Assay Laboratory. The presence of cyanide, copper, and iron in the seepage water identified it as process water. The seepage was found to originate from poor joint seals in the CIP tank secondary containment basin. This containment system has since been repaired. Monthly sample monitoring indicated that no contamination had reached Third Portage Lake. Investigation and remedial work was conducted in 2014 to delineate the extent of soil and groundwater and construct an interceptor trench to prevent migration of the residual cyanide plume toward Third Portage Lake. The results of analysis of samples collected for Third Portage Lake and monitoring wells (MW-07 and MW-08) installed between the interceptor trench and Third Portage Lake showed free cyanide concentrations were less than 0.005 mg/L.

These two seepage incidents were investigated, engineering controls put in place and monitoring programs implemented. Monitoring results to date indicate that cyanide has not impacted the beneficial use for aquatic life in these surface water bodies.

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

Discuss the basis for the Finding/Deficiencies Identified:

AEM protects groundwater through a combination of containment of process water and groundwater monitoring to ensure zero discharge is maintained. The TSF dam structures are designed with a compacted till blanket extending upstream of the toe and an impervious liner on the upstream side of the rock fill structure to limit seepage through the dam. Permafrost below the TSF limits infiltration.

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The potential impact to groundwater is considered minimal because the site is underlain by permafrost at a depth of approximately 1.5 m. Shallow groundwater flow may occur above the permafrost during the short summer season. When there is a potential that groundwater has been impacted AEM has conducted groundwater investigations. As discussed in Section 4.5 monitoring wells were installed at the road embankment in front of the Assay Laboratory to ensure groundwater seepage was not impacting Third Portage Lake.

There is no designated groundwater use established by the Government of Nunavut. In the vicinity of the site there is no beneficial groundwater use primarily because the existence of shallow permafrost which precludes the extraction of groundwater. All water resource is provided by the many lakes present in the region. In situations where groundwater flow provides an indirect discharge to surface water the *Canadian Council of the Minister of Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life* would apply. Monitoring results to date indicate that cyanide has not impacted the beneficial use for aquatic life in Third Portage Lake.

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

The operation is: in full compliance
 ■ in substantial compliance
 not in compliance...with Standard of Practice 4.7

Discuss the basis for the Finding/Deficiencies Identified:

All cyanide tanks and vessels within the mill are constructed within banded concrete basins and founded on concrete bases that provide secondary containment beneath the tank. During the audit all basins were observed to be clean and free of materials and fluids that could compromise their capacities. The containment areas are constructed with concrete sumps that, except for the leach tank containment, have dedicated pumps so spills can be pumped immediately back into the process. The leach containment sumps are pumped using a mobile pump as and when needed.

A study by Stavibel Engineering Services in 2014 found that the reagent cyanide (mixing/storage tanks), detox tanks and the CIP tank containment basin capacities were insufficient to contain 110% of the largest tank within the containment. The capacity of the leach tank containment and several other containments were not included in the assessment. The joint seals on several containments reported in poor condition. AEM implemented a program to repair joint seals and expand the containment capacities. Repair work on the joint seals for the containments inside the mill and in the leach tank containment basin were nearing completion at the time of the field component of the audit. The integrity and capacity of the all containment basins was included in detailed

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engineering review of the Mill as required under 4.8(5) of the Code. To be fully compliant with this requirement of the Code, AEM must provide documentation confirming that all cyanide tank containments have adequate capacity. **Please refer to CAR AEM-ICMC-CAR-02.** The existing interior and exterior containment basin structures and concrete containment floor within the process plant provide secondary containment for immediate releases from process tanks. These areas are also equipped with floor sumps and automated pumps to return spilled solution back to the process. Additionally, AEM has operational procedures in place to manage the process solutions and maintain the associated containment facilities within the process areas on a daily (per shift) basis. Based on these measures, the routine inspections performed by AEM, and implemented procedures for containing, characterizing, and cleaning up spills that may occur outside of containment areas, no immediate or substantial risk to health, safety or the environment is deemed to exist during implementation of this CAR.

No process solution is permitted to be discharged to the environment. All solutions collected in containment basins are pumped back into the process including any precipitation that collects in the leach tank basin.

All process lines are above-ground and located over containment basins to capture any leaks and prevent releases into the environment and impact of surface waters. To minimize the potential of leakage, the reagent strength cyanide lines are welded lines with no threaded joints.

The corridor for the tailings and reclaim water pipelines between the mill and the TSF is not lined. If a tailings or reclaim water release occurred flow would either be captured in the low basin area north east of the mill or would flow into the South or North cells of the TSF. The presence of shallow permafrost would limit the potential for infiltration into the ground. Except for a small length of the route where an earthen platform had been constructed over the line to accommodate a crane for leach tank repair and maintenance, the lines are not buried and were visible for inspection. Subsequent to the field component of the certification audit a section of the earth platform was excavated to form a trench and fully expose the pipeline. As a temporary measure steel plates were spanned across the trench over a short section to protect the pipeline from potential damage from a falling crane load. The configuration allows AEM to inspect and monitor the pipeline for potential leakage. AEM indicated that next summer a culvert will be constructed for the pipeline which will allow the earthen platform to be reestablished over the pipeline but still allow the integrity of the pipeline to be monitored.

Cyanide mixing, storage and process solution tanks are constructed materials compatible with cyanide and high pH conditions. Cyanide tanks are constructed of carbon steel; process pipelines are typically constructed of carbon steel or HDPE; the tailings and reclaim pipelines are constructed of HDPE.

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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:

Detailed TSF design report, and an as-built construction report for the TSF, that documents construction activities that primarily occurred between 2009 and 2011 during construction of the rock-fill roads, storm dikes, saddle dams, Stormwater Dike and the Saddle Dam Connector, are available at the site and demonstrate that a QA/QC program was implemented during construction. The as-built report includes descriptions and sequence of construction activities and provides records of geomembrane deployment and earthwork material testing. The design report and the as-built construction reports are signed by professional engineers.

At the time of this code verification audit AEM were in the finalizing the construction and commissioning of the Central Dike for the South Cell of the TSF which was scheduled to begin accepting tailings in October 2014.

The mill was designed by Hatch Ltd. Signed design drawings for the mill are retained by AEM but no as-built draws or QA/QC documents were available. To supplement the original QA/QC documentation available, AEM commissioned GCM Consultants to conduct inspections of the cyanide facilities at the Mill to ensure that the facilities are operated safely, efficiently, and in accordance with the design intent and generally accepted good practice. To be fully compliant with this requirement of the Code, AEM must provide a report signed by an appropriately qualified person concluding that the facility's continued operation within established parameters will protect against cyanide exposures and releases. **Please refer to CAR AEM-ICMC-CAR-02.** Based on visual inspection and review of AEM's maintenance program, cyanide facilities were being maintained in generally good condition and appeared to be fulfilling their intended functions. The absence of specific QA/QC records for the mill facilities pending completion of an independent engineering review does not, in the auditors' judgment, represent a substantial or immediate risk to the environment or the health and safety of the workforce.

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

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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:

AEM has implemented a *Water Quality and Flow Monitoring Plan* in accordance with the requirements of the *Nunavut Water Board Type A Water license # 2AM-MEA0815*. The Plan summarizes the monitoring locations, sampling frequency, monitored parameters, compliance discharge criteria and an adaptive management plan for water quality. The plan has been divided into two levels of investigation to characterize the range of impacts between the sources of contact water in the individual mine facilities and the point of discharge or release of contact water to the receiving environment. The two levels of monitoring include: 1) compliance monitoring; and 2) event monitoring, i.e., monitoring of unexpected events such as spills, accidents, and malfunctions. The program does not include discharge monitoring as there are no discharges of process water to surface water.

AEM has also developed monitoring and sampling procedures to execute the monitoring plan. These procedures were developed by experienced AEM environmental personnel using industrially established sampling and analytical procedures for soil, surface water, groundwater and aquatic life assessment and monitoring, adapted to account for the Arctic conditions within which the sampling program has to be conducted. These procedures specify sampling methods, sample preservation techniques, sample labelling and quality assurance/quality control, chain-of-custody and shipping instructions. AEM utilizes a *Water Sampling* field checklist for recording sampling events. Information collected the form includes sample I.D. and location; sampling crew names, date and time of sampling; field measurements (temperature, conductivity, dissolved oxygen, pH and turbidity) depth of water; depth sample collected; volume of sample; weather conditions, and other observations.

Compliance monitoring samples are submitted to accredited third party laboratories. AEM's onsite laboratory conducts WAD cyanide analyses of the tailings discharge and reclaim pond water. This laboratory is operated by a qualified chemist using the standard picric acid method of analysis.

The potential for wildlife impact by cyanide is low because the reclaim pond is frozen over for several months of the years and WAD cyanide concentrations in tailings being discharged to the TSF is well below 50 mg/L. Wildlife mortality monitoring is nevertheless conducted informally throughout the year as a responsibility of all employees. Monitoring is also formally documented on the *TSF Detailed Field Inspection Form*. Wildlife mortalities are reported and investigated through the Incident Reporting Procedure.

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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:

An *Interim Closure and Reclamation Plan* has been developed as a requirement of Nunavut Water Board Type A Water license # 2AM-MEA0815. This plan includes an updated estimate of closure and reclamation costs. The Plan is used to establish closure and reclamation costs for the mine and setting appropriate financial security with the Minister.

To more specifically address decommissioning and closure of cyanide facilities AEM prepared a draft plan entitled *Cyanide Management Decommissioning Overview* (CMDO). This plan will form an integral component and appendix of the *Interim Closure and Reclamation Plan*. The CMDO provides a generic list of steps necessary to decommission equipment and areas that have contained cyanide during the operation of the Meadowbank mine. The CMDO describes the steps required to decommission cyanide facilities including health and safety precautions, environmental considerations, cyanide stock reduction, disposal of unused stock, decontamination of piping and equipment, contaminated site remediation, waste disposal and post closure monitoring, if required. The CMDO contains a conceptual schedule for cyanide decommissioning which will be reviewed and updated as needed as closure approaches.

The *Interim Closure and Reclamation Plan* was updated in 2012, and in January 2014. AEM is required to submit a Final Closure and Remediation Plan at least 12 months prior to the expected mine closure (currently scheduled for 2017).

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

The operation is: ■ in full compliance

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in substantial compliance
not in compliance...with Standard of Practice 5.2.

Describe the basis for this Finding/Deficiencies Identified:

A cost estimate of the closure and reclamation activities for the Meadowbank Project, based on the current end of mine life configuration was initially \$26 million. This estimate included closure of all mine facilities and infrastructure, the AWPAR and the facilities at Baker Lake. This estimate was used as the basis of setting conditions in the Water Licence for the initial financial security for the Meadowbank Project.

Part C of the Water Licence stipulates the amount of financial security required for the first five years of operation and prescribed increasing in the security amounts each January for the years 2010, 2011, 2012, 2013 and 2014. Thereafter the Water Licence stipulates that the closure and reclamation costs be reviewed annually.

Pursuant with the *Water Licence*, AEM was required, as of January 2014, to furnish and maintain a security of \$43,900,000 with the Minister. The Water Licence also stipulates that AEM furnishes and maintains such further or other amounts as may be required by the Board based on annual estimates of current mine restoration liability. AEM provided a copy of a 1 January 2014 amendment of a Letter of Credit with the Bank of Nova Scotia with the Ministry of Indian and Northern Development, Nunavut listed as beneficiary, in the amount of \$43.9 million, as evidence that the financial security was in place and up to date.

The CMDO, dated October 2014, specifically addresses the closure and decommissioning of cyanide facilities. AEM estimated the cost for closure and decommissioning of all cyanide facilities to be \$4,362,329. This cost is based on a third party contractor undertaking the work. This estimate includes many items that are not considered by the Cyanide Code, e.g., site contouring, post closure water quality monitoring and dike stability monitoring. Nevertheless, the estimate is well within the current financial security set up for the Meadowbank Project.

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

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

Describe the basis for the Finding/Deficiencies Identified:

The Meadowbank facility implements and maintains a comprehensive Health and Safety Program. The program relies on the identification of all potential hazards resulting from operations. The process of identification, assessment and risk control is revised periodically or following incident and accident investigation or audits. The Health and Safety Program is based on an approach known as the “*Supervision Formula*”. The favoured means to implement the *Supervision Formula* is the employee’s “*Work Card*”. The *Supervision Formula* and *Work Card* process is monitored by a Follow Up Committee responsible for assessing the effectiveness of the overall approach to health and safety at the workplace. The identification of cyanide related exposure is further identified through the workplace inspection program.

Meadowbank established several procedures to perform cyanide related tasks. These cover operational, maintenance, storage, transportation and emergency response or spill contingency related activities. All cyanide related procedures include a “Required Equipment” and “Specific Conditions” section where PPE is generally identified and further detailed for safe completion of tasks. Similarly, specific documents such as the *Spill Contingency Plan* describe required PPE.

As discussed in Section 4.1, AEM is developing a formal Management of Change (MOC) procedure that will include the environmental and H&S departments in the review and approval process. This procedure will replace the existing informal review process in place at the time of the field component of the audit. To be fully compliant with this requirement of the Code, AEM must provide evidence that the MOC procedure has been finalized and implemented. **Please see Attachment A, CAR AEM-ICMC-CAR-04.** Because changes and modifications are generally being captured by the existing evaluation and approval process, it is the auditors’ judgment that there is currently no substantial or immediate risk to the environment or the health and safety of the workforce, while this procedure is being finalized and implemented.

The Meadowbank Division follows Agnico Eagle Mines “business values”. The rolling out of this commitment entails continuous and effective communication between management and workers in a multilingual environment involving a schedule based on a rotational system. To meet expected health and safety performance, the facility relies on different means of communication with employees. These include the joint health and safety committee; safety meetings, toolbox meetings and *Work Card*.

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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:

AEM has developed written management and operating plans and procedures for all cyanide facilities. The operating plans and procedures developed and implemented by AEM cover safe operation, maintenance and management of the facilities. Training and the implementation of the *Supervision Formula* also ensure operators systematically follow operating procedures at all cyanide facilities.

To prevent the generation of HCN gas during the cyanide mix procedure pH is maintained above 12.0. Operating procedures also require that pH in the process solutions to be maintained greater than 10.5. If pH drops below 10.5 an alarm is activated and the level corrected by addition of lime. pH levels are monitored by process operators through inline sensors and manual tests, and data are recorded on daily Leach-CIP Reports.

The Mill is equipped with 16 strategically located fixed Dräger HCN monitors. The coverage of the fixed HCN monitoring stations is supplemented with the use of portable GasBadgePro HCN monitors. AEM has a contractual agreement with Industrial Scientific, the manufacturer and service provider, to maintain these portable HCN monitors. The fire extinguishers are non-acid sodium bicarbonate based and the cartridges are nitrogen based. The extinguishers are capable of addressing an A, B or C type fires. The inspection and maintenance of fire extinguishers is managed through the JD Edwards, maintenance management software.

Shower/ eyewash stations were observed at strategic locations on the ground floor of the mill. Also there was a shower/ eyewash station on each level of the cyanide mix plant. The stations are monitored in real time such that if they are solicited, an alarm is automatically sent to the control room operator who is able to inquire on the circumstances of the use of the emergency equipment. The upper floors of the mill and the SAG cyanide addition point were; however, only served by portable eyewash units or eyewash bottle stations. The audit team requested that AEM conduct a risk review to determine whether the distribution of showers is adequate. Subsequent to the onsite audit AEM completed a risk review and concluded that additional shower/eyewash stations should be installed on the upper level of the mill. To be fully compliant with this requirement of the Code, AEM must provide evidence that shower/eyewash stations have been installed and operating. **Please see Attachment A, CAR AEM-ICMC-CAR-**

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05. Based on review of AEM operating procedures it is the auditor's judgment that adequate controls are currently in place that there is not a substantial or immediate risk to health and safety to the workforce while these shower/eyewash stations are being ordered and installed.

The AEM mining complex is well equipped with signage indicating the presence of sodium cyanide. Indeed, signage was observed on piping, tanks, near pumping areas, outdoor storage pad for C-Cans and mill entry doors. For signage on observed piping, the information included flow direction at critical areas. The hazard communication is further supported by the presence of MSDS hard copies in the Mill and for office areas, from the online resources.

AEM has procedures in place that meet the Nunavut regulatory framework to systematically investigate the circumstances leading to accidents and incidents as well as damage to assets and production loss. The procedure related to investigation details who and how to perform an investigation and sets reporting requirements and report format templates. AEM also has a training program that is a prerequisite for conducting accident or incident investigation.

Standards of Practice

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

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

Describe the basis for this Finding/Deficiencies Identified:

In compliance with federal and territorial regulations, the site developed a comprehensive Emergency Response Plan as well as implemented several first aid measures. The first aid measures include emergency showers and eye wash stations. This critical equipment is inspected regularly to ensure their readiness. Oxygen administration kits and defibrillators are additional first aid equipment available at the Mill. These oxygen tanks and defibrillators are inspected by the Emergency Response Team members regularly and are used only by trained personnel. Ten-minutes escape kits used as respiratory protection equipment complete the set of Mill emergency response equipment.

In the event of a worker being exposed to a cyanide release, operators and emergency response team members are instructed to establish a security perimeter and implement

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the decontamination measures. Once a cyanide-exposed worker is decontaminated and provided with initial first aid measures, the victim is directed to the Meadowbank health clinic located in the Service Building, which is physically connected to the Mill. The clinic is staffed with nurses and paramedics on a permanent basis. A doctor based in the province of Quebec and specially contracted by Meadowbank is on call 24/7. AEM keeps a supply of hydroxocobalamin antidote (Cyanokit®) at the health clinic.

The Meadowbank health clinic staff follows a well-documented procedure for medical evacuation. The Nunavut Health Agency's toxicologist, the Meadowbank on call physician and mine site nurse are involved in the decision process leading to a medical evacuation. Given the geographical location of the mine, the legal health services framework of Canada and the climate conditions prevailing during part of the year, there is no alternative to the current established mechanism for treating and evacuating a cyanide exposed employee.

An Emergency Response Team (ERT) supports Meadowbank operations with a minimum of 20 on-site ERT members at any given time. The ERT members are trained to address foreseeable emergency scenarios including the hazardous on-site routine activities that could result in cyanide exposure. To address exposure scenarios, the ERT conducts area specific mock drills to build and maintain response capacity and effectiveness. The mock drills are implemented regularly and the results of each emergency response are recorded into a hard copy logbook as stipulated by the Nunavut regulation.

In addition to specific mock drills, AEM conducts catastrophic mock drills every three years. A catastrophic mock drill normally involves different mine departments. The latest Meadowbank catastrophic mock drill generated several corrective actions to improve response effectiveness between all actors. The Emergency Response Councilor coordinated the implementation of the corrective measures resulting from the 2013 exercise.

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.

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Describe the basis for the Finding/Deficiencies Identified:

Meadowbank has developed and implemented an integrated *Site Emergency Response Plan* (ERP). The 63 pages tactical document is broken down in six sections plus 13 appendices. Appendix B is entirely dedicated to cyanide related emergency response. The ERP refers to several other relevant documents in the event of an emergency response including a *Spill Contingency Plan* and a *Crisis Management Plan*. As listed in the *Spill Contingency Plan* and ERP, Meadowbank has trained manpower and adapted equipment to address various emergency scenarios. A list of external contacts is provided and includes local, territorial and national stakeholders as well as logistic resources, both in Baker Lake and in Nunavut.

The ERP contains information about the specific duties of the key senior managers and health clinic officials. The environment department is also cited in the *Spill Contingency Plan* as the lead authority with regards to spill clean up effort. Meadowbank systematically investigates and reports on all accident and incident involving cyanide release. A follow up on the implementation of corrective action measures is performed by AEM.

Standards of Practice

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 tactical approach and general orientation of emergency response planning was developed in a collegial manner between various mine department managers. In preparing for the start of AEM operations in late 2009, the ERP was revised to address operational emergency response scenarios. Mine management supported the establishment of the Community Liaison Committee in 2010. This stakeholder group is met with on a regular basis and is a means for communicating various issues of interest to the community of Baker Lake including cyanide emergency response. No specific concerns have emerged from the community about cyanide emergency response although messages are broadcasted on the local radio station to inform Baker Lake residents about the cyanide transportation schedule during the short summer season.

The mine facility relies exclusively on its own resources and capacity to manage cyanide related emergencies. As such, no Baker Lake community stakeholder has a vital role

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described in the ERP other than police force implementing a security perimeter in the Baker Lake area. Cyanokit® antidotes were distributed to the hamlet's Health Clinic.

Standards of Practice

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's section on emergency measures provides a flow diagram, which presents the decision process to manage a cyanide release or HCN exposure and lists the responsible persons involved in the emergency response decision process. The plan specifies the roles and responsibilities of the ERT members and senior managers. Meadowbank relies on 50 trained ERT members. The call out procedure is explicitly mentioned in the ERP and communicated during training sessions. ERT members are called on individually allocated pagers. The list of emergency response equipment is found in the *Spill Contingency Plan*. The ERT members are responsible for ensuring that emergency response equipment is fully functional at all time. The emergency response equipment is located at the mine site but some basic containment items are kept in C-Cans distributed along the private road and at the Baker Lake Marshalling Area.

Standards of Practice

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:

Meadowbank complies with Nunavut regulatory obligations by reporting all accidents or incidents leading to worker hospitalization or fatality. Likewise, a cyanide spill of 5 L or 5 kg is a reportable event under the current legal framework. The need to report a cyanide

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release is confirmed in the *Spill Contingency Plan*. The ERP as well as the *Spill Contingency Plan* provides the key external agency contact information for emergency response purposes. This includes the contact information for Baker Lake community stakeholders. The *Crisis Management Plan* provides rationale for when to contact media.

Standards of Practice

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 *Spill Contingency Plan* contains a dedicated cyanide section in Appendix I. This appendix provides rationale on how to address a cyanide release outdoors as well as inside a building. Likewise, guidance is provided to address a cyanide spill near water. The appendix informs on the need and method for neutralization if the spill occurs on soil and the need to place contaminated soil in containers. There is explicit reference on the prohibiting use of neutralization chemicals near water or drainage channel. A *Cyanide Sampling Plan* has been developed for investigation and remediation of soil and water based cyanide impacts. The Plan provides guidance on how to perform sampling, types of analyses to be undertaken, clean up and closure criteria etc. The Plan also includes a contingency for potable water supply.

Standards of Practice

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 introductory statement in the ERP confirms a review process is undertaken on an annual basis to ensure compliance with applicable regulations, to evaluate its effectiveness and improve its procedures. The Emergency Response Councilors plan and implement two types of mock drills: catastrophic and area specific. The intent

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behind catastrophic mock drills is to measure emergency response on a large-scale with multi stakeholders both internal and external to the organization. The last catastrophic mock drill occurred in December 2013. The area specific mock drills are those exercises planned by the ERT for the ERT members. These drills are narrow in scope and designed to practice a specific skill set. The mock drills are conducted on a regular basis as part of the ERT training requirement. Opportunities for improvement are captured and lead to plan and procedure modification.

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

Describe the basis for the Finding/Deficiencies Identified:

Upon arrival to Meadowbank, all employees, contractors and visitors complete an orientation and a chemical awareness training, which presents topics relevant to mine including cyanide hazard. As such the cyanide awareness training covers hazard recognition; health effects; symptoms of exposure; and response to exposure among other issues. Categories of personnel that receive the Chemical awareness training include TSF personnel; warehouse; Mill operators and maintenance; Arctic Fuel Service trucking personnel (contractor); environment department personnel, emergency response team members etc. The Chemical Awareness and other training sessions are followed by a short exam and a review of the exam questions with the trainer. It is Meadowbank policy to provide refresher training to all employees after a period of 36 months or when workers are selected to occupy a new position. Special attention is given to student interns and contractors who may visit the mine site more than once in a given year. For these categories of visitors, cyanide hazard recognition refresher training is provided at the beginning of each presence at the mine. The cyanide hazard recognition notions are further examined in subsequent job related trainings if the position involves working in close proximity to cyanide. In this case, technical training may last up to 84 hours. On the job review of cyanide hazard recognition is revisited through the safety and “toolbox” meetings and Work Card. The training effectiveness is assessed through the Supervision Formula. The Meadowbank training department records all training related information on local and corporate managed databases. The training department also keeps hard copy of exams in employee’s file.

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Standards of Practice

8.2 Train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community and the environment.

The operation is: ■ in full compliance
 in substantial compliance
 not in compliance...with Standard of Practice 8.2.

Describe the basis for the Finding/Deficiencies Identified:

AEM follows Nunavut regulation pertaining to mandatory employee training as well as its own Sustainable Development policy, which includes the “Operate Safely” concept. As such, the Meadowbank Mill operations adopted a “Process Plant Career Path” system to train workers to perform their normal production tasks, including the safe management of cyanide, and manage employment needs and opportunities. The Career Path involves seven levels of responsibility. Employees must work through each level of responsibility for a determined period of time before being considered for the next level. The progressive level of responsibility system allows individuals to acquire the necessary skills to be considered for training for the following level. Most levels require a minimum of two years of work at the Meadowbank facility plus 84 hours of theoretical and practical training with evaluation. The candidate must succeed the examination. Finally, the trainer must confirm in writing that the candidate is considered competent for the assigned position. The other mine positions involving close proximity to cyanide do not have a similar progressive responsibility system. However, they are trained and evaluated for the position’s specific requirements. The training has both theoretical and practical components follow by an examination process.

The training department’s has two Mill Process trainers. These trainers provide in-depth, accurate and up to date task training on Mill operations, including operations where cyanide is a hazard. The Meadowbank trainers were recruited on the basis of their extensive experience in gold milling (over 30 years of experience), in health and safety as well as their ability to train workers effectively. Meadowbank is in the process of implementing a trainer performance evaluation program. The program is planned to begin before the end of 2014. In the meantime, mine management is capturing training effectiveness from the employee’s perspective through an annual survey process.

The tasks oriented training courses include a theoretical part as well as a practical element. Relief Operators assess training effectiveness by performing task observations on employees. Supervisors and Mill trainers also support this activity. The frequency of refresher training related to cyanide management tasks is set at 36 months following a

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Nunavut safety inspector recommendation. The training department refers to its training needs matrix on a continuous basis to monitor refresher training that must be delivered to employees. The training records of employees are retained electronically. In addition, paper files for individual employees are kept in filing cabinets in the training department. The paper files contain the hand written "Task Observation" documents and written copies or exam records.

Standards of Practice

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

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

Describe the basis for the Finding/Deficiencies Identified:

Several Meadowbank training courses address, to varying degree, the measures to be taken by concerned employees should there be a cyanide or by-product release and exposure. Thus, Mill workers are trained in cyanide exposure recognition and basic response to a cyanide emergency which includes communicate a Code1 on local radio system, ensure protection with appropriate PPE, and, if safe to do so, remove a victim from a contaminated area, remove contaminated clothing and decontaminate the victim as well as administrate oxygen. The mine site elected for a "buddy" approach when performing hazardous tasks associated to cyanide handling. The work system offers an effective means of communication with supervisors who are capable of further alerting either departmental first aid responders or the available Emergency Response Team members through a two-way radio system.

The Emergency Response Team members receive comprehensive training about potential cyanide related incidents. The ERT is composed of 50 individuals to ensure compliance with territorial regulations in the context of a rotational schedule. The ERT members are pooled from different departments at the mine site. The ERT Councilors coordinate the 12-hour per two month training of each ERT members. As such, the issue of refresher training is considered. The subject of the training session covers all surface mine rescue topics and includes both theory and practice. During the practice sessions, first aid and decontamination measures are often included in the mock drills. The mock drills are planned, implemented and evaluated for purposes of improvement of the quality of the response. Newly purchased emergency response equipment is systematically tested upon arrival to improve training delivery. Otherwise, training on equipment use for cyanide response measures such as PPE, decontamination

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equipment found in a mobile trailer (pump, patching kit) is offered by ERT coordination unit. The master plan provides details on the approach, the resources, the roles and responsibilities to respond to emergencies. The ERP refers to other documents considered essential for a cyanide release. This includes the Spill Contingency Plan and Crisis Management Plan. The ERP is revised annually or as needed. AEM management including the emergency response team, and the environment and health & safety departments have engaged with the Baker Lake community and Nunavut representatives to communicate cyanide risks, measures to ensure safe cyanide transportation and emergency response. Overall, good faith effort is underway by AEM to make stakeholders aware of the elements of the ERP related to cyanide. The local police force has accepted a role to enforce a security perimeter around an affected site in the event of an emergency.

As discussed in Section 8.2 training records are retained electronically. In addition, as a legal requirement from the territory of Nunavut ERT training records are kept in a hard copy logbook. Logbooks covering the periods of 2008-2011 and 2012 to present showed topics covered during the training sessions (practical or theoretical, ERT scenarios, catastrophic mock drill). The hard copy employee files and electronic records retain other information pertaining to date of training, trainer name and exam or "Task Observation" results.

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:

Meadowbank mining project maintained a platform for exchange of information with Baker Lake representatives as well as governmental agencies since 2005. The process was instrumental in designing standard operating procedures that account for the sensitivity of the local environment and concerns of the community. In addition, AEM supported the establishment of the Community Liaison Committee (CLC) in January 2009. Meadowbank senior managers participate in CLC meetings held on a quarterly basis. AEM maintains an office in Baker Lake. An open door policy is adopted to discuss and address community concerns or questions. In addition to the formal

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communication channels, Meadowbank holds multiple events at the mine site on a yearly basis.

Standards of Practice

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:

Different Inuit stakeholders have a varying degree of understanding of cyanide partly because the local Inuktitut language often does not provide words to express the technical concepts. The Meadowbank representatives adapt to the circumstances and present cyanide related topics according to the level of understanding of the audience. This means that discussions are technical with Kivalliq Inuit Association and kept general with local residents.

Standards of Practice

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:

A general description of the Meadowbank operations, including the cyanidation process and information regarding exploration and permitting are posted on the Agnico-Eagle website (<http://www.aemnunavut.ca/index.php?q=en/meadowbank>). This website is presented in English and Inuktituk. The information is accessible from AEM's main website page by selecting the "Community Sites" in the horizontal menu and "Nunavut" in the subsequent drop down menu. However, AEM does not currently have a written description of cyanide management activities in the Inuktitut language for community members that do not have computer access. AEM is in the process of developing a brochure prepared in the Inuktituk language that addresses cyanide management that will be made available at the Baker Lake office. To be fully compliant with this requirement

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of the Code, AEM must provide a copy of the new Cyanide Management Brochure. **Please see Attachment A, CAR AEM-ICMC-CAR-06.** It is the auditors' judgment that the currently lack of a cyanide brochure for the community does not present a substantial or immediate risk to health and safety. At the time of the field component of the audit, AEM had implemented a process aimed at informing Baker Lake residents about road access restriction during the months when cyanide is transported to the mine. The information is disseminated through regular broadcast on local public radio station.

In Nunavut, any workplace injury that results in a hospitalization or fatality is a reportable event to the government agency responsible for health and safety. This information is available to the public. Spills are required to be reported under the conditions set in the Nunavut Water Board License. AEM have chosen to report all cyanide spills greater than 1 kg or 1 L (less than the 5 kg or 5 L regulatory threshold reporting requirement). Two cyanide incidents have occurred since operations began in 2010. On 28 March 2013 an incident involving a spill of about 20 kg of cyanide briquettes occurred during the opening of a C-Can. On 20th August 2014, an operator was splashed with cyanide solution following a failure of a piece of equipment during maintenance (coupling at a service pump). Such reports are submitted to NIRB and are posted on the agency web-site which is accessible to the public.

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