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**INTERNATIONAL CYANIDE MANAGEMENT CODE  
GOLD MINING OPERATION RECERTIFICATION AUDIT  
BARRICK GOLDEN SUNLIGHT MINE, MONTANA**

**SUMMARY AUDIT  
REPORT**

*Submitted to:*

*International Cyanide Management Institute  
1400 I Street NW, Suite 550  
Washington, D.C. 20005*

*and*

*Barrick Gold of North America Inc.  
453 Montana Hwy 2 East  
Whitehall, Montana 59759*

*Submitted by:*

*ERM-West, Inc.  
136 E South Temple Street, Suite 2150  
Salt Lake City, Utah 84111*

January 19, 2018

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### Location and Description of Operation

Name of Project: Golden Sunlight Mine

Project Owner / Operator: Barrick

Name of Responsible Manager: Dan Banghart

Address and Contact Information: 453 Mt. Hwy 2 East, Whitehall, Montana USA 59759  
[dbanghart@barrick.com](mailto:dbanghart@barrick.com)

The Golden Sunlight Mine (GSM) is an open pit gold mine in Jefferson County, Montana located on the eastern flank of a fault-bounded mountain range known as Bull Mountain. Barrick's Golden Sunlight Mines, Inc. operates the GSM. It is located approximately six miles northeast of Whitehall, Montana in portions of Sections 17, 19, 20, 28, 29, 30, 32 and 33 of Township 2 North, Range 3 West, Section 6 of Township 1 North, Range 3 West, and Sections 24 and 25 of Township 2 North, Range 4 West. GSM has operated since 1981 under a Hard Rock Mine Operating Permit (No.00065) issued jointly by the Montana Department of State Lands (DSL), since reorganized into Montana Department of Environmental Quality (MDEQ), and the U.S. Bureau of Land Management (BLM), and is presently operating under Amendment 014 to the original permit. The mill was shutdown from April 2009 to January 2011 for process refitting to process ore from the East Area pit.

GSM has been mined by conventional open-pit methods. Open pit mining at GSM typically removed between 60,000 to 90,000 tons of material per day using conventional drill, blast, load and haul mining techniques. Approximately 2,400,000 tons of ore were hauled to the mill for processing each year. The GSM open pit is located just east of a major hydrologic divide that is coincident with a topographic ridge oriented north-south along the lower portion of the Bull Mountains. The active mine area encompasses both sides of the divide. The active and inactive mine areas at GSM cover approximately 5,071 acres.

Gold is extracted from the ore at GSM using a variety of physical and chemical processes. Ore is first crushed and ground. Thickening follows grinding and slurry from the thickener is leached using the carbon-in-pulp process (CIP). Carbon adsorption occurs in the CIP tanks and carbon columns charged with activated carbon. Slime and sand fractions from the CIP are separated in the wash circuit. The slimes report to the cyanide destruction circuit prior to disposal in the Tailings Disposal Facility (TDF). GSM also uses Sand Tailing Retreatment (STR) to improve the gold recovery and the sand fraction from the wash circuit goes to the STR circuit. The STR circuit separates the gold-bearing sulfides from the sand portion of the tailing by gravity concentration in spiral-shaped launders. The pyrite-rich concentrate is ground in a ball mill to expose gold encapsulated in pyrite to further cyanide leaching. Pyrite leach tailing is pumped back to the main leach circuit.

The final processing step is removal of gold from the carbon in pressure stripping vessels. Gold removed from the carbon is returned to solution for electrowinning onto steel wool cathodes. The gold-laden steel wool is smelted and poured into bars. Carbon is reactivated through acid washing followed by the regeneration kiln. Electro-winning product and gravity concentrates are refined onsite.

Process reagents used throughout the milling process include sodium cyanide, calcium hydroxide, activated carbon, and sodium hydroxide. A sulfur dioxide (SO<sub>2</sub>)/Air cyanide destruction plant was constructed at GSM in 1997 and 1998.

Since the concentration of cyanide in the tailing slurry remains over 200 mg/l, a sulfur dioxide (SO<sub>2</sub>)/Air

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cyanide destruction plant was constructed at GSM in 1997 and 1998. Ammonium bisulfite is used as the source of SO<sub>2</sub>. The plant consists of a combination of two unit operations. One unit utilizes a single high-compression thickener to recover a portion of the process solution for reuse in the milling circuits. The other unit takes thickener underflow and reduces cyanide concentration to less than 5 mg/l.

GSM uses sloped floors, sumps, concrete barriers, and secondary and tertiary containment to contain solution within the plant site area. Spill response, containment, and reporting procedures are provided in the Spill Prevention, Control, and Countermeasure (SPCC) Plan and the GSM Solid and Hazardous Waste Plan (2015).

There are two tailing impoundments at GSM. Tailing Impoundment No. 1 is no longer being used and has been reclaimed. Tailing Impoundment No. 2 is active. Additional tailings impoundment lifts were constructed in 2013-14 and again in 2015-16.

There is no perennial or intermittent stream flow out of the active mine area. However, the active mine area contains numerous incised drainage features that may exhibit ephemeral surface water flow in response to intense rainfall events. These events are generally infrequent and of short duration such that some drainage features may experience short-term runoff several times a year, and others may flow only once every several years. Since the ephemeral drainages at GSM are above the regional groundwater system, storm water rapidly infiltrates into the subsurface within the channel margins and provides a source of groundwater recharge.

In late 2015, open pit mining was discontinued at GSM, and approximately 136 employees were laid-off in connection with this change in operations. GSM is continuing development of its underground mining project utilizing a mining contractor employing 50 to 60 employees. The mill continues to operate, processing ore from various regional mining operations. GSM supports the underground mining project and mill operation with a staff of approximately 34 employees.

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**Certification**

Audit Company:           **ERM-West, Inc.**  
Audit Team Leader:   **Brent C. Bailey, P.E., CEA**  
E-mail:                   brent.bailey@erm.com  
Audit Dates:            August 8 – 10, 2017

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 (ICMI) and that all members of the audit team meet the applicable criteria established by the International Cyanide Management Institute for Code Verification Auditors.

I attest that this Summary Audit Report accurately describes the findings of the verification audit. I further attest that the verification audit was conducted in a professional manner in accordance with the International Cyanide Management Institute, Mining Operations Verification Protocol (December 2016) and using standard and accepted practices for health, safety and environmental audits.

<u>Brent C. Bailey</u> Name of Lead Auditor	 Signature	<u>November 8, 2017</u> Date
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<u>Joe Driscoll</u> Name of Auditor	 Signature	<u>November 8, 2017</u> Date
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**Summary of Findings**

**The operation is**            **in full compliance with**  
                                       in substantial compliance with      **All Code Principles**  
                                       not in compliance with

The Golden Sunlight operation was found to be in Full Compliance with the International Cyanide Management Code; and this operation has not experienced compliance problems during the previous three-year audit cycle.

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

**Basis for Audit Finding:**

GSM purchases all cyanide from the Cyanco plant in Winnemucca, Nevada. This Cyanco plant was recertified in full compliance by the ICMI in November 2016. The contract between Barrick Gold of North America, which includes GSM, and Cyanco requires that Cyanco only provide cyanide manufactured at an ICMI-certified plant.

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

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

**The operation is**            **in full compliance with**  
                                       in substantial compliance with      **Standard of Practice 2.1**  
                                       not in compliance with

**Basis for Audit Finding:**

Barrick has a written contract with Cyanco to provide cyanide to all of its North American operations, including the GSM. The contract and amendments require Cyanco to comply with the "Principles and Standards of Practice" of the International Cyanide Management Code during the manufacture, transportation, storage, use, and disposal of Product (cyanide). Compliance with the Code requires the supplier and transporter to conform to specific compliance matters set out in the Code's Cyanide Production and Cyanide Transportation Verification

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Protocols. These Verification Protocols specifically address packaging, labeling, storage, transportation, unloading, safety, security, training, and emergency response in accordance with the Code. Specific clauses in the contract amendments require compliance by any Cyanco’s subcontractors with the Code and that the subcontractors are Code-certified.

*Standard of Practice 2.2: Require that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management.*

**in full compliance with**

**The operation is**             in substantial compliance with **Standard of Practice 2.2**

not in compliance with

**Basis for Audit Finding:** The operation is in full compliance with Standard of Practice 2.2. GSM requires cyanide transporters to implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management.

GSM contracts with its supplier, Cyanco, who in turn contracts with the transporter, TransWood. TransWood is the only transporter of cyanide from Cyanco’s operation in Winnemucca to GSM. GSM’s contract with Cyanco requires that all subcontractors must be certified by the ICMI. TransWood was first certified by the ICMI on October 11, 2006, recertified on February 2, 2010, recertified a second time on July 12, 2013, and recertified again on January 2017. Bills of Lading showed Cyanco as the originator and TransWood as the only transporter. Neither Cyanco or TransWood uses interim storage facilities.

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

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

**in full compliance with**

**The operation is**             in substantial compliance with **Standard of Practice 3.1**

not in compliance with

**Basis for Audit Finding:**

The facilities for unloading and storing cyanide at GSM have been designed and constructed in accordance with cyanide producers’ recommendations and accepted engineering practices. An independent professional engineer inspected the facilities in 2009 and judged them to be appropriately designed. The unloading area is fenced and locked to prevent access by workers and is located within the larger mine site with fencing, gates, and security to prevent public access.

The nearest town is Whitehall, approximately 6 miles to the west of the mine. The nearest ranch is approximately 2.25 miles to the south. The nearest perennial watercourses are the Jefferson River approximately

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2 miles to the south and the Boulder River approximately 3 miles to the east.

GSM only receives liquid cyanide. Liquid cyanide is unloaded on concrete and asphalt surfaces that minimize seepage. Any leakage on the unloading pad is directed to secondary containment with a sump that reports to the cyanide destruct circuit. To prevent overflows from the cyanide storage tanks, GSM has installed a high-level alarm on the two interconnected tanks that is connected to the control panel inside the plant and to an audible alarm. GSM’s two cyanide storage tanks are installed on solid concrete pedestals within the concrete and asphalt secondary containment, thus providing a competent barrier to leakage. The cyanide storage tanks are located outside the plant with natural ventilation and away from acids, oxidizers and other incompatible materials.

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 3.2**
- not in compliance with

**Basis for Audit Finding:**

GSM receives and uses only liquid cyanide that does not require reuse, rinsing, or disposal of containers. The liquid cyanide is delivered in tanker trucks; no drums or wooden crates are involved. Transwood/Cyanco’s procedure for offloading prescribes the operation of valves and couplings for the tanker truck, while GSM’s procedure for offloading prescribes the operation of the valves for the two cyanide storage tanks. TransWood’s/Cyanco’s offloading procedure contains provisions for securely closing all valves and inspecting the truck for any cyanide residue on the tanker truck before leaving the unloading area. GSM’s offloading procedure prescribes the steps for safe offloading, including personal protective equipment (PPE) and observation by a combination of an operator and video camera during making and breaking of connections. GSM’s emergency response procedures describe measures for timely cleanup of reagent grade spills or leaks. The auditors observed an offload to confirm that procedures were being implemented. GSM does not have to address handling or stacking of containers because no containers are used.

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

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 4.1**
- not in compliance with

**Basis for Audit Finding:**

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GSM has developed a Health & Safety Management System (HSMS) and Environmental Management System (EMS), which are based on the ISO 14001 and OSHAS 18000 models. GSM has developed and implemented operator manuals; standard operating procedures (SOPs); and training, monitoring and inspection programs for the safe and environmentally sound operation of the cyanide facilities.

The Operating and Reclamation Plan (September 2014) and the Tailings Operations, Maintenance, and Surveillance (TOMS) Manual for Tailings Impoundment No. 2 and Associated Water Management Facilities, March 27, 2017, includes descriptions of the fluid management requirements for safe operation and regulatory requirements. TOMS lists the operating parameters for the impoundment, including maximum pool volume, design storm, freeboard, and beach length. The impoundment is designed for the 120-MG plus the 6 hr. Probable Maximum Precipitation with a minimum freeboard of 3 feet. The manual also describes target concentrations for weak acid dissociable (WAD) cyanide in the tailings impoundment, which are less than 50 mg/l. Wildlife protection measures includes 8-foot fencing and reducing the toxicity of cyanide levels in the pond water and hazing migratory waterfowl away from the area.

The sulfur dioxide (SO<sub>2</sub>)/air cyanide destruction plant results in the WAD cyanide concentrations typically averaging between 0 and 3 mg/L at the impoundment.

GSM conducts inspections on a shift, daily, weekly, monthly, and annual basis using inspection forms for the mill, tailings pipelines, tailings impoundment, seepage basins, and pump-back wells specifically tailored to allow evaluation of the facilities and equipment. These inspections cover all the cyanide facilities and frequency is sufficient to assure and document that these facilities are functioning within the design parameters. Daily shift inspections are completed by the operators and include operational and performance requirements (such as pH, cyanide levels, process flows, tank levels, leaks, cyanide salts, wildlife mortality, PPE cabinets, eye wash/shower stations, and others) of equipment. Weekly inspections are dedicated to the inspection and maintenance of the cyanide facilities and include tanks, pipes, pumps, safety devices, tailings impoundment and tailings leak detection system, corrosion, salt buildup, leakage, leach problems, fencing, signage, pond liners, and a tailings impoundment leak detection system. Tanks in the mill are visually inspected monthly for rust, corrosion, salts, leakage, and scale. Also, secondary containments in the mill are visually inspected monthly for cracks, salts, sump pump alarms, sump pump performance, and debris. Pool levels and freeboard in Tailings Impoundment #2 and seepage basins are noted during the inspections. Inspections of the tailings impoundment diversion channel are conducted in accordance with the Montana Storm Water Pollution Prevention Plan (SWPPP), i.e. after every precipitation event of 0.5-inches in 24 hours or quarterly if there are no storm events. Inspection forms are dated with either names or initials of the inspectors. Deficiencies are noted for repairs, work order numbers, and completion dates are included. Corrective actions are tracked through the maintenance program. The inspection frequencies are sufficient to assure properly functioning systems.

The preventative maintenance program consists of both scheduled and unscheduled activities. For unscheduled activities, equipment is operated until signs of deterioration (not failure) and then maintenance or repair jobs are scheduled. The workflow begins with inspectors reporting issues in writing or in person to the maintenance foreman. The Mill maintenance planner and foreman review the inspection sheets and Maintenance develops work orders in Oracle<sup>®</sup>. Completion of jobs is noted on the equipment history logs.

GSM maintains a backup generator for the seepage basins at the tailings impoundments and another backup generator for lighting at the mill. These generators undergo monthly inspections along with regular testing and maintenance to ensure their ongoing operation. The mill is designed with check valves and backflow preventers such that all solution movement stops quickly in the event of a power outage. The tailings pipeline from the mill to the impoundment would drain by gravity during a power outage and its volume is small compared to the available capacity of the impoundment.

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GSM utilizes a Management of Change procedure to evaluate changes in the site operating practices, and provided examples of its use showing sign off by safety and environmental staff.

Operating plans and contingency plans contain and describe contingency measures for the mill, tailings impoundment, pipeline breakage, and related facilities. In addition, these plans discuss closure and temporary closure measures.

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 4.2**
- not in compliance with

**Basis for Audit Finding:**

GSM has developed a standard operating procedure for recovery circuit operation that describes how the correct cyanide levels are to be maintained in the leach and wash circuits. GSM has been processing ores from other mine sites in the area with a variety of ore grades and these ores are evaluated prior to processing. As long as an ore type falls within the general operating parameters then it is accepted for processing. The daily target fluctuates as determined by measurements from the leach tanks and cyanide addition is adjusted as necessary. Determining and establishing cyanide application rates is a continuous process based on variations in ore types and the desire for optimum gold recovery with minimal reagent use. There are continuous, on-going efforts to optimize (minimize) cyanide usage.

GSM has installed variable speed reagent (cyanide) pumps to facilitate a more uniform feed system; and utilizes titrations three times per shift to determine cyanide levels and make adjustments in the feed from the control room to the variable speed feed pumps.

GSM has developed an SOP for recovery circuit operation that describes how the correct cyanide levels are to be maintained in the leach and wash circuits, and that evaluates cyanide consumption rates, process flow density, pH, and solid percentage through the process circuit every 4 hours during operation.

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 4.3**
- not in compliance with

**Basis for Audit Finding:**

GSM has developed a water balance model that is comprehensive and probabilistic. The model covers the mill, Tailings Impoundment #1 (seepage only), Tailings Impoundment #2, reclaim basins, and tailings pumpback well

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system. The water balance considers the factors relevant to the cyanide facilities: tailings deposition, precipitation, evaporation, seepage, undiverted run-on, pumpback water, and reclaim water. The water balance model does not incorporate freeze-thaw effects, as the potential impacts are considered negligible. GSM does not discharge to surface water, so this component is not included in the model. The primary effect on water balance from a power outage would be the tailings pipeline draining into Tailings Impoundment #2; however the volume in the pipeline is negligible relative to the capacity of impoundment and this volume of water is not added to the calculations.

The water balance is probabilistic in that it incorporates uncertainty and variability in precipitation, utilizing historical data (meteorological station data and tailings impoundment volumes) to project future conditions and impacts. The model can run increased intensity precipitation events to evaluate water volume and impacts on the tailings impoundment. The GSM water balance uses precipitation and evaporation data from the on-site weather station near the closed Tailings Impoundment #1. New data is incorporated into the water balance model monthly.

The GSM water balance model includes a 9-inches in 6-hour Probable Maximum Precipitation (PMP) event for the Tailings Impoundment #2. This event by definition does not have an associated return period, as it is the largest event that can be expected at the site. The water balance model demonstrates a warning when the water volume in the pond is equivalent to 3 feet of freeboard. In 2017 this was 120 MG plus the estimated volume from the PMP.

Also the water balance model includes run-on to the Tailings Impoundment #2 from the Mill Area and uses an appropriate infiltration curve number to account for infiltration into the ground. A diversion channel diverts a much larger upstream watershed around the impoundment and therefore flows from this area are not included in the model.

GSM has implemented monitoring and inspection activities to support the water balance and prevent overtopping of the tailings impoundment. GSM measures the pool elevation in Tailings Impoundment #2 and summarizes the data in a monthly Water Balance Memo. This allows comparison of the allowable maximum operating pool elevation to the measured level. The run-on diversion channel for the tailings area is inspected routinely after significant rainfall.

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 4.4**
- not in compliance with

**Basis for Audit Finding:**

GSM has restricted wildlife access to the tailing impoundment area and the reclaim basin area with an 8-foot high wildlife fence. GSM has installed a cyanide destruct circuit at the mill to maintain weak acid dissociable (WAD) cyanide concentrations below 50 mg/l in the tailings slurry and decant pool. GSM samples the Tailings Impoundment #2 twice per month and compiles the data in a graph of WAD cyanide concentrations over time. The graph shows WAD values from January 2011 to July 2017. Other than one elevated value in January 2014,

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considered a sampling error, the high value was 35.1 on November 9, 2015, during the past three years. The average WAD cyanide level in the pond was 8.3 mg/l. GSM's measures have been effective in preventing wildlife mortalities and no mortalities have occurred from 2014 to mid-2017. GSM does not have a heap leach, and ponding and overspray are not issues. GSM demonstrated with sampling and results that WAD cyanide concentrations in open waters do not exceed 50 mg/l.

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 4.5**
- not in compliance with

**Basis for Audit Finding:**

GSM does not have a direct discharge to surface water. Cyanide facilities are operated to not discharge to the ephemeral washes at the site and the nearest perennial surface water is Jefferson Slough, located approximately three quarters of a mile to the southwest of the tailings impoundment area.

GSM monitors three surface water stations on the Jefferson Slough, one upstream (SW-3) and two downstream (SW-6 and SW-8). Data for 2014 through 2016 shows total cyanide concentrations <0.005 mg/l (i.e., non-detects) in these monitoring points. The aquatic life standards set by the MDEQ are 0.022 and 0.0052 mg/l for acute and chronic levels of total cyanide, respectively. GSM states in their Annual Reports to Montana Department of Environmental Quality that surface water quality at the upstream station (SW-3) varies little from that at the most downstream station (SW-8), indicating that there is no impact to surface water via the indirect (i.e., groundwater) pathway.

*Standard of Practice 4.6: Implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of groundwater.*

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 4.6**
- not in compliance with

**Basis for Audit Finding:**

GSM has met the numerical standard of 0.2 mg/l for total cyanide (TNC) established by the MDEQ at the point of compliance (POC) wells downgradient of the tailings area. The designated beneficial uses for groundwater are drinking water and livestock use, with the drinking water use having the 0.2 mg/l standard. Measures to prevent and manage potential seepage include impermeable surfaces at the mill; secondary containment for pipelines; geomembrane-liner for the active Tailings Impoundment #2; geomembrane-lined reclaim and overflow ponds; and pumpback well systems for the closed unlined Tailings Impoundment #1 and the reclaim/overflow ponds.

The 2014, 2015, and 2016 Annual Reports indicated TCN levels less than the 0.2 mg/l standard and GSM is in

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compliance at the groundwater points of compliance over the period of consideration for the 2017 Recertification Audit.

*Standard of Practice 4.7: Provide spill prevention or containment measures for process tanks and pipelines.*

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 4.7**
- not in compliance with

**Basis for Audit Finding:**

GSM has provided secondary containments for all cyanide-related tanks, and these containments are in good condition. Secondary containments for the reagent-grade tanks, leach tanks, and horizontal tank are outside the mill building and consist of concrete walls and concrete or asphalt floors with liner underneath. Secondary containments for all other process tanks are inside the mill building and consist of concrete walls, curbs, and floors. Each of the two drop towers along the slurry pipeline have concrete secondary containment and concrete overflow containment. All process tanks are mounted on solid concrete pedestals; the drop towers are mounted on the solid concrete floor of the secondary containment. GSM has no cyanide-related tanks without secondary containment. GSM contracted with a professional engineer to survey the secondary containments at the mill and draw conclusions regarding capacity - all containments and enclosures provide more than 110% capacity of the largest tank within the enclosure. The drop tower containments on the tailings slurry have limited capacity and excess slurry flow could overflow the containment, but any overflow would follow natural topography to the Tailings Impoundment #2, and GSM has procedures for cleaning up any such spills.

Any solutions, whether cyanide or precipitation, in secondary containments at the mill report to sumps with automatic pumps, which in turn send the solutions either back to the tanks, the drop towers, or to the cyanide destruct circuit. Any solutions in the drop tower secondary containments are returned to the slurry pipeline. GSM has provided secondary containment for all cyanide related pipelines. All process pipelines at the mill run over concrete floors that drain to sumps. The tailings slurry pipeline has pipe-in-pipe containment. The tailings reclaim pipeline, depending on the reach, has pipe-in-pipe containment (12-inch high-density polyethylene (HDPE) inside 16-inch HDPE), pipe within a gravel-filled wrap-around liner (for both 10-inch HDPE and 10-inch steel pipe within the gravel-filled wrap-around liner), and 10-inch HDPE pipe within concrete conduit. The seepage reclaim pond pipeline is buried from the reclaim pond pumping station back to Tailings Impoundment #2 and is double-walled. If there were a slow leak from the inside pipe the solution would flow in the outside containment pipe and be detected at the pump station. The pump station is in containment and is monitored daily. GSM does not have any cyanide pipelines near or crossing perennial surface water. All tanks and pipelines were observed to consist of materials compatible with cyanide, such as stainless steel and HDPE.

*Standard of Practice 4.8: Implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.*

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 4.8**

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not in compliance with

**Basis for Audit Finding:**

Quality Control/Quality Assurance (QC/QA) programs have been followed for the mill, tailings pipelines, Tailings Impoundment #2, and the tailings reclaim and overflow ponds. The QC/QA programs addressed earthworks including borrow characterization, stripping of unsuitable materials, materials placement, materials compaction, and compaction testing. GSM has retained the QC/QA documentation for the Tailings Impoundment #2 and the associated reclaim and overflow ponds.

Modifications to the cyanide facilities that were constructed after the initial Cyanide Code Audit and reviewed during the 2014 Recertification Audit include an expansion raise to Tailings Storage Facility No. 2 during 2011-12. Additionally another Tailings Dam Expansion (Raise) was under construction during the 2014 Recertification Audit. (It was confirmed that this work had been completed during the 2017 Recertification Audit.) GSM constructed another lift for Tailings Impoundment #2 in 2015-2016. Design features and materials of construction were the same as for the 2013-2014 construction. A Montana Registered Professional Engineer signed the documents. GSM has completed QC/QA programs to document construction and modification of all tailings impoundment facilities.

Original QC/QA documentation for the mill and the tailings slurry and reclaim pipelines no longer exists and GSM utilized the services of consulting, professional engineers to demonstrate that these facilities were constructed with sound engineering practices. GSM demonstrated during the Initial Audit that consulting engineers were contracted to provide alternative demonstrations that cyanide facilities were constructed with a standard of care appropriate to protect against cyanide exposures and releases. GSM has retained QC/QA documents dating back to the early 1980s for the tailings impoundments. GSM stated that they have retained internal QC/QA documents for the tailings reclaim and overflow ponds. In addition, the Tailing Operations Manual contains a list of QC/QA documents for the tailings impoundments.

GSM has utilized professional engineers for the design and QC/QA program for the cyanide facilities.

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

**in full compliance with**

**The operation is**  in substantial compliance with **Standard of Practice 4.9**

not in compliance with

**Basis for Audit Finding:**

GSM has developed plans and procedures for monitoring wildlife, surface water, and groundwater. Qualified GSM environmental staff and consultants prepared these plans and procedures. GSM's Surface and Groundwater Sampling Plan specifies required training; well monitoring procedures; sampling equipment; sampling procedures for wells, surface water, springs, and lined ponds; sample containerization, sample identification, sample filtering and preservation, required preservatives, lists of constituents and laboratory methods, sample shipment, chain of custody procedures, quality control measures, decontamination, record keeping, and staff responsibilities. The sampling plan states, "all conditions such as flow conditions, weather conditions, presence

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of ice, cover, etc. should be noted on the field sheet.”

GSM monitors for indirect discharges to surface water via the groundwater pathway downgradient of the site. This includes monitoring and sampling over 200 wells every quarter, including pump-back wells, monitoring wells, and nearby private residential wells. There are three surface water stations on the Jefferson Slough approximately three quarters of a mile from the tailings area, one upstream from the groundwater mixing zone and two downstream from the groundwater-mixing zone.

GSM does not monitor for cyanide in discharges to surface water because the operation does not directly discharge to surface water.

GSM inspects and records wildlife mortalities related to cyanide on a daily basis. The daily tailings inspection form contains a section for observed evidence of wildlife and bird mortalities.

GSM monitors groundwater and surface water at frequencies appropriate. The sampling plan contains a series of tables with monitoring frequency by analyte suite.

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

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 5.1**
- not in compliance with

**Basis for Audit Finding:**

GSM has prepared reclamation closure plans as part of their permitting programs for the operations that have been reviewed and approval by the MDEQ. The Operation and Reclamation plan has been prepared in accordance with applicable state requirements, and contains measures to address decommissioning of the cyanide facilities including the tailings impoundments, collection ditches, and equipment that has contained process solutions. Measures include cyanide stabilization/neutralization, and treatment of outflows, residual chemicals, or fluids. The plan addresses:

- Complete utilization of reagents;
- Discharge of final solutions to Tailings Impoundment No. 2;
- Decontamination (i.e., descaling, triple rinse, and inspection);
- Disposal, sale, or recycling of decontaminated materials; and
- Shipment of hazardous materials offsite.

The plan also addresses closure and reclamation of TSF2.

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The SOP, Mill Demo Material (May 2011) further details how demolition materials that have contacted cyanide solutions will be disposed of after decontamination. The SOP also addresses disposition of decontamination wash water.

The Operation and Reclamation Plan states that final reclamation of mine facilities will begin after they become permanently inactive. The plan contains text regarding the sequencing and duration of decommissioning activities.

GSM staff stated that the MDEQ conducts an annual internal review of the Operating and Reclamation Plan, and prepares an update of the entire plan and bond every 5 years. The Plan is also reviewed and updated with any change in the approved Mine Plan on file with the MDEQ.

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 5.2**
- not in compliance with

**Basis for Audit Finding:**

GSM has external (regulatory) and internal cost estimates. The external (regulatory) cost estimate uses Davis-Bacon wage rates and rental equipment rates. The cost estimate covers all closure and reclamation at the GSM and includes decommissioning of cyanide facilities. GSM maintains bonds totaling \$112,153,980 as required by the MDEQ. This amount is for all closure and reclamation at the GSM, and includes decommissioning of cyanide facilities.

DEQ requires updates to the regulatory closure cost estimate every five years. This closure cost estimate includes decommissioning of cyanide facilities.

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

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 6.1**
- not in compliance with

**Basis for Audit Finding:**

GSM has operational and maintenance SOPs related to the activities that involve exposure to cyanide as well as the management and operation of the cyanide facilities. These SOPs cover the safe operation of the entire cyanide management facilities and cover decontamination prior to maintenance work. The documents describe

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required Personal Protective Equipment (PPE), cyanide hazards and cyanide decontamination procedures, operator responsibilities, and procedures for using and handling cyanide. In addition there are checklists that must be completed when some of these activities are undertaken.

Procedures to review proposed process and operational changes and modification for their potential impact on work health and safety are controlled under GSM’s Management of Change (MOC) Procedure. MOC examples showed that MOC forms for change were distributed to the functional group representatives. The forms were filled out and initialed by the relevant functional group managers or designated representative, including safety and environmental managers. Through the evaluation process it is determined that some process or task changes warrant further evaluation, and GSM uses the Barrick Gold Corporation Formal Risk Assessment program.

Prior to their shift, each operator undertakes a Field Level Risk Assessment (FLRA) on a safety participation card. Prior to a specific task, teams undertake team based risk assessment on a Pre Task Plan. These risk assessments require the employees to understand the task, look at what can go wrong, how it would affect them, how likely it is to happen, and what the operator can do to prevent or control the event.

If a new SOP is required or an SOP requires an update, then the Safety Manager coordinates the requirements with the relevant operators. The draft SOP is then circulated to the supervisors who review them with the crews. The Superintendent has final approval. Also, the monthly Safety meetings provide an opportunity for employees to review Policies, Plans, and SOPs, and raise questions and concerns that can then be incorporated into any updates.

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 6.2**
- not in compliance with

**Basis for Audit Finding:**

The Mill Superintendent depending on the ore characteristics sets target pH levels – but generally it fluctuates between 11 and 11.5. The Grind Circuit Operator SOP states that the operator has to “maintain pH as required to insure no potential hydrogen cyanide (HCN) gas forms.” pH levels are monitored throughout the shift in the respective areas. The target pH levels are listed on a white board in each of the areas. If a pH level falls below the target level then the operators will make lime additions to bring the pH level back up. Lime additions can be made in several different locations throughout the process facility.

GSM uses both fixed and personal monitors to confirm that controls are adequate to limit worker exposure to hydrogen cyanide gas. Fixed Monitors have been placed in strategic locations throughout the mill to protect workers from exposure to HCN gas levels.

In addition, the operation has identified areas and activities where potential worker exposure to elevated levels of HCN may exist, i.e., 4.7 ppm for stop work and investigate and 10 ppm for evacuation. Both fixed and portable HCN monitors are used to ensure that worker exposure to HCN gas is limited. Fixed monitors have been placed in strategic locations throughout the mill to protect workers from exposure to instantaneous HCN gas levels. The

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operation also undertakes weekly HCN Surveys to assess operator’s exposure to HCN.

The HCN Gas Monitor Requirements SOP states that “Fixed Monitors will be “Bump” tested weekly and calibrated quarterly as per manufacturer recommendations. Calibration and Bump test data will be documented and filed.” The fixed monitors are ‘bump’ tested weekly where the 4.7 and 10 ppm alarms are tested by inserting 10 ppm span gas into the unit thereby making the alarms sound. The results are recorded on a weekly bump test inspection sheet. The fixed monitors have audible and flashing lights on the unit and at 10 ppm alarms have a different audible alarm (which is an evacuation alarm) and flashing light. The Safety Manager conducts the quarterly calibrations and results are recorded on the quarterly calibration inspection sheet.

The personal gas monitors are calibrated automatically when they are placed on the base pad. The resulting documentation is stored electronically on the monitor docking station in the Safety Managers office. The docking station maintains the electrical charge, performs monthly calibrations, and registers a continuous, digital maintenance record. Every time the monitor is docked the high and low level alarms are tested.

Signs indicating the presence of cyanide are provided in all areas where cyanide is used and stored including the off-loading area, the process tanks, and pipes. Signs are located at the doors of the Mill Buildings stating that, “All process solution contains cyanide” and “No Eating, No Drinking, No Smoking, and No Tobacco Products and No Naked Flames.” Pipes carrying cyanide are marked and the direction of flow is indicated with arrows on the pipes.

Emergency showers and eye wash stations are located around the plant where there is a risk of cyanide exposure. These are checked regularly. Fire extinguishers are located throughout the facility and are inspected monthly by GSM staff. The fire extinguishers are serviced and inspected on an annual basis by the external company A&M Fire. All fire extinguishers are dry powder in the mill area and cyanide areas.

Safety Data Sheets (SDS) are available in tubes at the various work locations as well as offices, control rooms, the lunch room, and the O drive on the company’s computer system network.

Procedures are in place to investigate cyanide exposures, and to modify operating procedures in the light of any findings from the investigations.

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

**in full compliance with**  
**The operation is**  in substantial compliance with **Standard of Practice 6.3**  
 not in compliance with

**Basis for Audit Finding:**

Items readily available in case of an emergency include:

- Water at the unloading area from the emergency shower, eye wash, and fresh water hose.
- Oxygen and resuscitators stored in the safety cabinet located near the unloading area as well as other cyanide safety cabinets, in the on-site ambulance and with the emergency jump kit. Amyl nitrite is

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stored in five locations, close to the off-load area, 2 places in the mill, 2 places near the tailing area (booster pump house), and 1 place in the assay lab. There is also one in the ambulance.

- Communication in the event of an incident either by means of radio or landline telephones. During unloading, both the mill operator attending the unloading and the truck driver have a radio. There is an emergency alarm at the unloading area and unloading is monitored from the grind shack control room via video cameras.

The Cyanide Code champion inspects the contents of the two cyanide safety cabinets every month and completes a safety cabinet checklist, which includes: oxygen bottles; regulators; non re-breather masks; amyl nitrite (and expiry date); presence of danger tape; bag valve mask; refrigerator running; 2 self-contained breathing apparatus (SCBA); and face shield, goggles, and PPE.

GSM has a specific written emergency response plan to respond to cyanide exposures. The Cyanide Emergency Response Plan (CERP) details procedures for HCN alarms, response for man down from HCN, and appropriate PPE for rescue. Emergency responses for HCN gas and medical/decontamination procedures for cyanide poisoning are included in the plan. The plan has specific response procedures for both liquid cyanide and HCN gas exposures.

GSM has trained First Responders (who have undergone First Responder (FR) Awareness Training, Emergency Medical Technicians (EMTs), and a basic life support ambulance to transport patients to one of three clinics. The operation has appropriately trained First Responders, and all workers have received basic cyanide awareness training that includes first aid training for cyanide exposure. GSM has an ambulance to transport patients to one of three clinics. GSM is also able to call on one of two life flight helicopters able to transport patients to the appropriate clinic. Communication in the event of an incident is either by means of radio or landline telephones.

GSM has written and received acknowledgement from three hospitals regarding the potential requirement to treat cyanide exposed victims at the medical facilities. These letters included details of the potential for cyanide exposed patients to be taken to the facility.

GSM's Site Emergency Response Drill Policy states, "one live incident/exercise will be held each year." Further, the policy states "Lessons learned will be communicated to all parties involved so that our performance at the next drill/exercise or actual event will be enhanced." The CERP states that it will be updated after cyanide related emergencies and after mock drills. Numerous tabletop and field mock drills are held every year, debriefings are documented, and the lessons learned are incorporated into the annual updated CERP. In 2015, 2016, and 2017 mock drills were conducted to test the Plan that included cyanide exposure related scenarios including responses to "man down" from liquid cyanide exposure, "man down" from HCN gas exposure, and spills out of containment.

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

*Standard of Practice 7.1: Prepare detailed emergency response plans for potential cyanide releases.*

- in full compliance with**
- The operation is**       in substantial compliance with      **Standard of Practice 7.1**
- not in compliance with

**Basis for Audit Finding:**

GSM has prepared an Emergency Response Binder that contains numerous emergency response plans and procedures including a Cyanide Emergency Response Plan (updated June 2014) and the 120 Plan - What to do in the First 2 hours of an incident, revised April 2013. These two plans specifically address emergency response to accidental releases of cyanide. Also, the Cyanide Emergency Response Plan outlines response activities for the following:

- Catastrophic Release from process;
- Transport Event: off-site and on-site;
- Release during unloading;
- Release during fire and explosion;
- Pipe, Tank and Valve rupture;
- Overflow of Ponds and Impoundments;
- Power outage and pump failure; and
- Uncontrolled Seepage.

The Tailings Operations Manual (TOMs) also details Emergency Planning and Response for overtopping the tailings impoundment. Emergency response procedures for various potential tailings dam failures are addressed in the “Tailings Storage Facility Emergency Preparedness and Response Plan” April 2017; and the TOMs Manual, October 17, 2013.

Failure of the cyanide treatment, destruction system is addressed in the “Golden Sunlight Mine Operating Policy - Cyanide Destruction” (v.3, 4/26/2011) The Policy was established to raise awareness regarding the importance of maintaining acceptable tailing solution WAD cyanide levels and describe operating procedures for the cyanide destruction circuit. The Policy outlines measures to be taken for possible upset conditions. For example, GSM Operations and Environmental personnel have identified various failure scenarios of the cyanide destruction system that include feed pump and piping failures, and the possible need for thickener or reactor vessel component repairs, among other possible problems. In these cases it may be necessary to bypass the cyanide destruction circuit in which hydrogen peroxide would be pumped directly to the final tailing pipeline.

In addition, the Policy states that if the tailing pond WAD cyanide concentration exceeds 15 ppm the Mine General Manager and Environmental Superintendent will be notified immediately with reports of the actions

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taking place to reduce pond WAD cyanide levels. Should the pond WAD CN level exceed 20 ppm, samples will be collected and analysed daily to facilitate the evaluation of the measures being taken. In the event that the tailing pond WAD CN level exceeds 35 ppm, arrangements will be made to provide 24-hour wildlife hazing activities. Finally, if the pond WAD CN level reaches or exceeds 50 ppm, the Mine General Manager, Environmental Superintendent, Mill Superintendent, Chief Metallurgist, and Utility Crew Foreman will develop an action plan which may include suspending process operations until pond WAD CN levels are decreased.

The Cyanide Emergency Response Plan (CERP) has specific response actions. Clearing site personnel is detailed in the 120 Plan as the first actions in the event of a 30% sodium cyanide spill both in and out of containment. The GSM CERP response action for Pipe, Tank, and Valve Ruptures details actions to be undertaken if local communities are affected that involves contacting Jefferson County sheriff’s office to coordinate evacuation of local residents and roads.

The contact numbers for Jefferson County sheriff’s office are detailed in the 120 Plan, the CERP and the EMS Chemical Spill and Control Plan. The Incident Command Staff Roles and Responsibilities document gives details on who is responsible for contacting the Sheriff’s office in order to evacuate potentially affected communities.

The use of cyanide antidotes and first aid measures are detailed in the CERP. Control of releases at their source, and containment, assessment, mitigation and future prevention of releases are covered in the CERP.

The cyanide supplier and transporter take primary responsibility for any accidents resulting in a cyanide spill up to the point of unloading at the operation.

The Emergency Response Binder also includes a Contact List and Emergency Contact Procedures. It includes the Command Staff Roles and Responsibilities document that provides details on who is responsible for contacting the sheriff’s office in order to evacuate potentially affected communities.

*Standard of Practice 7.2: Involve site personnel and stakeholders in the planning process.*

**in full compliance with**  
**The operation is**  in substantial compliance with **Standard of Practice 7.2**  
 not in compliance with

**Basis for Audit Finding:**

GSM has involved its workforce and stakeholders, including potentially affected communities, in planning and preparing the CERP. Worker’s comments from Field Level Risk Assessments, Pre Task Plans, monthly safety meetings, EMT training meetings, and live drills are used for cyanide emergency planning. GSM has involved stakeholders such as Whitehall Ambulance, Whitehall Fire Department, Boulder Ambulance, Boulder Fire Department, Basin Ambulance, Pony/Harrison Quick Response Unit, Jefferson County Sheriff, Jefferson County Department of Emergency Services, and the Local Emergency Response Planning Committee (LEPC) in emergency response planning. This has involved site tours and training to stakeholder representatives and asking for input into the emergency response processes.

GSM has provided information of emergency response processes to local community via site tours and training. Community representatives include:

- Community Transition Advisory Committee (CTAC)

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- Jefferson County officials,
- The Mayor of Whitehall

GSM representatives attend meetings of the Jefferson County Local Emergency Planning Committee (LEPC). Through participation on the LEPC, the representatives have been able to inform the community that GSM uses cyanide at the operation and that it has prepared a CERP to address emergency situations. GSM has sent letters of notification about cyanide risks and response actions to a number of local community emergency services. GSM includes various emergency services in live drills.

GSM representatives attend meetings of the Jefferson County Local Emergency Planning Committee (LEPC). Through participation on the LEPC the representatives have been able to inform the community that GSM uses cyanide at the operation and that it has prepared a CERP to address emergency situations.

GSM includes various emergency services in live drills. Following these drills GSM, conducts a review to obtain feedback on what went well and areas for improvement.

Local response agencies have been given a copy of the 120 Plan, CERP and EMS Chemical Spill and Control Plan.

Outside responders send information to the mine about contact number changes and the mine actively checks the contact numbers for all outside responders. When the Montana Department of Environmental Quality (MDEQ) hotline number changed, the mine was contacted in order to update their plans. The Hazardous waste contingency plan (updated April 2016) lists the updated MDEQ hotline number. GSM is in regular contact with the ambulance and life flight companies.

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 7.3**
- not in compliance with

**Basis for Audit Finding:**

GSM has designated appropriate staff as well as equipment and other resources for emergency response. The Incident Command Staff Roles and Responsibilities document details the emergency response coordinators who have explicit authority to commit the resources necessary. All responders are appropriately trained as required by the GSM Cyanide Training Policy that requires training for all staff including emergency responders from Mill operators, Mill Maintenance, and Tailings employees. The Emergency Response Binder includes call-out procedures and 24-hour contact information for the coordinators and response team members along with the specific duties and responsibilities of the coordinators and team members. The binder also includes a list of PPE and available emergency response equipment. The Emergency Equipment Readiness Inspection Policy details the inspection scheduling requirements for emergency response equipment to ensure its availability.

Outside responders and medical facilities are aware of their roles in emergency situations as GSM attends Jefferson County LEPC and Community Transition Advisory Committee (CTAC) meetings. GSM also involves

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outside responders entities and stakeholders in mock drills to ensure they are aware of their involvement in Emergency Response.

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

**in full compliance with**

**The operation is**  in substantial compliance with **Standard of Practice 7.4**  
 not in compliance with

**Basis for Audit Finding:**

The CERP and Incident Command Staff Roles and Responsibilities documents provide contact numbers and contact duties for the following:

- GSM Management;
- Ambulance service;
- Clinics;
- Hospitals;
- State Government agencies (DEQ, State Emergency Response Commission, Montana Disaster and Emergency Services);
- Federal Agencies (Mine Safety and Health Administration (MSHA), Bureau of Land Management (BLM));
- Sheriff’s Department;
- Fire services; and
- Law enforcement.

Additionally, the CERP details procedures for notifying these bodies in the event of an emergency incident.

More specifically, the CERP and the Incident Command Staff Roles and Responsibilities documents provide details for contacting the County Sheriff’s office that in turn would contact potentially affected communities. The Staff Roles document also provides contact numbers and contact duties for a Media coordinator. The Chemical Spill and Control Plan details notification procedures of the public via the County Sheriff’s Office and LEPC. The documents referenced here are included in the Emergency Response Binder.

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

**in full compliance with**

**The operation is**  in substantial compliance with **Standard of Practice 7.5**

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not in compliance with

**Basis for Audit Finding:**

The EMS Chemical Spill and Control Plan SOP states the neutralizing chemicals that can be used, their storage locations, and equipment available for dealing with a spill. The chemicals include lime, soda ash, and sodium hypochlorite. Sodium hypochlorite is recommended for oxidizing sodium cyanide. The document details the neutralization preparation, concentration, and procedure, and details strengths of the various neutralizing agents and appropriate PPE and decontamination of equipment following any procedures. The document also describes locations for the deposition of decontaminated soils. The GSM Monitoring and Analysis Plan details the analytical methodology and sampling plan that would include sampling the impacted surrounding area, and both up and down gradient. End point remediation is established by testing soils to make certain that cyanide concentrations do not exceed 0.2 mg/kg. (MDEQ Guidance Circular DEQ-7).

The EMS Chemical Spill and Control Plan states, GSM has determined the number of properties that could be affected if the drinking water supply was affected by a cyanide release. They have contacted their local bottled water supplier to warn them that in the event of such an emergency they would ask them to provide bottled drinking water to the local community.

The EMS Chemical Spill and Control Plan SOP states the neutralizing chemical sodium hypochlorite or other neutralizing chemicals are not to be used if they have the potential to travel to surface water.

The Surface and Groundwater Sampling Analysis Plan is a guide to the standard sampling protocols (sampling and purging methods, parameters, type of containers, preservation, frequency, etc.) used at the site. The document presents sampling methods and techniques that are recommended for meeting regulatory requirements for proper water sampling procedure.

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

**in full compliance with**

**The operation is**  in substantial compliance with **Standard of Practice 7.6**

not in compliance with

**Basis for Audit Finding:**

The CERP states that the document will be reviewed annually and revised as necessary after cyanide related emergencies and mock drills. Also, the CERP has a requirement to update the Plan after any incident. The Plan was last updated in June 2014.

The CERP is one of several documents included in the Emergency Response Binder that is comprehensive and includes documents that address a range of emergency conditions including cyanide issues. The Hazardous Waste Contingency Plan (updated April 2016) has the emergency reporting procedures in which the updated MDEQ phone number is listed. (The current version of the CERP does not contain the MDEQ hotline number and the site would use the hotline number provided in the Hazardous Waste Contingency Plan.)

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Numerous tabletop and mock drills are held every year, debriefings are documented and the lessons learned are incorporated into the annual update of the Cyanide Emergency Response Plan. Several mock drills were conducted during the 2017 Recertification cycle.

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

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 8.1**
- not in compliance with

**Basis for Audit Finding:**

All site personnel are trained in cyanide safety as part of GSM's Basic Cyanide Awareness Training. Topics include: Industrial Uses, Physical and Chemical Characteristics, Safe handling, Personnel Protective Equipment, Poisoning Symptoms, First Aid for Over Exposure, and Emergency Response. Refreshers in cyanide awareness must be undertaken annually. A refresher in Basic Cyanide Awareness Training is undertaken annually as part of the Mine Safety and Health Administration (MSHA) 8 hour refresher training. Additional refresher training regarding cyanide hazard recognition is undertaken in monthly safety meetings.

Records listing training received as part of the MSHA Annual refresher are stored in files in the safety office as well as on the employee's HR file. All training records are entered into a training matrix/spread sheet to show the cyanide related topics that have been reviewed.

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

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

**Basis for Audit Finding:**

Operators who are involved in unloading, mixing, production, and maintenance tasks receive basic cyanide awareness training as well as on the job training in their tasks. The on the- job training includes training in the specific SOPs and is provided by a competent person (supervisor). Components of the SOP include a pre work area inspection, PPE requirements, and steps to be followed. The employee is instructed on the proper use of any equipment, risks associated with the tasks, and other related safety issues. The employee is required to demonstrate competency in conducting the task prior to working without supervision in an area. Assessment of competency is achieved through dialogue with the supervisor and by observing the employee. The supervisor then signs that they provided the training and the employee signs off that they have received the training. This record is maintained to demonstrate the level of training the employee has received. The effectiveness of training

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is assessed through written tests after the basic cyanide awareness training.

The Safety Manager/Cyanide Code Champion and area supervisors provide training. The Safety Manager/Cyanide Code Champion completed the Cyanco safety training in 2011 and is a certified MSHA trainer. Department supervisors give specific task training using SOPs where cyanide management activities are involved. The supervisors have also trained competent workers to conduct training. The Safety Manager/Cyanide Code Champion also provides training to new employees.

All operators receive training in all relevant SOPs and the trainer (supervisor) signs off when they are considered competent to undertake the task unsupervised. Task training records for each individual are kept in each individual department. Records include their names, the name of the trainer, the date of training, and the topics covered.

Refresher training is provided with the annual MSHA refresher and in monthly safety meetings. The MSHA refresher includes the basic cyanide awareness module. The monthly safety meetings go through task specific procedures and SOPs and Operator Evaluation Questions are asked to ensure that the operators understand cyanide related topics. Pop Quiz style cyanide and symptoms tests are undertaken in cyanide safety meetings. In addition, SOPs are reviewed for cyanide related maintenance tasks. The SOP is reviewed as part of the Pre-Task Plan (PTP), which includes the Field Level Risk Assessment (FLRA). The PTP is signed off by all employees participating in the task to ensure they understand the task in question.

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

- in full compliance with**
- The operation is**  in substantial compliance with **Standard of Practice 8.3**
- not in compliance with

**Basis for Audit Finding:**

Workers and contractors assigned to a specific area where cyanide is an integral part of the process, such as unloading, mill operations, and maintenance, are trained on the safe use and handling of cyanide that includes being trained in the appropriate emergency response for worker exposure and environmental releases of cyanide.

All employees are trained in cyanide decontamination, first aid procedures, and the guidelines outlined in the Cyanide Emergency Response Plan such as the response to a cyanide spill, release, or emergency. Training also includes the use of the cyanide antidote, SCBA, and other PPE necessary to respond to a cyanide emergency. Refresher training in cyanide emergency response is undertaken annually.

All workers and contractors receive annual basic cyanide awareness training that covers first aid procedures for cyanide release incidents and initial emergency response actions.

Cyanide related mock drills are characterized by participation of the entire mine site, and production comes to a halt. Production and maintenance workers are always involved in the cyanide drills and receive ongoing cyanide awareness training during weekly safety meetings. Many of these employees are designated response personnel.



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EMTs and First Responders participate in Emergency Medical Services Continuing Education Classes given by the safety department.

GSM has undertaken a number of training events at the mine to make those off-site emergency responders familiar to the cyanide emergency response plan. Live mock drills were conducted in 2015, 2016, and 2017. Each drill included a debriefing, lessons learned, and any actions items identified. The Site Emergency Response Drill Policy details that any training deficiencies noted in the drill will be addressed by additional training. Drills are observed and recorded to make sure that the procedures have been followed. The debriefing allows discussion and input from the EMT's and suggestions may be implemented in the next drill.

After completion of the Basic Cyanide Awareness training, employees are given a quiz to test their knowledge. Records for the Basic Cyanide Awareness Course, monthly safety meetings, EMT, and First Responder (FR) training are kept. These include the names of the employee and the trainer, the date of training, the topics covered, and how the employee demonstrated an understanding of the training materials.

**9. DIALOGUE: Engage in public consultation and disclosure.**

*Standard of Practice 9.1: Provide stakeholders the opportunity to communicate issues of concern.*

**in full compliance with**

**The operation is**             in substantial compliance with **Standard of Practice 9.1**

not in compliance with

**Basis for Audit Finding:**

GSM has a number of community engagement initiatives including participation at monthly Community Transition Advisory Committee (CTAC) meetings, site visits, participating in the Jefferson County LEPC, and attending other community group meetings where the general public can voice concerns. GSM is very transparent and provides a very high-level of information to the community.

GSM is very transparent and provides a very high-level of information to the community, to the extent that members of CTAC were invited to the close out meeting of the cyanide code audit. One of the Cyanide Code Auditors sat in on the CTAC meeting with the General Manager during the 2017 Recertification Audit and the meeting was very effective and informative.

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

**in full compliance with**

**The operation is**             in substantial compliance with **Standard of Practice 9.2**

not in compliance with

**Basis for Audit Finding:**

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GSM can interact with stakeholders through the following forums:

- CTAC monthly meetings;
- Whitehall Health and Safety Fair held every April;
- Frontier Days;
- Whitehall Black Tie Blue Jeans annual fundraiser (GSM sponsors and participates);
- Site tours;
- Whitehall Ledger (weekly newspaper);
- Montana Mining Association annual conferences;
- Meetings for permitting applications (as required);
- Presentations to community groups;
- Presentations to emergency service groups; and
- Chamber of Commerce meetings.

The CTAC meetings are a very good way for members of the public and media to be able to raise concerns directly to the mine manager.

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

     **in full compliance with**

**The operation is**            in substantial compliance with      **Standard of Practice 9.3**

     not in compliance with

**Basis for Audit Finding:**

GSM has developed a brochure that is made available at local events and at the mine entitled ‘Barrick Golden Sunlight Mine Good Mine Great Neighbor.’ This brochure includes a gold processing method flow diagram that details the use of cyanide. This brochure is given out to tour groups and at events such as the Whitehall Health and Safety Fair and Whitehall River Rally. In addition, GSM has presented detailed presentations regarding the cyanide code and gold processes at CTAC meetings that are attended by local community and business leaders, local press, and members of the public.

GSM makes operational and environmental information regarding cyanide available through the Corporate Barrick website <http://www.barrick.com/>, site visits, and in presentations provided to local community groups. The majority of the local population is literate, and therefore written information is considered adequate.

The Corporate Barrick website contains general information in the format of performance tables that are detailed by region and mine site, and include GSM. These tables include information for the last three years regarding amount of cyanide used, number of chemically related wildlife mortalities, chemical spills escaping second level containment, chemical spills escaping mine property, and number of regulatory actions.

Conditions within State Regulations and GSM’s Operational Permit require reporting of releases to DEQ that include a summary of any cyanide spills and releases. GSM also is required under Federal law to complete

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MSHA reports that include details of any cyanide-related worker exposure or death. Both MSHA and DEQ reports are available to the public. These reports include:

- Incidents of cyanide exposure resulting in hospitalization or fatality (MSHA);
- <http://www.msha.gov/>;
- Incidents where releases off the mine site required response or remediation (DEQ);
- <http://www.deq.mt.gov/default.mcpix>;
- Incidents where releases on or off the mine site resulted in significant adverse effects to health and to the environment (DEQ; MSHA); and
- Incidents where a release on or off the mine site required reporting under applicable regulations, (DEQ).

Any accidental spills, releases, or worker exposures would be reported at the monthly CTAC meetings.

No incidents that caused applicable limits for cyanide to be exceeded have occurred, i.e. there were no incident reports for 2014, 2015, 2016 and 2017.

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Golden Sunlight Mine

Name of Facility

**Environmental Resources Management**



Signature of Lead Auditor (Brent C. Bailey)

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Audit Dates

