

SUMMARY AUDIT REPORT

VISUS CONSULTING GROUP, INC.

INTERNATIONAL CYANIDE MANAGEMENT CODE MINING OPERATION CERTIFICATION AUDIT SOLEDAD MOUNTAIN MINE | KERN COUNTY, CALIFORNIA

Prepared for

GOLDEN QUEEN MINING COMPANY, LLC

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Submitted to

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UNITS OF MEASURE AND ABBREVIATIONS

Cal/ARP	California Accidental Release Prevention Program
Code	International Cyanide Management Code (the Code)
Cyanco	Cyanco Company, LLC
DE	Diatomaceous Earth
ERSCP	Emergency Response / Spill Contingency Plan
FACE	Financial Assurance Cost Estimate
GQM	Golden Queen Mining Company, LLC
HCN	Hydrogen cyanide
HDPE	High-density polyethylene

UNITS OF MEASURE AND ABBREVIATIONS (CONTINUED)

HLF	Heap Leach Facilities
HPGR	High-pressure grinding roll
ICMC	International Cyanide Management Code
ICMI	International Cyanide Management Institute
mg/L	Milligrams per liter
MSHA	Mine Safety and Health Administration
PPE	Personal protective equipment
ppm	Parts per million
PVC	Polyvinyl chloride
QA/QC	Quality Assurance and Quality Control
RWQCB	California Regional Water Quality Control Board, Lahontan Region
SCBA	Self-contained breathing apparatus
SDS	Safety Data Sheet(s)
SMARA	California Surface Mining and Reclamation Act
Soledad Mountain	Soledad Mountain Mine
SOP	Standard Operating Procedure
TransWood	TransWood Inc.
Visus	Visus Consulting Group, Inc.
WAD	Weak-acid dissociable

0.0 GENERAL

0.1 Operation Contact Information

Name of Mine:	Soledad Mountain Mine
Name of Mine Owner:	Golden Queen Mining Company, LLC
Name of Mine Operator:	Golden Queen Mining Company, LLC
Name of Responsible Manager:	Mr. Robert Walish, President and CEO
Address and Contact Information:	Golden Queen Mining Company, LLC 2818 Silver Queen Road / P.O. Box 1030 Mojave, CA 93502-1030 Telephone: +1 (661) 824-4300 Email: rwalish@goldenqueen.com

0.2 Location and Description of Operation

The Soledad Mountain Mine (“Soledad Mountain”) is an open-pit, heap leach mine owned and operated by Golden Queen Mining Company, LLC (“GQM”). The mine is located in Kern County, California approximately five miles south of the town of Mojave, California and 23 miles north of Lancaster, California, just west of Highway 14 on Silver Queen Road (see **Figure 1**). Access to the property is via good quality paved roads.

The operation is situated at an existing historical underground mine site where, between 1935 and 1942, an estimated 1,180,000 tons of ore were mined and milled. In addition, approximately 7,300 tons of gold and silver ore mined in the nearby Soledad Extension vein were transported to mills at the site and processed by cyanidation. GQM began operations at Soledad Mountain in January 2016, announcing full commercial production on December 19, 2016. Soledad Mountain has shipped approximately 76,000 ounces of gold and 532,000 ounces of silver since the first pour on March 1, 2016.

Ore is hauled by truck from the open pits to a primary crusher, where it is crushed and conveyed to a coarse ore stockpile. From the coarse ore stockpile, ore feeds to the primary screen, the secondary crusher and finally, a high-pressure grinding roll (“HPGR”). GQM adds cement to the coarse crushed ore as a binder ahead of the HPGR to ensure good permeability of the ore stacked on the heap and to control the pH of the leach solution. The HPGR discharge is conveyed to a fine ore stockpile and then conveyed by an overland conveyor to a movable conveyor and stacker system (i.e., grasshopper conveyors and a radial stacker) located on the heap leach pad. The ore is

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agglomerated on the first three grasshopper conveyors, by wetting the ore with dilute sodium cyanide solution and mixing the ore with a system of belt plows installed on the conveyors. The radial stackers place the agglomerated ore on the active portion of the heap for leaching with process solution using drip irrigation.



GQM will ultimately construct two heap leach pads in phases, Phase 1 pad and Phase 2 pad. The Phase 2 pad will be constructed once the existing Phase 1 pad nears capacity or as contingency capacity to ensure planned recovery of gold and silver.

Two 18-inch diameter high-density polyethylene (“HDPE”) pipes within an HDPE-lined channel running along the northern edge of the Phase 1 heap leach pad, collect pregnant (silver and gold bearing) process solutions from the heap. The pipes convey pregnant solution by gravity to a concrete Pump Box, from which the solution is pumped to the gold and silver recovery plant. The lined channel provides secondary containment for the solution conveyance pipes.

The operation employs the Merrill-Crowe process (zinc precipitation process) to extract gold and silver from the pregnant leach solution. In the Merrill-Crowe process, suspended solids and dissolved oxygen are first removed from the pregnant solution. Clarifying filters are used to remove the suspended solids to less than one part per

million (“ppm”). Zinc dust metered into the deaerated solution combines with the cyanide in a rapid, cementation-type reaction and gold and silver are precipitated as micron-sized particles of metallic gold and silver.

After precipitation, the solution is pumped to plate and frame filters where the gold and silver particles are removed, at which point the solution is termed, barren. These filters are located inside the refinery and this is where all subsequent processing takes place. From the refinery, the barren solution flows to the Barren Solution Tank where reagent-strength cyanide solution is added to raise the cyanide concentration of the barren solution to the desired level prior to pumping to the heap.

Within the refinery, mercury present in pregnant solution is precipitated with the gold and silver. The gold and silver precipitate is removed manually from the plate and frame filters and stored in mercury retort pans. Then the precipitate is heated in the mercury retort where water and mercury vapors are condensed and collected in the retort condensing system and the mercury trap. The dried precipitate is mixed with selected fluxes (typically silica, borax and soda ash) and melted in an induction furnace. Impurities in the melt combine with the fluxes to form slag, which is tapped as required and poured into slag pots. Slag is cooled and crushed and occluded particles of gold and silver are recovered by gravity for further processing. The molten mix of gold and silver (i.e., the doré) is poured into molds, cooled, cleaned and shipped to a commercial refinery where gold and silver bullion are produced for final sale.

A lined event pond (i.e., the Overflow Pond), located immediately downgradient of the Pump Box, is designed to provide adequate capacity for the retention of any operational upsets plus precipitation from the design storm event. In order to more efficiently manage flows that exceed the Pump Box capacity during large precipitation storm events, the Overflow Pond has a divider berm, which creates a smaller operational pond and a larger surplus pond. The combined volume of the two ponds when the divider berm is submerged is approximately 27 million gallons allowing for two feet of freeboard.

Sodium cyanide is delivered to Soledad Mountain as an aqueous solution in a tanker truck directly from the manufacturer’s production plant located in Winnemucca, Nevada. The solution is pumped from the tanker truck to the Cyanide Storage Tank located outside the Merrill-Crowe Plant. The weak-acid dissociable (“WAD”) cyanide concentration of the liquid sodium cyanide delivered to the site is 300,000 milligrams per liter (“mg/L”). Aside from this reagent-grade cyanide, free cyanide concentrations in the pregnant and barren solutions average approximately 200 mg/L and 260 mg/L, respectively, throughout the process circuit.

0.3 Cyanide Facilities

The International Cyanide Management Code (“ICMC” or “Code”) defines a **“cyanide facility”** as *“a storage, production, waste management or regeneration unit for managing cyanide or cyanide-containing process solution,”* or *“a pollution control device, equipment or installation used to prevent, control or minimize the risk of a cyanide release”*. The Code defines **“process solution”** as any solution with a WAD cyanide concentration of 0.5 mg/L or greater. Based on this criterion, the auditor identified the following primary, active cyanide facilities at Soledad Mountain:

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Merrill-Crowe Plant

As discussed below, refineries at gold and silver mines are currently excluded from the Code. Therefore, the primary cyanide facilities at the Merrill-Crowe Plant, outside the secured refinery area, include:

- Process tanks;
 - Cyanide Storage Tank
 - Barren Solution Tank
 - Press Feed Box
 - Dirty Pregnant Solution Tank
 - Pre-coat Mix Tank
 - Body Feed Mix Tank
- Vessels;
 - Diatomaceous Earth (“DE”) Settling Pond
 - De-aeration Tower
 - Three (3) Clarification Filters – one standby
- Pumps;
 - Cyanide Area Sump Pump
 - Two (2) Barren/Agglomeration Cyanide Metering Pumps
 - Clarification Filters Feed Pump
 - Barren Solution Pump
 - Barren Wash Solution Pump
 - De-aeration Vacuum Pump
 - Press Feed Pump
 - Pre-Coat Pump
 - Clarification Area Sump Pump
- Other;
 - Associated piping, valves, supports, transfer and handling systems
 - Concrete secondary containments (floors, curbs, stem walls, sumps)

Heap Leach Facilities

The Heap Leach Facilities (“HLF”) consists of the facilities that receive and store crushed and agglomerated ore on the heap leach pads for leaching with dilute sodium cyanide solution, and the associated solution management systems. Specifically, the HLF consists of the following key components, all of which are classified as cyanide facilities:

- One dedicated, single use, conventional heap leach pad (Phase 1 pad);
- Pipeline Containment Channel (lined channel with pipelines for conveying barren and pregnant solution between the heap leach pad and the Merrill-Crowe Plant);
- Concrete Pump Box;

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- Overflow Pond;
- All associated pumps, piping, equipment, supports, transfer and handling systems; and
- Upstream and side-hill channels designed to collect and route surface water runoff around the HLF.

Agglomeration Process

Because process solution is introduced during agglomeration, the cyanide facilities within the agglomeration process include the:

- grasshopper conveyors; and
- radial stacker.

GQM uses raw water in the crushing circuit for dust suppression. Thus, the ore conveying, crushing, HPGR and screening equipment ahead of the grasshopper conveyers are not cyanide facilities or subject to the Code. Additionally, the description of the HLF contained in the Soledad Mountain *Report of Waste Discharge* includes a solution recycle system. Please note that the Soledad Mountain operation does not currently utilize a solution recycle system.

Two uses of cyanide at gold mines not presently evaluated under the Code include management of cyanide in laboratories and management of cyanide in gold refining. Therefore, the GQM laboratory facilities and on-site refinery are currently excluded from Code requirements and were not part of this audit. As mentioned in **Section 0.2** above, the plate and frame filters are located inside the refinery.

0.4 Auditor Information

Audit Company:	Visus Consulting Group, Inc.
Audit Team Leader:	Mark A. Montoya, PE, CEA Lead Auditor and Mining Technical Expert Auditor
Contact Information:	Telephone: 720.301.0892 Email: mmontoya@visuscorp.com
Names and Signatures of other Auditors:	Mr. John Lambert (Ramboll Environ) ICMI Pre-certified Mining Technical Expert Auditor

Visus Consulting Group Inc. (“Visus”) contracted Mr. John Lambert, Ramboll Environ, as an independent third-party auditor due to the conflict of interest resulting from Visus’ involvement with the *Emergency Response / Spill Contingency Plan* and the *Report of Waste Discharge* prepared for Soledad Mountain. As an independent auditor, Mr. Lambert reviewed and assessed the certain Protocol Questions under ICMC Principles 4, 5, 6 and 7 as follows:

- Principle 4 – 4.1.2 and 4.1.5
- Principle 5 – 5.1.1, 5.1.2 and 5.1.3
- Principle 6 – 6.3.3 and 6.3.7
- Principle 7 – 7.1.1, 7.1.2, 7.1.4, 7.3.1, 7.4.1, 7.4.2, 7.5.1, 7.5.2, 7.5.3, 7.6.1 and 7.6.3

Audit Dates: April 30 through May 4, 2018 (the independent auditor conducted his review July 9-13, 2018)

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 ICMI for ICMC Verification Auditors. I further attest that this Summary Audit Report accurately describes the findings of the verification audit conducted for the Soledad Mountain Mine located in Kern County, California and that the verification audit was conducted in a professional manner in accordance with the ICMC Mining Operations Verification Protocol (dated February 2018) and using standard and accepted practices for health, safety and environmental audits.

FOR VISUS CONSULTING GROUP, INC.



Mark A. Montoya, PE, CEA
President | Principal
Lead Auditor and Mining Technical Expert Auditor

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0.5 Audit Findings

The operation is in	<input type="checkbox"/> Full Compliance	with the International Cyanide Management Code.
	<input checked="" type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

This is the initial ICMC verification audit for the Soledad Mountain Mine. Since beginning operations in January 2016, the mine has not experienced any cyanide exposures or releases, which are subject to listing under Question 9.3.3 of the ICMI *Mining Operations Verification Protocol*. Additionally, GQM has not begun the practice of using colorant dye in high-strength cyanide solutions at Soledad Mountain.

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0.6 Summary of ICMC Principles and Standards of Practice

For easy reference, **Table 1** below provides a summary of the ICMC Principles and associated Standards of Practice.

Table 1 Summary of ICMC Principles and Standards of Practice for Gold Mining Operations	
PRINCIPLE	STANDARDS OF PRACTICE
1. PRODUCTION: Encourage responsible cyanide manufacturing by purchasing from manufacturers who operate in a safe and environmentally protective manner.	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.
2. TRANSPORTATION: Protect communities and the environment during cyanide transport.	2.1 Establish clear lines of responsibility for safety, security, release prevention, training and emergency response in written agreements with producers, distributors and transporters. 2.2 Require that cyanide transporters implement appropriate emergency response plans and capabilities, and employ adequate measures for cyanide management.
3. HANDLING AND STORAGE: Protect workers and the environment during cyanide handling and storage.	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. 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.
4. OPERATIONS: Manage cyanide process solutions and waste streams to protect human health and the environment.	4.1 Implement management and operating systems designed to protect human health and the environment including contingency planning and inspection and preventive maintenance procedures. 4.2 Introduce management and operating systems to minimize cyanide use, thereby limiting concentrations of cyanide in mill tailings. 4.3 Implement a comprehensive water management program to protect against unintentional releases. 4.4 Implement measures to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions. 4.5 Implement measures to protect fish and wildlife from direct and indirect discharges of cyanide process solutions to surface water. 4.6 Implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of ground water. 4.7 Provide spill prevention or containment measures for process tanks and pipelines. 4.8 Implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications. 4.9 Implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface and ground water quality.

Table 1 (continued) Summary of ICMC Principles and Standards of Practice for Gold Mining Operations	
PRINCIPLE	STANDARDS OF PRACTICE
5. DECOMMISSIONING: Protect communities and the environment from cyanide through development and implementation of decommissioning plans for cyanide facilities.	<ul style="list-style-type: none"> 5.1 Plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife and livestock. 5.2 Establish an assurance mechanism capable of fully funding cyanide-related decommissioning activities.
6. WORKER SAFETY: Protect workers' health and safety from exposure to cyanide.	<ul style="list-style-type: none"> 6.1 Identify potential cyanide exposure scenarios and take measures as necessary to eliminate, reduce and control them. 6.2 Operate and monitor cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures. 6.3 Develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.
7. EMERGENCY RESPONSE: Protect communities and the environment through the development of emergency response strategies and capabilities.	<ul style="list-style-type: none"> 7.1 Prepare detailed emergency response plans for potential cyanide releases. 7.2 Involve site personnel and stakeholders in the planning process. 7.3 Designate appropriate personnel and commit necessary equipment and resources for emergency response. 7.4 Develop procedures for internal and external emergency notification and reporting. 7.5 Incorporate into response plans monitoring elements and remediation measures that account for the additional hazards of using cyanide treatment chemicals. 7.6 Periodically evaluate response procedures and capabilities and revise them as needed.
8. TRAINING: Train workers and emergency response personnel to manage cyanide in a safe and environmentally protective manner.	<ul style="list-style-type: none"> 8.1 Train workers to understand the hazards associated with cyanide use. 8.2 Train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community and the environment. 8.3 Train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.
9. DIALOGUE: Engage in public consultation and disclosure.	<ul style="list-style-type: none"> 9.1 Provide stakeholders the opportunity to communicate issues of concern. 9.2 Initiate dialogue describing cyanide management procedures and responsively address identified concerns. 9.3 Make appropriate operational and environmental information regarding cyanide available to stakeholders.

1.0 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	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 1.1.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

GQM purchases liquid cyanide exclusively from Cyanco Company, LLC (“Cyanco”), manufactured at its Winnemucca, Nevada production facility. Cyanco delivers sodium cyanide solution in tanker trucks directly from its Winnemucca plant. The initial term of the *Sale and Purchase Agreement* between GQM and Cyanco is October 1, 2015 to December 31, 2022 and continues for successive two-year terms unless cancelled by either party within 180 days of expiration.

The *Sale and Purchase Agreement* does not specifically state that the cyanide must be produced at an ICMC-certified facility; however, Cyanco was originally certified to the ICMC as a Signatory Production Operation in October 2006. ICMC recertification audits of Cyanco’s Winnemucca liquid cyanide solution production facility were performed in 2009, 2013 and 2016 and the facility was most recently recertified in full compliance with the Code on November 22, 2016.

GQM provided documentation of all cyanide purchase transactions through January 18, 2018. Soledad Mountain received its first cyanide shipment from Cyanco on January 26, 2016 and Cyanco has manufactured all cyanide delivered to Soledad Mountain, to date. As further verification, GQM provided written confirmation that it has purchased cyanide directly and exclusively from Cyanco from the time Soledad Mountain was first commissioned, to date.

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2.0 TRANSPORTATION

Protect communities and the environment during cyanide transport.

Standard of Practice 2.1

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

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 2.1.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

As stated under ICMC Standard of Practice 1.1 above, GQM purchases liquid sodium cyanide solution from Cyanco, manufactured at its Winnemucca, Nevada plant. By contract, Cyanco is solely responsible for the production and transport of sodium cyanide to the delivery point at Soledad Mountain. The GQM *Sale and Purchase Agreement* with Cyanco specifies that GQM take ownership of the cyanide at the time of delivery (i.e., as the cyanide solution passes from the tanker truck into the Cyanide Storage Tank).

Cyanco utilizes the transport company, TransWood, Inc. (“TransWood”) to deliver sodium cyanide direct to Soledad Mountain in tanker trucks from Cyanco’s Nevada plant. TransWood is a signatory to the Code, currently certified as fully compliant, with established lines of responsibility for safety, security, release prevention, training, and emergency response. Although GQM’s *Sale and Purchase Agreement* with Cyanco does not define responsibility for the Code Transportation Principles and Standards of Practice, the Cyanco and TransWood ICMC certifications demonstrate that the parties are aware of their responsibilities under the Code. TransWood’s initial ICMC certification date is October 11, 2006 and the most recent recertification date is January 12, 2017. See also, ICMC Standard of Practice 1.1 above, regarding Cyanco’s ICMC compliance status.

The *Sale and Purchase Agreement* between GQM and Cyanco does not specify that the designated responsibilities extend to any subcontractors used by the producer, distributor, transporter or the operation for transportation-related activities. Nonetheless, only producers and transporters certified in full compliance with the Code (i.e., Cyanco and TransWood) supply cyanide to Soledad Mountain.

GQM has not yet begun the practice of using colorant dye in high-strength cyanide solutions at Soledad Mountain. Therefore, the *Sale and Purchase Agreement* does not include a requirement for the addition of colorant dye to high-strength liquid cyanide prior to delivery.

Standard of Practice 2.2

Require that cyanide transporters implement appropriate emergency response plans and capabilities, and employ adequate measures for cyanide management.

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 2.2.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

The *Sale and Purchase Agreement* between GQM and Cyanco does not require that the transporter(s) be certified under the Code. Nonetheless, only producers and transporters certified in full compliance with the Code (i.e., Cyanco and TransWood) supply cyanide to Soledad Mountain.

GQM maintains signed bills of lading demonstrating maintenance of custody by TransWood from the point of origin to Soledad Mountain. During this 2018 ICMC audit, the auditor reviewed representative samples of records for years 2017 through 2018 as verification. As further verification, GQM provided written confirmation that Cyanco has utilized TransWood exclusively to deliver cyanide from its Winnemucca plant directly to Soledad Mountain from the time the operation was first commissioned, to date.

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3.0 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.

The operation is in	<input type="checkbox"/> Full Compliance	with Standard of Practice 3.1.
	<input checked="" type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

A qualified engineering firm designed the Merrill-Crowe Plant, and GQM provided the design documentation for the plant and associated facilities, which include the cyanide offload and storage facilities. In January 2016, a Cyanco representative evaluated the offload and storage facilities prior to approving the first shipment of cyanide to the site. Additionally, under requirements of the California Accidental Release Prevention (“Cal/ARP”) Program, a qualified engineer performed a walkthrough of the facility as part of a required Hazard Review designed to satisfy the seismic provisions of the California Building Code. The visual assessment addressed the Cyanide Storage Tank and associated equipment, the Barren Solution Tank, and the high-strength cyanide feed line between the two tanks.

During cyanide offload events, the tanker truck parks on a concrete pad provided with concrete curbing. The pad slopes to drain into the adjacent concrete containment area provided for the Cyanide Storage Tank via knockouts in the curbing. The Cyanide Storage Tank (an enclosed, cylindrical, flat bottom tank) is located outside the plant building on a solid reinforced concrete plinth (pedestal) foundation. A reinforced concrete pad, sloped to drain to a concrete sump equipped with an automated pump, underlies the tank foundation. Reinforced concrete containment curbs and walls surround the concrete pad on three sides, and the plant building’s concrete stem wall along the fourth side completes the containment. The tank material is carbon steel and the pipe material is welded stainless steel throughout the system.

The Barren Solution Tank (an enclosed tank), located outside on the north side of the Merrill-Crowe Plant building, also sits on a solid reinforced concrete plinth (pedestal) foundation within curbed concrete secondary containment. A reinforced concrete pad underlies the tank foundation. The slab drains to a concrete box culvert that ties into the HDPE-lined Pipeline Containment Channel connected to the Pump Box and Overflow Pond. Steel structure supports the De-aeration Tower above the concrete secondary containment area located outside on the north side of the Merrill-Crowe Plant building. All other process solution tanks and vessels are located directly on the reinforced concrete slab inside the Merrill-Crowe Plant building or above the slab supported by steel structure.

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There are no springs, seeps, or intermittent streams in the mine area. The closest intermittent stream is located approximately three miles to the west. The nearest ephemeral drainage is located approximately 200 feet north of the Merrill-Crowe Plant, running along the south side of Silver Queen Road. Barbed wire fence surrounds the entire mine site and entrance to the site is via a secured gate with a manned guard on duty at all times. A chain-link security fence surrounds the Merrill-Crowe Plant and Overflow Pond areas. Valves at the cyanide offload and storage facility were secured with locks and/or blind flanges.

As mentioned, the Cyanide Storage Tank and the Barren Solution Tank are located outside in an open-air environment with minimal potential for hydrogen cyanide (“HCN”) gas build-up. The Merrill-Crowe Plant building, where other process tanks and vessels reside, is well ventilated.

The primary reagents utilized at Soledad Mountain include cyanide, antiscalant, DE, zinc dust and fluxes. Acid is not used in the process. DE and zinc (in bags) are stored inside the Merrill-Crowe Plant building. The furnace fluxes are stored inside the refinery. As previously described, cyanide is stored in a carbon steel tank located within a concrete secondary containment. No other reagents are stored within this containment.

During the field component of this audit, GQM was using an acidic antiscalant, stored within the same concrete secondary containment area as the Barren Solution Tank and the high-strength cyanide feed line coming from the Cyanide Storage Tank, creating the potential for accidental mixing of these incompatible materials. Therefore, GQM started using a non-acidic antiscalant as of late June 2018 and, as verification, provided the Safety Data Sheet (“SDS”) for the new product along with a photo of the placard on the antiscalant tank showing the contents.

The Cyanide Storage Tank is equipped with a tank level indicator and high-level alarm system to prevent overflowing during offload events. Cyanco is also able to monitor the solution level in the tank remotely (via telemetry) prior to dispatching a new load. The telemetry system helps ensure that the proper amount of material is delivered, minimizing the potential for overflowing the tank. Procedures are in place for recording the tank level on the bill of lading prior to starting the offload.

At the time of this 2018 ICMC audit, GQM had not implemented procedures for routine testing and maintenance of the tank level instrumentation installed on the Cyanide Storage Tank to ensure that the instrumentation is functioning properly. Therefore, the auditor requested that GQM implement a preventative maintenance program for this instrumentation according to the manufacture’s recommendations and advised GQM to retain the maintenance records over the three-year periods between Code audits. Additionally, the auditor requested that GQM confirm the high-level set point currently established on the instrumentation. Following the field component of this audit, GQM developed a new Standard Operating Procedure (“SOP”), which provides the guidelines for testing and maintaining the cyanide tank level instrumentation. The SOP indicates that Plant Maintenance will perform the testing at least once per year and that the ultrasonic sensor is set to alarm at the 80 percent fill level. As evidence of implementation, GQM must provide copies of the maintenance records for one preventative maintenance event. Please refer to **Corrective Action Request GQM-ICMC-CAR-01** in **Attachment A**.

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.

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 3.2.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

Soledad Mountain receives liquid cyanide transported to the site in tanker trucks; therefore, there are no empty cyanide containers requiring treatment or disposal.

Cyanco’s SOP for the delivery of cyanide provides detailed procedures for operating the valves and couplings, both for routine and emergency situations. The SOP defines procedures for securing the trailer at the offload area, verifying the solution level in the Cyanide Storage Tank and notifying GQM of the intent to offload before starting the offload process, use of proper Personal Protective Equipment (“PPE”), making proper coupling connections and disconnections, operating valves during startup and shutdown, and procedures for emergency shutdown.

Soledad Mountain receives only liquid cyanide; therefore, no mixing occurs. Nonetheless, Cyanco’s delivery SOP provides emergency procedures for responding to leaks and overflows. Procedures include depressurizing the offload hydraulics via the hydraulic pump’s trip valve or via breaking off the Emergency Shutdown Device on the trailer. The procedure instructs the driver to contact Cyanco and TransWood dispatch for instructions and to avoid personal hazard by staying away from the leaking product.

The Cyanco SOP addresses appropriate PPE; however, GQM personnel indicated that TransWood does not require its drivers to use personal HCN gas monitors during offload events. The SOP requires the driver to verify that a trained GQM operator is present before making any connections or disconnections and before starting the flow of cyanide solution. Nonetheless, GQM personnel indicated that TransWood always uses two drivers for each delivery to Soledad Mountain based on the travel distance from Winnemucca, Nevada. Therefore, the second TransWood driver observes the offload from a safe distance.

Although Cyanco implements its delivery SOP during offloads, the auditor requested that GQM develop and implement written procedures for its involvement in cyanide deliveries and offloads to prevent exposures and releases. Following the field component of this ICMC audit, GQM developed its own cyanide delivery SOP, which provides general procedures for its involvement in cyanide deliveries and offloads. The SOP lists requirements for proper PPE, conducting a pre-operational inspection of the area, placing warning signs, and checking the storage tank level before and after the transfer. GQM also developed a checklist for recording the pre-offload inspections. The procedures include the requirement for a GQM worker to be present as an observer during the offload and to carry a mine radio at all times during the delivery. GQM provided task training records associated with this new

cyanide delivery SOP and inspection program. As further evidence of implementation, GQM provided a copy of a checklist completed during an actual cyanide delivery occurring on September 5, 2018.

GQM did not have a scheduled cyanide delivery during the field component of this ICMC audit. Therefore, the auditor was not able to observe an actual offload event. Consequently, verification for this Standard of Practice was by review of written procedures and interviews with GQM personnel.

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4.0 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.

The operation is in	<input type="checkbox"/> Full Compliance	with Standard of Practice 4.1.
	<input checked="" type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

Please refer to **Section 0.3** above for a listing of the active cyanide facilities at Soledad Mountain. During the field component of this 2018 ICMC audit, GQM had implemented written plans and procedures related to the operation of its cyanide facilities, which include SOPs, operating plans and operating permits.

Although the plans, procedures and permits provide the framework for operating the process facilities and conducting certain critical tasks, in the auditor’s professional judgment, at the time of this 2018 ICMC audit, GQM had not developed and implemented comprehensive written management and operating plans or procedures for its cyanide facilities, which adequately address the protection of human health and the environment. Therefore, the auditor requested that GQM develop and implement written procedures, comprehensive of all cyanide-related tasks that, if not performed properly, have the potential to cause cyanide exposures or releases. Please refer to **Corrective Action Request GQM-ICMC-CAR-02** in **Attachment A**.

The Soledad Mountain *Report of Waste Discharge*, regulatory operating permits, water balance model, and the Merrill-Crowe Plant engineering study and operations manual identify the assumptions and parameters on which the facility design is based and the applicable regulatory requirements governing the facility design, construction and operation. The primary regulatory operating permits for Soledad Mountain include the *Waste Discharge Requirements* and associated *Monitoring and Reporting Program* and *Conditional Use Permits*.

The *Report of Waste Discharge* includes all elements regarding the design and operation of the HLF. GQM submitted the *Report of Waste Discharge* to the California Regional Water Quality Control Board, Lahontan Region (“RWQCB”) in accordance with the California Code of Regulations for construction and operation of the Facility. Waste discharges to land are regulated under the *Waste Discharge Requirements* issued by the RWQCB based on its review of the *Report of Waste Discharge*. GQM must comply, at all times, with the engineering plans, specifications, and technical reports submitted with the complete *Report of Waste Discharge*.

The *Conditional Use Permits* list requirements for monitoring stormwater, maintaining a cyanide destructing compound on site for use in the event of spills, using drip emitters, implementing heap contouring to avoid ponding, storing chemicals properly, installing wildlife and security fencing, maintaining a backup power source, installing and maintaining netting or other protective measures on the HLF, and implementing closure measures.

The water balance model developed for Soledad Mountain incorporates the freeboard, design storm events, and heap draindown requirements for use in sizing the water management facilities. The Merrill-Crowe Plant design documents and operations manual identify the plant design assumptions and operating parameters.

GQM implements routine inspection and maintenance programs for the Soledad Mountain cyanide facilities, which address proper management of process solutions to maintain the design storage capacities. In addition to routine monitoring of groundwater, stormwater, leak detection and vadose zone systems, and stormwater diversion structures, the Environmental Department conducts routine inspections of the perimeter fencing surrounding Merrill-Crowe Plant and the Overflow Pond areas. Process personnel conduct routine inspections of process facilities, which include visual inspections of tanks, secondary containments, pipelines, pumps and valves and pond levels. GQM documents these inspections on checklists and inspection forms. Generally, the inspection records that GQM provided during the field component of this 2018 ICMC audit include the date of the inspection, the name of the inspector, any observed deficiencies and the nature and date of corrective actions. In the auditor's professional opinion, the frequencies of the inspections that GQM was implementing during the field component of this ICMC audit are sufficient to ensure and document that the cyanide facilities covered by those inspections are functioning within design parameters.

Nonetheless, although GQM performs routine inspections of the Soledad Mountain cyanide facilities as described above, in the auditor's professional judgment, at the time of this 2018 ICMC audit, GQM's inspection program does not adequately cover and document inspection of all cyanide facilities. Inspection records were available for the Merrill-Crowe Plant and Refinery areas and for water levels in the Overflow Pond. However, GQM did not provide documentation demonstrating inspections of the Pump Box and appurtenances, process solution pipelines between the Merrill-Crowe Plant and the leach pad and pond, the Pipeline Containment Channel provided for the pipelines and the liner integrity of the Overflow Pond. Therefore, the auditor requested that GQM develop a comprehensive inspection program for all cyanide facilities. Inspection forms must be focused rather than general and must document the date of the inspection, name of the inspector, and any observed deficiencies. Finally, the inspection forms must document the nature and date of corrective actions. Please refer to **Corrective Action Request GQM-ICMC-CAR-03** in **Attachment A**.

GQM does not have a formal change management procedure. The Weekly Managers Meeting, attended by the President/CEO, Mine Manager, Plant Operations Manager, and Maintenance Manager, serves to assess potential risks associated with changes in processes or operating practices. Environmental and Safety personnel do not attend the weekly meetings. Managers discuss potential and proposed changes and involve Environmental and Safety personnel as necessary. GQM workers also raise and discuss safety related topics in the weekly Mine Operations Meeting. Nonetheless, the auditor determined that GQM does not always involve Environmental and

Safety personnel in the evaluation of cyanide-related process or operating changes prior to implementation. Therefore, the auditor requested that GQM implement a written change management procedure or a policy statement requiring that GQM management discuss cyanide-related process or operating changes with Environmental and Safety personnel prior to implementation.

Following the field component of this ICMC audit, GQM provided a memorandum from the General Manager addressed to all GQM managers and process supervisors, which serves as a policy statement for Change Management Review. The policy states that upper management must review significant changes to cyanide-related processes and that the General Manager must approve the changes in writing. Further, the policy states that, prior to implementing any changes, Environmental and Safety personnel will review potential risks and regulatory compliance concerns and provide documentation verifying review and the Process Operations Manager will keep records of all approved changes.

The *Report of Waste Discharge* and *Waste Discharge Requirements* provide contingency plans for non-standard operating conditions, which include measures to take in response to problems identified by facility monitoring and/or inspection programs and upsets in the operational water balance. The *Report of Waste Discharge* provides the contingency plans to address the failure or breakdown of the waste handling facilities or contingency systems and presents the rationale for development of “*reasonably foreseeable release scenarios*” for the purposes of compliance with the regulations for detecting, characterizing, and responding to releases to groundwater, surface water, or the unsaturated, or vadose zone.

During temporary closure or cessation of operations, GQM will submit an Interim Management Plan to the Kern County Planning & Community Development Department. In accordance with the *Conditional Use Permits*, if mining operations cease for 12 consecutive months without the submittal and subsequent approval of an Interim Management Plan, the facility shall be considered abandoned, and reclamation work shall begin within 60 days.

As mentioned in **Section 0.2** above, to efficiently manage flows that exceed the Pump Box capacity during large precipitation storm events, the Overflow Pond has a divider berm, which creates a smaller operational pond (West Overflow Pond or west cell) and a larger surplus pond (East Overflow Pond or east cell). The West Overflow Pond stores process solution on a continuous basis and is therefore equipped with bird balls. The East Overflow Pond remains empty except during upset conditions. Since the pregnant and barren process solution contain cyanide concentrations that exceed 50 mg/L WAD, and because the East Overflow Pond does not have permanent avian deterrent systems, quick response and measures are necessary to prevent wildlife mortalities during upsets.

A recent upset, caused by a power failure on top of a barren pump replacement, resulted in process solution flowing into the East Overflow Pond, which does not routinely store process solution or have avian deterrent systems. Consequently, two duck mortalities occurred before GQM could remove the process solution from the East Overflow Pond. Therefore, the auditor requested that GQM update its written contingency procedures for responding to releases of process solution to the East Overflow Pond. Following the field component of this ICMC audit, GQM developed an SOP, which provides general procedures for managing the Overflow Pond, including during upset operating conditions and storm events. Additionally, the SOP lists measures that GQM will take to

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prevent wildlife mortalities during upsets. GQM provided copies of task training records associated with this new SOP.

At the time of this 2018 ICMC audit, GQM had not implemented a formal preventative maintenance program or work order system. GQM performs preventative maintenance and corrective maintenance required to repair issues indentified during inspections; however, the operation does not employ maintenance software or work order systems. Thus, Soledad Mountain maintenance activities are undocumented. Nonetheless, GQM implements redundant equipment and systems as the primary component of its preventative maintenance program for cyanide facilities at Soledad Mountain. Operational redundancy and backup measures implemented include redundant solution pumps, standby power supply, standby pumps, and spare pumps. GQM has taken initial steps to implement a formal preventative maintenance program, which includes implementation of a computerized maintenance system to manage and document maintenance activities.

Because GQM had not yet established a work order system or a program to document maintenance activities, the auditor was unable to review representative maintenance records for the cyanide facilities to verify implementation. Therefore, the auditor requested that GQM implement a preventative maintenance program for its cyanide facilities that addresses and documents routine maintenance of critical equipment for which a failure could result in a cyanide release or exposure. Please refer to **Corrective Action Request GQM-ICMC-CAR-04** in **Attachment A**.

GQM maintains a diesel-powered electric generator on site to provide backup power for heap leach pumping operations in the event of a commercial (primary) power outage. GQM personnel indicated that the generator is capable of powering the entire Merrill-Crowe Plant. GQM performs routine maintenance on the generator (i.e., startups, fluid checks and battery tests) to ensure that the generator is operational when needed and records this maintenance in a logbook kept in the generator container. However, GQM could not locate the logbook during the field component of this 2018 ICMC audit. Therefore, the auditor requested that GQM provide maintenance records for the emergency generator (e.g., routine startups, service and battery checks). Following the field component of this ICMC audit, GQM developed a new logbook, which documents routine and non-routine startups and run times. GQM provided a copy of the logbook along with an invoice documenting service performed on the generator by a service contractor in May 2018. Additionally, GQM implemented an inspection checklist to document routine checks for warning lights, alarms, fuel and oil levels, battery condition, and any leaks and provided a copy of a completed form along with associated training records.

Standard of Practice 4.2

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

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 4.2.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

This Standard of Practice is not applicable, as Soledad Mountain is a heap leach operation and does not currently operate a mill.

Standard of Practice 4.3

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

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 4.3.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

The Soledad Mountain HLF is a closed system with zero discharge of solutions. Any precipitation falling onto the ore heap is retained within the solution management system with no discharge or runoff. In the event of a pump or power failure, the Overflow Pond is sized to store up to eight hours of draindown volume at the design solution application rate and a diesel-powered electric generator is available to provide power to the HLF pumping operations. Additionally, capacity exists within the Overflow Pond to retain the estimated precipitation from the design storm event over the entire lined HLF footprint should these conditions occur simultaneously.

Soledad Mountain has a probabilistic water balance, developed using GoldSim™ software. The model assesses the potential water consumption and make-up water requirements for the HLF by simulating solution flows reporting to the HLF over the operational period of the mine. GQM can analyze solution management issues (i.e., storage capacity and solution balance status) using the probabilistic water balance model, simulating the month-by-month operation of the HLF.

GQM initially developed the water balance model to support the design of all solution retaining and solution conveyance structures and will continuously refine the model to reflect any facility or operational changes going forward. In 2017, GQM performed an update of the operational water balance considering expansion of the HLF

and implementation of an Intermittent Leach System, which doubles the pumping capacity. Ultimately, GQM did not implement the system.

The Soledad Mountain water balance model considers leaching of ore stacked on the pad, the collection of pregnant solution at the Pump Box, the collection of contingency storage events within the Overflow Pond, and the extraction process itself. The model simulates incremental daily inflows, consumption and losses to predict the system's net solution status. When inflows exceed losses, the model tracks excess solution for storage within the Overflow Pond. For periods producing net negative solution balances, when excess solution is not available, it assumes that make-up water can be obtained from the Overflow Pond or from an outside source. Thus, the model tracks mass balance of excess solution within the system or the need for make-up water for the expected life of the facility.

The model calculations assume a constant ore production rate and solution application rate for the heap leach pad at an average solution flowrate. The water balance model uses design storm event precipitation values for the area obtained from the National Oceanic and Atmospheric Administration Atlas and the model indicates that the Overflow Pond volume is sufficient to accommodate the 1,000-year, 24-hour design storm. Monthly average precipitation and lake evaporation input parameters used in the model are based on the precipitation data for Mojave, which is located approximately five miles north of the mine site. Surface water diversions collect and route upstream runoff such that it flows completely around the HLF and does not impact operations. Evaporation and moisture uptake by ore on the heap are the only losses that the water balance model considers.

Based on climate conditions, the water balance model does not consider the effects of potential freezing and thawing conditions on the accumulation of precipitation within the HLF and the upgradient watershed. Additionally, based on the Overflow Pond design and available emergency backup power, the water balance model does not consider the effects of potential power outages or pump and other equipment failures on the draindown from ore on the heap or the emergency removal of water from the system.

In accordance with the *Monitoring and Reporting Program*, made part of the *Waste Discharge Requirements*, Environmental personnel perform weekly inspections of the available freeboard in the Overflow Pond and report the values to the RWQCB quarterly. Process personnel check pond levels daily and the Merrill-Crowe Plant supervisor provides the results to GQM management in a weekly report. Additionally, GQM periodically inspects the site drainage diversions to ensure the physical integrity of the structures.

GoldSim™ determined the maximum required pond volume to be approximately 25 million gallons. A conservative estimate assuming fully saturated heap conditions, full magnitude of the 1,000-year, 24-hour storm applied over the heap footprint, and eight-hour draindown condition, results in a required pond volume of 26.9 million gallons. The available capacity of the pond when the divider berm is submerged is 27.1 million gallons, which includes maintaining two feet of freeboard. As-built stage/capacity values for the Overflow Pond specify the pond crest at elevation 2,770 feet and the 27.1 million gallon capacity at elevation 2,768 feet.

GQM has collected precipitation data from an on-site meteorological monitoring station since 2007 for baseline environmental requirements and continues to collect data in support of mine operations. Environmental personnel compile and submit precipitation data monthly to the GQM President and CEO, but to date, GQM has not used the data to recalibrate the water balance model. The Soledad Mountain site is only five miles from the Mohave weather station, used for the initial data collection, and the site has comparable topographic conditions.

Standard of Practice 4.4

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

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 4.4.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

WAD cyanide concentrations in all process solution at Soledad Mountain exceed 50 mg/L. In accordance with the *Waste Discharge Requirements*, the Pump Box and the Overflow Pond are considered surface impoundments. GQM stores open process solution in these facilities on a continuous basis.

As previously described, to efficiently manage flows that exceed the Pump Box capacity during large precipitation storm events, the Overflow Pond has a divider berm, which creates a smaller operational pond (West Overflow Pond or west cell) and a larger surplus pond (East Overflow Pond or east cell). The West Overflow Pond stores process solution on a continuous basis and is therefore equipped with bird balls. The East Overflow Pond remains empty except during upset conditions and does not have bird balls or other avian deterrent systems.

The Pump Box is a reinforced concrete box structure located at the northwest corner of the Overflow Pond. The Pump Box receives pregnant solution flows from the heap. Two pregnant solution pumps at the Pump Box, one operating and one on standby, pump pregnant solution to the Merrill-Crowe Plant. Any overflow from the Pump Box reports directly to the Overflow Pond via an HDPE overflow pipe installed through the side of the Pump Box. GQM has installed grating over the Pump Box to prevent wildlife access.

Other potential areas where open solutions may occur on a temporary basis include the Pipeline Containment Channel (in the event of a leaking or ruptured pipe), and on the heap itself. During the field component of this 2018 ICMC audit, the auditor observed open process solution flowing in the Pipeline Containment Channel between the Merrill-Crowe Plant and the Overflow Pond. Therefore, the auditor requested that GQM install netting over this segment of the channel or route the flow through a pipe.

Following the field component of this audit, GQM provided photographs demonstrating that maintenance personnel routed the solution flowing from the Merrill-Crowe Plant into a pipe, thereby eliminating open process

solution in the channel. Prior to the modification, the open solution was flowing in a high-use area next to the Merrill-Crowe Plant and Pump Box, where trained personnel operate. Additionally, GQM conducts routine daily wildlife inspections in process areas. Therefore, no immediate or substantial risk to employee or community safety, health or the environment was deemed to exist during implementation of this corrective action.

GQM periodically cleans the clarification filters in the Merrill-Crowe Plant, anywhere from 10 times per day to once every two weeks. During the cleaning process, DE slurry removed from the three clarifiers reports to the DE Settling Pond located outside the Merrill-Crowe Plant, directly against the plant’s north wall. Following consultation with ICMI, the auditor determined that the DE Settling Pond is an open-topped vessel and is not subject to the ICMC requirement for covering or netting. The location, configuration, and operation of the structure formed the basis for this determination. GQM personnel indicated that no cyanide-related wildlife mortalities associated with the structure have occurred, to date.

GQM erected a barbed wire fence around the perimeter of the mine property. This fence will remain in place until vegetation is established on the leached and rinsed ore remaining on the heap leach pads following closure and reclamation. A six-foot high, chain-link security fence surrounds the Merrill-Crowe Plant and Overflow Pond areas.

GQM applies process solution to the ore heaps via drip irrigation systems. After stacking, a small track dozer spreads the ore to create a smooth surface and the drip emitter lines are recessed in small furrows to minimize surface ponding and to reduce evaporative losses. Placement of the ore on the heap via conveyor and stacker system minimizes compaction and promotes permeability. During the field component of this audit, the auditor observed an isolated area of minor ponding at the toe of an active leaching area. The ponding looked to be the result of a compacted area next to a vehicular traffic way.

Standard of Practice 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	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 4.5.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

Soledad Mountain is designed and operated as a zero-discharge facility (closed system) with no direct discharge to surface water. Any precipitation falling onto the ore heap is retained within the solution management system with no discharge or runoff. No surface water bodies exist in the immediate vicinity of the operation.

The operation is located in within the Antelope Hydrologic Unit of which the beneficial uses of surface water, as set forth and defined in the Basin Plan, are: Municipal and domestic supply; Agriculture; Groundwater recharge;

Water contact recreation; Non-contact water recreation; Warm freshwater habitat; and Wildlife habitat. According to the *Waste Discharge Requirements*, GQM is not allowed to discharge waste to surface waters that cause, or contribute to, a violation of the water quality objectives established for the Antelope Hydrologic Unit.

There are no springs or perennial streams within one mile of the operation. Numerous geologic studies prepared for the mine have found no evidence (seasonal or otherwise), such as springs or vegetation, of shallow groundwater on the mountain or flanks of the mountain. The nearest ephemeral drainage is located approximately 200 feet north of the Merrill-Crowe Plant, running along the south side of Silver Queen Road, and the nearest intermittent stream is located approximately three miles west of the site.

GQM samples stormwater discharges at two monitoring points located upgradient and downgradient from the process facilities when runoff flow exists, and submits results to RWQCB quarterly. Environmental personnel indicated that GQM has not collected any samples to date and indicated that if sampling detects cyanide, GQM would immediately notify RWQCB.

Standard of Practice 4.6

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

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 4.6.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

The Soledad Mountain HLF is a closed system with zero discharge of process solutions. Solution storage and process tanks, pumps, piping, equipment, transfer and handling systems have secondary containment, consisting of synthetic liners, concrete slabs, curbed concrete containment areas and pipe-in-pipe systems.

The solution collection and containment system for the heap leach pad consists of a composite liner (i.e., a geomembrane in direct contact with a constructed soil liner). In addition to the environmental protection provided by the composite liner system, the hydraulic head on the liner is minimized via internal solution collection piping placed on the geomembrane and by the site grading; both designed to ensure positive drainage. The heap leach pad has an integrated leak detection system, which includes a leak detection layer and a vadose zone monitoring system.

Two HDPE header pipes collect pregnant process solutions from the heap and lie within the Pipeline Containment Channel, double-lined with geomembrane and running along the northern edge of the heap leach pad. Solutions from the leach pad flow by gravity to the Pump Box and are then pumped to the Merrill-Crowe Plant. The Pump Box is a concrete structure with a geomembrane liner beneath along with a soil underliner. The Overflow Pond,

located adjacent to and downgradient of the Pump Box and Merrill-Crowe Plant, is designed to provide adequate capacity for the retention of any operational upsets and precipitation events exceeding the design storm. The Overflow Pond is double-lined with a composite (geomembrane and soil) secondary liner and a primary geomembrane upper liner with a dedicated leak detection system.

The Merrill-Crowe Plant, which includes the cyanide offload and storage facilities, provides concrete secondary containment for all process tanks and areas. See also ICMC Standard of Practice 3.1 above for a description of measures planned to protect groundwater at the cyanide offload and storage facilities.

In addition to the structural controls designed to protect groundwater, GQM implements a program for routine monitoring of the leak detection systems for the various liner systems and routine monitoring of the vadose zone and groundwater downgradient of the process facilities. GQM also conducts regular inspections of all process facilities to ensure that the operating criteria are being met and to ensure the physical integrity of protective systems.

The Soledad Mountain operation is located in the Fremont Valley Groundwater Basin. The beneficial uses of groundwater in the Fremont Valley Groundwater Basin, as set forth and defined in the Basin Plan and as listed in the *Waste Discharge Requirements*, are municipal and domestic supply, agriculture, industrial service supply and freshwater replenishment. Soledad Mountain has not experienced seepage since operation began that has caused cyanide concentrations in groundwater to rise above the protective standard.

GQM uses a contractor to conduct groundwater monitoring in accordance with the *RWQCB Monitoring and Reporting Program* stipulated by the *Waste Discharge Requirements*. GQM currently monitors five groundwater wells for WAD cyanide concentrations, all of which are located downgradient of the process facilities. GQM samples the wells quarterly and reports analytical results to RWQCB quarterly and annually. Also in accordance with the *Monitoring and Reporting Program*, GQM samples its vadose zone lysimeters monthly. The vadose monitoring system consists of five lysimeters.

During this 2018 ICMC verification audit, the auditor reviewed the *Quarterly Monitoring Report* submitted to RWQCB for the first quarter of 2018. Results indicate that WAD and Total cyanide concentrations for all samples collected from the groundwater monitoring wells were below the detection limits. Monitoring well MW-4 was dry. GQM personnel indicated cyanide has not been detected in any of the wells since operations began.

GQM monitored the lysimeters in January, February and March of 2018. In January, low levels of cyanide were detected in one lysimeter, which GQM suspects is attributable to use of historical tailings on site as construction material below the liner system (analyses of past samples of the historical tailings indicated the presence of very low levels of cyanide). In February and March, all lysimeters were dry.

Standard of Practice 4.7

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

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 4.7.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

All cyanide mixing, storage and process tanks at the Soledad Mountain operation are provided with concrete, secondary containment. During the field component of this 2018 ICMC audit, the concrete containments were in good repair.

The concrete floor of the Merrill-Crowe Plant slopes to a trench drain, which reports to a floor sump. The floor slab and stem walls provide secondary containment for the process tanks and vessels located inside the building. The tanks and vessels sit directly on the floor slab or are supported above the floor slab by steel structure. The concrete floor has joints, water stop seals, and reinforcing to reduce settling and cracks.

Due to large size, some of the process equipment is located outside in patio areas adjacent to the building. The Cyanide Storage Tank is located outside on the west side of the Merrill-Crowe Plant building on a solid reinforced concrete plinth (pedestal) foundation. The foundation is surrounded by a reinforced concrete pad sloped to drain to a concrete sump. The Barren Solution Tank and the De-aeration Tower are also located outside the Merrill-Crowe Plant building (on the north side) within a common concrete secondary containment. The Barren Solution Tank sits on a solid reinforced concrete plinth (pedestal) foundation and steel structure supports the De-aeration Tower above the concrete floor. There is also a small carbon steel water tank used for the de-aeration vacuum system that resides next to the De-Aeration Tower. Reinforced curbs and/or short containment walls surround both patio areas on three sides, and the building’s concrete stem walls along the fourth side of each patio complete the containments.

The three filter presses are located within the Refinery, which comprises the east end of the Merrill-Crowe Plant building. The building floor slab and stem walls provide secondary containment for the presses. The concrete floor slopes to a floor sump.

The entire concrete containment area provided for the Merrill-Crowe Plant and exterior patio areas, including the concrete apron provided for the cyanide delivery truck, is interlinked via knockouts in the concrete curbing and building stem walls. Should any spills exceed the capacities of the floor sumps, process solution would flow via gravity through the system of knockouts to the HDPE-lined Pipeline Containment Channel provided for the pregnant solution pipelines and then to the Overflow Pond. The channel connects to the patio area containment provided for the Barren Solution Tank and the De-aeration Tower on the north side of the Merrill-Crowe Plant

building via a concrete box culvert. All concrete floor sumps are equipped with automatic pumps to return spillage back to the process and any spills that exceed the sump capacities would flow via gravity to the Overflow Pond.

The Overflow Pond has a capacity of 27.1 million gallons, allowing for operational upsets, climatological contingencies and two feet of freeboard. The capacities of the largest process tanks, i.e., the Cyanide Storage Tank, Barren Solution Tank and the De-Aeration Tower, are 23,500 gallons, 39,660 gallons and 20,668 gallons, respectively.

All cyanide solution pipes and process equipment are provided with secondary containment. The varied forms of secondary containment provided, include synthetic liners, concrete slabs and curbed concrete containment areas. All process pipelines at the Merrill-Crowe Plant are located within concrete secondary containment. The process solution pipelines running between the heap leach pad and the Pump Box are contained within the double-lined Pipeline Containment Channel. At a road crossing on the north side of the Merrill-Crowe Plant, the pipelines pass through a concrete box culvert, which ties into the concrete secondary containment provided for the plant facilities. Aside from this roadway crossing, all process pipelines are above ground. There are no perennial streams or other surface water features located in close proximity to the operation; therefore, no pipelines require special protection needs.

GQM uses stainless steel, carbon steel, HDPE and polyvinyl chloride (“PVC”) piping materials and piping system components for conveyance of cyanide solutions and slurries. Cyanide storage and process tanks and vessels are carbon steel and concrete. These materials are compatible with cyanide and high pH solutions.

Standard of Practice 4.8

Implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.

The operation is in	<input type="checkbox"/> Full Compliance	with Standard of Practice 4.8.
	<input checked="" type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

Please refer to **Section 0.3** above for a list of the active cyanide facilities at the Soledad Mountain operation. GQM implemented Quality Assurance/Quality Control (“QA/QC”) programs during construction of the Soledad Mountain cyanide facilities. The QA/QC programs cover major installations such as the heap leach pad and pond liner construction, process buildings and equipment, reagent-strength cyanide tanks, and the concrete containments, supports/foundations and piping related to these facilities.

In January 2016, a Cyanco representative evaluated the offload and storage facilities prior to approving the first shipment of cyanide to the site. Additionally, in February 2016, under requirements of the Cal/ARP Program, a

qualified engineer performed a walkthrough of the facility as part of a required Hazard Review designed to satisfy the seismic provisions of the California Building Code. The visual assessment addressed the Cyanide Storage Tank and associated equipment, the Barren Solution Tank, and the high-strength cyanide feed line between the two tanks. In general, the engineer found the system to be in good condition and well maintained.

An engineering firm conducted the QA/QC programs for the HLF (i.e., the heap leach pad, Pipeline Containment Channel, Pump Box, Overflow Pond, and associated piping systems). The QA/QC documentation prepared for the HLF addresses earthworks, the vadose zone monitoring system, soil liner fill, geomembranes, leak detection and solution collection systems and appurtenances.

GQM provided a Construction Completion Certification letter from the contractor that constructed the Merrill-Crowe Plant building and associated concrete works and also provided the Kern County inspection report and zoning approval for the Merrill-Crowe Plant building (foundation, electrical and masonry components). However, during the field component of this 2018 ICMC audit, GQM was unable to provide QA/QC documentation for the Merrill-Crowe Plant facilities; i.e., the process equipment.

A professional civil engineer registered in the State of California prepared the QA/QC documentation for the HLF and the construction reports include a certification that the facilities were constructed in general accordance with the project's Drawings and Specifications, the approved Design Specification Clarifications implemented during construction, and California regulations. A qualified Cyanco representative evaluated the offload and storage facilities prior to approving the first shipment of cyanide to the site and provided written correspondence of its evaluation and conditional approval. An engineering consulting firm performed the walkthrough of the cyanide handling facilities under requirements of the Cal/ARP Program and the results contain a certification that the report was prepared in accordance with California regulations. The Construction Completion Certification letter from the Merrill-Crowe Plant construction contractor provides a statement from the Chief Financial Officer certifying that the concrete work at the plant and construction of the building meets the standards and specifications and is complete per the agreement and design drawings.

GQM provided QA/QC documentation for all existing cyanide facilities (i.e., major installations) constructed at Soledad Mountain with the exception of the Merrill-Crowe Plant facilities not covered under the Cyanco and Cal/ARP visual inspections (mentioned above). Therefore, the auditor requested that GQM provide a statement from the qualified person (i.e. professional engineer) who originally signed off on the QA/QC program describing the nature of the program and its results; or have a qualified person conduct a visual inspection of the Merrill-Crowe Plant facilities (e.g., tanks, vessels, pipelines, pumps and associated valves and fittings, and steel structures supporting the equipment) and issue a report concluding that continued operation of the facilities will protect against cyanide releases and exposures. Please refer to **Corrective Action Request GQM-ICMC-CAR-05** in **Attachment A**.

GQM has retained the original QA/QC documentation for all other cyanide facilities constructed to date.

Standard of Practice 4.9

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

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 4.9.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

The *Monitoring and Reporting Program*, made part of the *Waste Discharge Requirements*, provides procedures for leak detection, vadose zone and groundwater monitoring activities. The program defines monitoring points, frequencies, parameters, constituents of concern, concentration limits, points of compliance, data evaluation methods, required monitoring records and reporting requirements, and includes general provisions for sampling and analysis. GQM implements the protocols for groundwater sampling and analysis specified in the *Water Quality Monitoring and Data Management Procedures Manual*, which are consistent with sampling and analysis requirements in California regulations. GQM does not have a written procedure for wildlife monitoring.

RWQCB staff prepared the *Monitoring and Reporting Program*. A qualified environmental scientist developed the GQM *Water Quality Monitoring and Data Management Procedures Manual* and updated the manual four times since 2006 to keep it consistent with expansion and refinement of the monitoring program. The current plan is dated March 2013.

Groundwater monitoring wells are sampled according to the approved sampling protocol, which includes methods for sample collection, sample preservation and shipment, analytical procedures, field and laboratory quality control, and chain of custody control. The *Monitoring and Reporting Program*, the sampling protocol, and the monitoring reports submitted to RWQCB provide monitoring locations.

The *Water Quality Monitoring and Data Management Procedures Manual* includes provisions for recording appropriate field parameters and sampling conditions and includes a standardized field form (Water Sampling Log) that is completed each time a water quality sample is collected. GQM samples the lysimeters and uses a separate field form to record sampling conditions.

GQM does not monitor surface water (see ICMC Standard of Practice 4.5 above). No perennial streams or other surface water features are located within one mile of the Soledad Mountain operation or in close proximity. The nearest intermittent stream is located approximately three miles west of the site. Consequently, GQM monitors stormwater discharges at two on-site sample points following precipitation events that generate adequate flow.

In total, GQM samples five groundwater monitoring wells for WAD and Total cyanide concentrations on a quarterly basis. All of the monitoring wells are located downgradient of the process facilities. Additionally, in accordance

with the *Monitoring and Reporting Program*, GQM samples its vadose zone lysimeters monthly. Groundwater and vadose zone monitoring results are submitted to the RWQCB in quarterly and annual reports.

As previously mentioned, GQM does not have a written procedure for wildlife monitoring and the operation is not subject to formal regulatory requirements for reporting wildlife mortalities. Nonetheless, GQM Environmental personnel provide wildlife awareness training for sensitive species to all persons coming on site and train all employees to observe and report wildlife presence and mortalities site wide on a continuous basis. If GQM discovers a wildlife mortality, Environmental personnel are to provide the date discovered, location, cause of death (if known or suspected) and species (if known) to federal and state regulatory agencies. GQM indicated that four cyanide-related wildlife mortalities have occurred since Soledad Mountain first received cyanide on site.

Because WAD cyanide concentrations in barren and pregnant solutions continuously exceed 50 mg/L at the Soledad Mountain operation, the auditor recommended that GQM implement a written procedure or policy to document wildlife presence and cyanide-related wildlife mortalities. During the field component of this audit, GQM developed an inspection form to document the presence of wildlife in process areas, inspections of freeboard and bird balls in the Overflow Pond, solution ponding in channels and on the heap, and condition of diversion channels and fencing. GQM subsequently provided completed copies of the form for inspections conducted over the period May 7, 2018 to July 13, 2018.

In the auditor's professional opinion, the GQM monitoring program is designed to adequately characterize groundwater and to identify changes in a timely fashion. In accordance with the *Waste Discharge Requirements* and associated *Monitoring and Reporting Program*, GQM conducts groundwater sampling quarterly and samples its vadose zone lysimeters monthly. GQM Process personnel inspect the leak detection systems weekly. GQM conducts wildlife monitoring daily, which in the auditor's professional opinion, is adequate.

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5.0 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.

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 5.1.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

GQM has developed a preliminary closure and post-closure plan (Preliminary Closure Plan), which meets the requirements detailed in the *Surface Mining and Reclamation Plan* approved by the Kern County Board of Supervisors. The *Preliminary Closure Plan*, submitted to the RWQCB, provides the parameters for closure and post-closure maintenance and monitoring of the facilities regulated by the *Waste Discharge Requirements*. Specifically the plan outlines measures for neutralization of HLF (i.e., the heap leach pads, ore stacked on the pads and solution management systems) and decommissioning of the Pump Box, Overflow Pond, Pipeline Containment Channel, and process equipment. GQM will submit a final closure and post-closure plan (Final Closure Plan) to the RWQCB upon notification of closure, no later than 180 days prior to beginning any partial or final closure activities. The *Final Closure Plan* will be prepared by or under the supervision of either a California Registered Civil Engineer or a Certified Engineering Geologist in accordance with accepted and then current environmental engineering practices and industry standards, and will be implemented to meet the requirements of the *Waste Discharge Requirements* with respect to closure.

Additionally, the 2018 Financial Assurance Cost Estimate (“FACE”) prepared for Soledad Mountain includes measures for removal of the Merrill-Crowe Plant and ancillary process equipment and support structures, including neutralization and demolition of the Cyanide Storage Tank and system components exposed to cyanide solution. The FACE, updated annually, does not include measures for closure of the cyanide facilities covered under the *Preliminary Closure Plan* (HLF described above), as those facilities are bonded separately.

Closure activities are anticipated to occur over a three-year period after completion of active mining, leaching and rinsing of the remaining residues on the heaps. Final closure will however depend upon the results of groundwater quality monitoring, successful completion of revegetation, and meeting all regulatory requirements. GQM anticipates that 12 months will be required to rinse each area and effectively treat the leached residues on the heap.

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In accordance with the *Waste Discharge Requirements*, GQM must update/modify the *Preliminary Closure Plan* if there is a substantial change in operations, or if requested by the RWQCB. Additionally, the *Waste Discharge Requirements* stipulate that the *Preliminary Closure Plan* and associated cost estimates shall be updated and submitted to the RWQCB annually; confirming that the closure plan conforms to the existing operations at that time. Other than updating the closure costs annually, GQM has not updated the *Preliminary Closure Plan* since commencing operations in January 2016. GQM has not made any substantial changes in operations or implemented new technical parameters that justify a plan update.

Standard of Practice 5.2

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

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 5.2.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

GQM prepares cost estimates annually for the items covered in the approved *Preliminary Closure Plan* and the *Surface Mining and Reclamation Plan* and submits evidence annually demonstrating adequate financial assurance pursuant to the requirements of the *Waste Discharge Requirements* and in accordance with the California Surface Mining and Reclamation Act (“ SMARA”).

GQM retains a consultant to prepare the cost estimate for closure and post-closure maintenance for the specific items regulated by the *Waste Discharge Requirements*, which include measures for neutralization of the HLF including the heap leach pads, ore stacked on the pads and solution management systems and decommissioning of the Pump Box, Overflow Pond, Pipeline Containment Channel, and process equipment. The estimate establishes the bond amount required by the RWQCB for the facilities regulated by the *Waste Discharge Requirements*. GQM provided documentation regarding the most recent approved estimate, dated January 5, 2017. Although not yet approved during field component of this 2018 ICMC audit, GQM also provided documentation regarding the 2018 estimate, dated December 12, 2017.

Pursuant to SMARA, GQM retains a consultant to prepare a FACE annually. Once the FACE is approved by the lead agency, the GQM must provide a financial assurance mechanism to cover reclamation costs in the event that the mine is abandoned or the operator is financially unable to complete the required reclamation activities. Among other items, the FACE includes costs for removal of the Merrill-Crowe Plant and ancillary process equipment and support structures, including neutralization and demolition of the Cyanide Storage Tank and system components exposed to cyanide solution. The FACE does not include costs for closure of the cyanide facilities regulated by the *Waste Discharge Requirements*, as those facilities are bonded separately. GQM provided the current approved FACE prepared for Soledad Mountain and submitted to the California Department of Conservation - Division of

Mine Reclamation and Kern County for bonding purposes (revised April 25, 2018). Although not yet approved during field component of this 2018 ICMC audit, GQM also provided the 2018 FACE (dated May 2, 2018).

Both approved estimates provide the expected cost that would be incurred by a third party both to perform closure and reclamation and to carry out post-closure monitoring and maintenance. GQM has estimated costs based on a proposed two-year post-closure monitoring and maintenance period.

Soledad Mountain operates under three separate closure and reclamation bonds, as follows:

- Reclamation Bond posted with Kern County, the California Department of Conservation - Division of Mine Reclamation and the Bureau of Land Management
- Performance Bond For Closure posted with RWQCB
- Financial Guarantee Bond For Corrective Action For Known or Reasonably Foreseeable Release Costs posted with RWQCB

The *Reclamation Bond* is based on the FACE. Following the field component of this 2018 ICMC audit, GQM provided evidence of the Financial Assurance Mechanism for the approved the 2018 FACE amount.

The *Performance Bond For Closure* is based on the estimate prepared under the requirements of the *Waste Discharge Requirements*. Following the field component of this 2018 ICMC audit, GQM provided evidence of the Financial Assurance Mechanism for the approved 2018 end-of-year estimate amount.

The *Financial Guarantee Bond For Corrective Action For Known or Reasonably Foreseeable Release Costs* is not associated with decommissioning. Therefore, the auditor did not request evidence of the bond instrument.

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6.0 WORKER SAFETY

Protect workers' health and safety from exposure to cyanide.

Standard of Practice 6.1

Identify potential cyanide exposure scenarios and take measures as necessary to eliminate, reduce and control them.

The operation is in	<input type="checkbox"/> Full Compliance	with Standard of Practice 6.1.
	<input checked="" type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

Please refer to ICMC Standard of Practice 4.1 above, regarding the procedures that GQM currently implements for the operation of its cyanide facilities, and **Corrective Action Request GQM-ICMC-CAR-02** in **Attachment A**. GQM implements procedures for confined space entry and provided a completed copy of a *Confined Space Entry Permit* regarding work performed inside the Pump Box. The permit describes the planned work, includes the requirement for a risk assessment and addresses control measures, PPE and checks for HCN gas levels.

GQM conducts inspections at the beginning of each shift, which include checking for solution leaks in barren and pregnant solution lines, proper operation of shower/eyewash stations, proper fire extinguishers, condition of tank facilities (tanks, foundations and containments) and active lock-outs. In accordance with Cyanco's delivery SOP, prior to each cyanide offload, the delivery driver verifies the solution level in the Cyanide Storage Tank and records the level on the bill of lading. The driver also tests the shower/eyewash station and ensures the use of proper PPE. Following the field component of this ICMC audit, GQM developed procedures detailing its involvement in cyanide deliveries and offloads. The procedures list requirements for proper PPE, conducting a pre-operational inspection of the area, placing warning signs, and checking the storage tank level before and after the transfer.

GQM solicits employee input regarding its health and safety procedures and considers this input in developing and evaluating its procedures. Methods implemented include the weekly Safety Meetings, weekly Mine Operations Meetings and annual Mine Safety and Health Administration ("MSHA") Refresher Training. In these forums, GQM workers raise and discuss safety related topics.

Please refer to ICMC Standard of Practice 4.1 above, regarding GQM's policy for reviewing proposed process and operational changes and modifications for their potential impacts on worker health and safety.

Standard of Practice 6.2

Operate and monitor cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures.

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 6.2.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

GQM targets pH levels in cyanide process solutions between 10 and 11 to limit the evolution of HCN gas. GQM adds cement to the coarse crushed ore as a binder to ensure good permeability of the ore stacked on the heap and as the primary means to control the pH of the leach solution. GQM also adds sodium hydroxide at the Barren Solution Tank, if necessary. Furthermore, using a tote located at the Overflow Pond, GQM adds liquid caustic soda to increase the pH of fresh makeup water pumped from the production wells before adding cyanide and pumping to the heap leach pad. The pH level of the reagent-grade cyanide solution provided by Cyanco is roughly between 12.2 and 13.2.

GQM monitors areas and tasks where the concentration of HCN gas can exceed 10 ppm on an instantaneous basis or 4.7 ppm continuously over an 8-hour period. This monitoring program includes installation of three fixed monitors in identified high-risk areas, which include the cyanide offload and storage area; inside the Merrill-Crowe Plant building (near the center of the process area); and inside the Refinery. The fixed systems are each equipped with visual (red strobe light) and audible (siren) alarms set to trigger at 3.0 ppm. Standard procedure is for workers to first evacuate the area when the alarm triggers and then call GQM management to investigate.

Additionally, the Soledad Mountain operation currently has five personal, portable HCN gas monitors in service. GQM Process personnel wear the portable monitors during any work tasks that require “breaking” a process line (e.g., opening a pipe system that conveys solution), when working in a confined space and when working at the Pump Box. The personal monitors are programmed to alarm when HCN gas concentrations reach 4.5 and 10 ppm. Standard procedure is for workers to first evacuate the area when the alarm triggers and then call GQM management to investigate. GQM personnel indicated that TransWood does not require its drivers to use personal HCN gas monitors during offload events.

GQM implements a program to maintain, test and calibrate its stationary and portable cyanide monitoring equipment as required by the manufacturers and retains the calibration records for a period of one year. The Operation and Maintenance Manual for the fixed HCN gas monitors recommends a calibration frequency of three to six months, based upon environmental factors. GQM provided the calibration certificate, issued by the manufacturer, demonstrating calibration of the three sensors on December 14, 2017 and indicating that the next required calibration date is December 14, 2018. GQM also provided a handwritten bump test log for 2017 and

January 2018. The Operating Manual for the portable HCN gas monitors recommends performing a bump test before each day's use to verify proper device operation. GQM personnel indicated that the monitors automatically notify users when bump test and calibrations are required. During the field component of this 2018 ICMC audit, GQM did not provide bump test or calibration records for the personal monitors. Therefore, the auditor requested that GQM provide bump test and calibration records for the handheld HCN gas monitors over the previous three months. Following the field component of this audit, GQM provided bump test and calibration records downloaded from the docking station, over the period October 13, 2017 through September 18, 2018, for the five units in service.

GQM has installed signs on the Cyanide Storage Tank warning workers that the tank contains sodium cyanide. Additionally, at the cyanide offload and storage area and at numerous locations on the outside walls and entrances to the Merrill-Crowe Plant building, GQM has installed signs prohibiting smoking, eating and drinking. However, other than the Cyanide Storage Tank, the auditor did not observe placement of signage warning workers that cyanide is present. Therefore, the auditor requested that GQM place additional warning signage advising workers that cyanide is present, and if necessary, that suitable PPE is required. Areas where additional cyanide signage was identified include the Merrill-Crowe Plant process areas, Overflow Pond, Pump Box, and at strategic locations at the heap leach pad and along the Pipeline Containment Channel. As evidence of implementation, the auditor requested photographs depicting the new signs installed. Following the field component of this audit, GQM provided photographs of new signs installed at strategic locations throughout the process areas. The signs warn of cyanide and include product safety information, handling procedures (Do's and Don'ts), the requirement for proper PPE, and emergency response guidance. GQM trains all personnel who may encounter cyanide in cyanide awareness, hazard recognition and related prohibitions when working around cyanide. Therefore, no immediate or substantial risk to employee or community safety, health or the environment was deemed to exist during implementation of this corrective action.

There are two emergency shower/eyewash stations located inside the Merrill-Crowe Plant building and one station located at the cyanide offload and storage area. Each station is connected to a freshwater circuit. Process operators check the stations daily (each shift) during routine inspections and record results on the inspection form. Safety personnel perform more thorough inspections monthly and document the inspections via tags on the stations. The auditor checked the shower/eyewash stations and all three functioned properly.

GQM indicated that only dry chemical fire extinguishers are located in cyanide areas. The extinguishers spot-checked at the Merrill-Crowe Plant (i.e., at the cyanide offload and storage area and inside the plant) were dry chemical and the units observed had current inspection tags and were easily accessible. Process operators check the extinguishers daily (each shift) during routine inspections and record results on the inspection form. Safety personnel perform more thorough inspections monthly and document the inspections via tags on the extinguishers. A contractor performs an annual inspection of the fire suppression systems, which includes the extinguishers. Tags on the extinguishers document the annual inspections.

GQM has installed signs on the Cyanide Storage Tank warning workers that the tank contains sodium cyanide. The Barren Solution Tank is labeled “*Barren Tank*” and other process tanks have labels describing the various circuit components (e.g., Clarifier, Pre-Coat Mix, Press Feed Box, Body Feed Mix, etc.). GQM installed “*Danger Cyanide*” signs at locations where workers have direct access to process solution, such as at the Pump Box, DE Settling Pond, and Press Feed Box.

Labeling of process tanks and pipelines at the cyanide offload area was generally good; although, not all pipes had labels. Additionally, in the auditor’s professional judgment, existing labeling of the high-strength feed line required enhancement as did tank and pipeline labeling throughout the other process circuits. Therefore, the auditor requested that GQM place additional labels on tanks and pipes to alert workers of cyanide and flow directions. Areas where additional cyanide labeling is needed included the Merrill-Crowe Plant process areas, pipelines at the Overflow Pond and Pump Box, and pipelines in the Pipeline Containment Channel and on the heap (i.e., at or near pipe junctions, valves, or other locations where releases are most likely or which may require frequent maintenance). As evidence of implementation, the auditor requested photographs depicting the new labels installed.

Following the field component of this audit, GQM provided photographs of new labels installed on pipes throughout the process areas. All labels include flow directions. Furthermore, GQM confirmed that it placed labels near junctions and valves and on long pipe runs at various intervals throughout process areas. GQM trains all personnel who may encounter cyanide in cyanide awareness, hazard recognition and related prohibitions when working around cyanide. Additionally, many pipelines already had “Barren” or “Pregnant” solution labels. Therefore, no immediate or substantial risk to employee or community safety, health or the environment was deemed to exist during implementation of this corrective action.

GQM maintains SDS information in hardcopy format at the Merrill-Crowe Plant and at each mine department office. GQM also has access to SDS information electronically using a chemical management software application. SDS information is in English, the language of the workforce.

GQM implements a written procedure for investigating and evaluating all incidents, including cyanide exposures and releases, with the intent to determine if the operation’s policies and programs to prevent such incidents are adequate or whether they require revision. GQM indicated that no cyanide-related exposures or releases have occurred since operations began. Therefore, the auditor reviewed an *Incident Investigation Form* for a non-cyanide-related incident that occurred, which involved damage to heavy equipment, but no personal injury. The report includes pertinent information regarding the incident.

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Standard of Practice 6.3

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

The operation is in	<input checked="" type="checkbox"/>	Full Compliance	with Standard of Practice 6.3.
	<input type="checkbox"/>	Substantial Compliance	
	<input type="checkbox"/>	Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

The Soledad Mountain operation has three cyanide antidote kits, located at the main gate guard shack in a temperature-controlled environment. Although the kits are available on site, GQM personnel are not authorized to administer the antidote. Paramedics and/or physicians, with the ground and air ambulance services, obtain and administer the antidote when arriving on site, as necessary.

GQM stores medical oxygen with resuscitators in dedicated wall-mounted containers at the Merrill-Crowe Plant, the main gate guard shack, the Administration Offices and the laboratory located near the crusher. Potable and/or bottled water and emergency shower/eyewash stations are available at the Merrill-Crowe Plant, which includes the cyanide offload and storage area.

The primary means of communication while on site is the radio system. Not all workers carry radios; however, all operators working alone carry a radio. GQM authorizes managers, supervisors and lead operators to carry cellular telephones while on site. Additionally, the Merrill-Crowe Plant and the mine offices have landline telephones and cellular telephones are accessible at the offices, if needed. GQM personnel indicated that TransWood drivers do not carry a mine radio while on site.

Following the field component of this audit, GQM implemented a formal inspection program for its first aid equipment and provided completed inspection forms for the period May through August 2018. The inspection program covers monthly inspections of the cyanide antidote kits, first aid kits, automatic external defibrillators, self-contained breathing apparatus ("SCBA") and medical oxygen located at the main gate guard shack and the Merrill-Crowe Plant. The forms document the date of the inspections and name of the inspector.

GQM's procedure for responding to a cyanide exposure is to initiate the emergency notification procedure (*Mayday Procedure*), decontaminate the victim and administer oxygen as necessary, and keep the victim warm and calm while waiting for medical assistance (i.e., the off-site ambulance service). Soledad Mountain emergency response procedures provide written procedures to respond to cyanide exposures and for contacting off-site ground and air ambulance services. Ground ambulance service would originate from Mojave, located approximately five miles (five minutes) north of the Soledad Mountain site. Ground transport from the site via ambulance to the Antelope Valley Hospital, located approximately 23 miles south of the Soledad Mountain site in Lancaster, would take approximately 15 or 20 minutes. With a helicopter stationed at the Mojave Airport, Mercy

Air is the primary air transport service if an air ambulance is required. The estimated time of arrival to the mine site is eight minutes, including start time.

GQM provided written correspondence with Mercy Air demonstrating that the air ambulance service is aware of the potential to transport and treat cyanide exposure victims. In the email, Mercy Air confirmed that all crewmembers are trained in the signs, symptoms and treatment of cyanide exposure and that the training is standard throughout the Mercy Air system. Following the field component of this audit, GQM provided written correspondence with Hall Ambulance and Antelope Valley Hospital, making the entities aware of the potential need to treat cyanide exposure victims and inviting the entities to attend an upcoming training course conducted by Cyanco at the mine site. The ambulance service and the hospital both responded via email acknowledging receipt of GQM's letters and expressing a desire to attend the training and GQM informed the auditor that it is very familiar with and confident in both entities and their ability to treat cyanide exposure victims.

GQM implements a program to conduct mock drills annually to test its emergency response procedures for cyanide-related worker exposures in order to determine if the procedures are adequate. GQM conducted its first cyanide-related mock drill on April 26, 2018. The drill scenario involved a blown gasket in a flange at the Cyanide Storage Tank causing a release of process solution within secondary containment and a worker exposure to high-strength cyanide.

During the field component of this ICMC audit, GQM discussed the drill with the auditor; however, the draft version of the drill report did not include pertinent information. Therefore, the auditor requested that GQM update the drill report to describe the scenario simulated, identify any deficiencies in the response procedures that require revision, and to list the lessons learned and the corrective actions directed. As evidence of implementation, the auditor requested a copy of the final drill report and written and/or photographic documentation demonstrating that GQM has addressed such deficiencies and corrective actions. Following the field component of this audit, GQM provided an updated drill report addressing the auditor's request. The updated report includes written confirmation that GQM implemented the corrective actions identified by the drill.

GQM did not provide complete written documentation regarding the mock drill; however, the operation identified and is aware of the response deficiencies and corrective actions generated from the drill. Therefore, no immediate or substantial risk to employee or community safety, health or the environment was deemed to exist during implementation of this corrective action.

7.0 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.

The operation is in	<input type="checkbox"/> Full Compliance	with Standard of Practice 7.1.
	<input checked="" type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

GQM has developed an Emergency Response / Spill Contingency Plan (“ERSCP”) for the Soledad Mountain Mine. The main body of this document presents the basic framework of the emergency response program, including its management, review and implementation, and defines the emergency situations that may reasonably be expected to occur at the operation. Based on the site-specific features of the operation and its environmental setting, the ERSCP lists 20 types of emergencies that may involve cyanide.

Response Plans specific to each emergency scenario are provided as attachments to the ERSCP and provide the systematic procedures and information required to respond to the associated emergencies. The *Response Plans* include, as is applicable; contact information, location of resources, immediate actions to be taken, an Incident Commander action checklist, possible monitoring requirements, clean-up procedures, and post incident actions. General information is also provided regarding specific precautions and dangers associated with an emergency.

The ERSCP states that a *Response Plan* for each emergency scenario is presented as an attachment to the document. Various *Response Plans* are also referenced within the body of the ERSCP as a source of additional information or guidance. However, the auditor observed that many of the *Response Plans* listed were missing as attachments. The Code requires that emergency response plans or other related documentation provide an appropriate degree of specific instruction in response tasks for each potential cyanide failure scenario applicable to the operation. Therefore, the auditor requested that at a minimum, GQM update the ERSCP to include the missing attachable *Response Plans* that pertain to cyanide failure scenarios applicable to Soledad Mountain. Alternatively, GQM must review and revise the ERSCP as necessary to ensure that response instructions, if not addressed in other documentation, be included for all potential cyanide failure scenarios not attached as *Response Plans*. GQM should remove references to *Response Plans* in the body of the ERSCP for each *Response Plan* not included as an attachment. Additionally, GQM must remove all references to on-site “emergency vehicles” in the ERSCP since the Soledad Mountain operation does not have such vehicles. Please refer to **Corrective Action Request GQM-ICMC-CAR-06 in Attachment A.**

Cyanco is solely responsible for the production and transport of sodium cyanide to the delivery point at Soledad Mountain and utilizes the transport company, TransWood, to deliver sodium cyanide direct to the mine in tanker trucks from Cyanco’s Nevada plant. TransWood is a signatory to the Code, currently certified as fully compliant, with established lines of responsibility for safety, security, release prevention, training, and emergency response. GQM indicated that it would provide assistance should a transportation-related emergency occur on the mine site.

The ERSCP lists the general responsibilities of all employees in the event of an emergency. Responsibilities include notifying supervisors of the emergency circumstances, reporting the emergency in accordance with the “May Day Procedure”, assisting as appropriate until the response team arrives and if safe to do so, evacuating the area if an alarm sounds or instructed to do so, and keeping clear of the emergency scene if outside responders are on site unless personally requested otherwise.

The ERSCP requires the GQM Incident Commander to contact public response agencies in the event of an emergency that could impact the public. In the event of a cyanide-related medical emergency, the Incident Commander immediately calls for off-site medical assistance. *Response Plans* detail first aid response procedures including application of medical oxygen and decontamination; response actions to take in the event of a high-strength cyanide spill or a spill involving solution outside of containment; the establishment of hot zones and decontamination corridors; HCN gas monitoring; stopping the flow, containment and decontamination of the spill; and stipulate that hypochlorite is not to be used where there is a potential for impacting a flowing water body. The ERSCP also addresses post incident site remediation and confirmation sampling after cleanup and requires the Safety Coordinator to conduct a detailed analysis of the incident and make recommendations for corrective action to ensure that a similar incident does not reoccur.

Standard of Practice 7.2

Involve site personnel and stakeholders in the planning process.

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 7.2.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

GQM involves its workforce and stakeholders in the cyanide emergency response planning process. Methods implemented include the weekly Safety Meetings, weekly Mine Operations Meetings, mock drills and training.

In 2015, a Cyanco representative provided cyanide safety training to GQM management and outside agencies prior to commencement of operations. Outside agencies that attended include Kern County Sherriff’s Office, Kern County Fire Department, California Highway Patrol, Antelope Valley Hospital and Hall Ambulance. Cyanco provided this same training to the GQM workforce. Additionally, GQM conducted a cyanide-related mock drill on in 2018 (please refer to ICMC Standard of Practice 6.3 above). Although outside stakeholders did not participate in

the drill, GQM plans to involve outside stakeholders in future emergency response mock drills as a means to obtain input. The primary involvement of outside stakeholders in cyanide-related emergencies is ambulance response and administration of the antidote by paramedics and/or physicians (with the ambulance service and at the hospital).

There is not a community located nearby that would potentially be affected by a cyanide-related release from the Soledad Mountain operation. GQM purchased the private properties located in close proximity to the mine and currently uses the houses for storage and office facilities. The closest community is Mojave, located approximately five miles north of the mine site. Nonetheless, GQM consults with community representative and involves outside stakeholders in the cyanide emergency response planning process.

Please refer to ICMC Standard of Practice 6.3 above, regarding additional involvement with participating ambulance services and hospital facilities. Soledad Mountain began operations in early 2016; therefore, GQM has not made significant changes to the response responsibilities of outside responders since that time.

Standard of Practice 7.3

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

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 7.3.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

The roles and responsibilities for emergency management are set out in the ERSCP. The Incident Commander will be the most senior position from the affected Department or Work Area (i.e., the Department Manager) and the General Manager is primarily responsible for public relations and information control. The ERSCP includes the names, position and cell numbers of the GQM emergency managers and coordinators.

GQM does not have designated First Responders or an Emergency Response Team. The ERSCP requires all employees to receive training regarding the basic framework of the emergency response program, including its management and implementation and regarding awareness of the types of emergency situations that may reasonably be expected to occur at the operation. Managers and supervisors are to receive annual refresher training regarding implementation of the ERSCP and associated Response Plans. In addition, the ERSCP requires that GQM conduct mock drills of its emergency response procedures in order to train its response personnel and consider the adequacy of training, determine if the response procedures are adequate, and to keep outside responders familiar with the roles assigned to them in the ERSCP.

The ERSCP lists emergency call numbers for responders/resources and details the specific duties of each team member. The Safety Coordinator is responsible for reviewing the contact information monthly to ensure that it remains current.

The ERSCP lists the contents and number of pieces of equipment and supplies contained at the main gate guard shack and at the Merrill-Crowe Plant, as well as the locations of the SCBA and First Aid Kits (First Aid cabinets, automatic external defibrillators, oxygen and masks). There are three cyanide antidote kits kept in the main gate guard shack. In accordance with the ERSCP, the Safety Coordinator is responsible for checking the contents of the Emergency Equipment & Supplies once per month and for replacing items that have been used or are missing. During these inspections, the Safety Coordinator is also responsible to ensure that the cyanide antidote kits are stored at the proper temperature and that the antidotes have not expired or been tampered with.

Based on GQM’s response procedures and aside from the first aid equipment, the only response equipment utilized by GQM is the fire extinguishers and SCBA used to investigate an incident. Please refer to ICMC Standard of Practice 6.2 above, regarding the fire extinguisher inspection program. During the field component of this ICMC audit, GQM did not provide records demonstrating routine inspection of the SCBA units maintained on site. Therefore, the auditor requested that GQM provide evidence demonstrating that it performs routine inspections of the units. As evidence of implementation, the auditor requested copies of completed inspection records and/or the inspection program policy. Following the field component of this audit, GQM provided photographs showing adhesive stickers on each SCBA unit, documenting monthly inspections for June, July and August 2018 and further indicated that it plans to photo-document the inspection stickers moving forward. No immediate or substantial risk to employee or community safety, health or the environment was deemed to exist during implementation of this corrective action.

The ERSCP identifies and describes the roles of outside responders that may be called upon in support of an emergency response. These include the Kern County Fire Department, California Highway Patrol, Kern County Sherriff, off-site medical facilities (Tehachapi Hospital and Loma Linda Hospital) for medical treatment and Antelope Valley Hospital for treatment including cyanide-exposure victims, and ambulance services. The ERSCP lists the outside entities that are provided with a copy of the ERSCP.

Standard of Practice 7.4

Develop procedures for internal and external emergency notification and reporting.

<p>The operation is in</p> <p><input checked="" type="checkbox"/> Full Compliance</p> <p><input type="checkbox"/> Substantial Compliance</p> <p><input type="checkbox"/> Non-Compliance</p>	<p>with Standard of Practice 7.4.</p>
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Discussion of the basis for this Finding and any Identified Deficiencies:

The *Waste Discharge Requirements* stipulate notification and reporting requirements when evidence of discharges is discovered during routine monitoring of the leak detection sumps, vadose zone lysimeters and groundwater monitoring wells and after discovering any seepage, spill, leak, or other breach of the containment system. The Cyanco cyanide delivery SOP includes emergency response procedures in the event of cyanide transportation-related or offload-related incidents. The ERSCP provides current contact information for outside responders (Medical, Fire, Law Enforcement), regulatory agencies, support resources and GQM managers and corporate personnel, respectively.

The General Manager is primarily responsible for public relations and information control and makes decisions regarding all outside notifications and communication (other than emergency first responders). The General Manager or designated representative will manage incoming inquiries and external contacts with the news media, public, and government agencies (except to perform required regulatory reporting).

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.

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 7.5.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

The ERSCP describes the remediation measures to contain, recover, or neutralize cyanide spills that occur outside of containment. Neutralization is conducted through application of calcium hypochlorite, except hypochlorite must not be used when spills have reached or there is a potential to reach flowing water bodies. The calcium hypochlorite is in granular form and is stored at the Merrill-Crowe Plant.

Any release from concrete secondary containment or the lined area of the HLF, GQM will initiate a soil-sampling plan to determine the extent of any soil contamination resulting from the release, which includes collecting soil samples. GQM will ship the samples to a State-approved laboratory for testing to determine the presence of all Constituents of Concern, including cyanide. Contaminated material would be excavated (“dig to dry”) and hauled to the heap leach pad for disposal.

If evidence of a release is detected within the vadose monitoring system, the leak detection sumps, or in soil sampled from the downstream natural drainage, GQM will immediately implement additional monitoring and/or mitigation procedures based on the criteria presented in the *Report of Waste Discharge*. GQM does not use the water obtained from the well field as a potable source. A vendor provides bottled water as the drinking water supply; therefore, written provisions for an alternate water supply are not necessary.

GQM will immediately initiate verification procedures (set out in the *Waste Discharge Requirements*) whenever there is a determination of a release to groundwater. If there were verification of a release, GQM would immediately notify the RWQCB and submit a technical report in accordance with California regulations proposing an Evaluation Monitoring Program or demonstrating to the satisfaction of the RWQCB that a source other than the Soledad Mountain operation caused evidence of a release.

Standard of Practice 7.6

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

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 7.6.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

The ERSCP includes the requirement to periodically review and update the plan throughout the development and operation of the facility, as new and/or modified facilities are constructed and as operational and process changes occur. The Safety Coordinator is responsible for ensuring that the ERSCP is reviewed at least annually and revised as necessary. GQM developed a draft of its ERSCP in June 2013, ahead of operations and subsequently updated the draft in January 2016 to incorporate site personnel, update contact information and revise response procedures and on-site capabilities. During the field component of this 2018 ICMC audit, GQM was in the process of reviewing and updating the 2016 version of its ERSCP. Upon completion, an independent auditor reviewed the 2018 version of the ERSCP to determine compliance with various elements of ICMC Principle 7.

GQM conducted its first cyanide-related mock drill in April 2018 to evaluate emergency response procedures. The drill scenario involved a blown gasket in a flange at the Cyanide Storage Tank causing a release of process solution within secondary containment and a worker exposure to high-strength cyanide. Please refer to ICMC Standard of Practice 6.3 above for additional detail.

Please refer to ICMC Standard of Practice 6.2 above. GQM implements a written procedure for investigating and evaluating all incidents, including cyanide exposures and releases, with the intent to determine if the operation’s policies and programs to prevent such incidents are adequate or whether they require revision. GQM indicated that no cyanide-related exposures or releases have occurred since operations began.

8.0 TRAINING

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

Standard of Practice 8.1

Train workers to understand the hazards associated with cyanide use.

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 8.1.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

GQM provides all Soledad Mountain employees that may encounter cyanide with training in recognizing the cyanide present at the operation, the health effects of cyanide, symptoms of cyanide exposure, and procedures to follow in the event of an exposure or release. GQM uses four videos produced by Cyanco as the training materials. The auditor viewed the training videos and reviewed training records for the initial cyanide hazard training provided by Cyanco.

GQM provides periodic refresher training, regarding cyanide safety, to all on-site employees in conjunction with required MSHA annual eight-hour refresher training. The auditor reviewed personnel files to verify that employees receive this refresher training.

GQM uses sign-in sheets with agendas and MSHA Form 5000-23 as documentation of cyanide awareness, first aid and refresher training. The Safety Department manages and maintains training records for all employees through the term of employment. During this 2018 ICMC audit, the auditor reviewed personnel files to verify that GQM retains training records.

Standard of Practice 8.2

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

The operation is in	<input type="checkbox"/> Full Compliance	with Standard of Practice 8.2.
	<input checked="" type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

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GQM trains its workers to perform cyanide-related tasks and issues an MSHA Form 5000-23 for each process circuit work task to document the training. This task-specific training supplements the cyanide safety training provided to all employees who may encounter cyanide. GQM also provided a verification form regarding training conducted in April 2016 on two SOPs related to the cyanide offload and storage system. The form includes signatures from the trainer and trainees, certifying that the trainees received the training and are aware of their responsibilities to maintain, operate and perform standard start-up, shutdown and maintenance procedures for operating the sodium cyanide system. During this ICMC verification audit, the auditor reviewed personnel files as verification that GQM provides the required training for cyanide-related tasks.

In the auditor's professional judgment, at the time of this 2018 ICMC audit, GQM did not provide adequate evidence demonstrating that its training materials identify the specific cyanide management elements that each employee must be trained in to perform cyanide-related tasks safely. The training provided in April 2016 on the cyanide offload and storage system provides adequate documentation for certain tasks related to the cyanide offload and storage area; however, GQM did not provide similar documentation for other process areas and tasks. Therefore, the auditor requested that GQM develop training materials that identify the specific cyanide management elements that each employee must be trained in to perform the task/job properly, such as task training forms for cyanide-related SOPs. Please refer to **Corrective Action Request GQM-ICMC-CAR-07** in **Attachment A**.

GQM senior personnel (i.e., the Merrill-Crowe Plant and Laboratory supervisors) provide the required task training, which includes review of the related SOP. The GQM Refinery Manager trains the supervisors and has 30-plus years experience in the mining industry and commercial laboratories. Additionally, the supervisors and/or experienced operators provide hands-on training. GQM managers and supervisors receive periodic Train-The-Trainer training, most recently in June 2017. The GQM Manager Plant Operations and the Safety Coordinator are both MSHA certified trainers.

The initial task training does not authorize trainees to perform the associated work tasks unsupervised; however, the trainee must complete the training requirements and receive an MSHA Form 5000-23 before performing the tasks. GQM pairs new operators with experienced operators for two weeks to provide additional hands-on training and before allowing new operators to work unsupervised around cyanide.

GQM provides task-related refresher training when procedural or operational changes occur. Additionally, GQM provides task-related refresher training in weekly Safety Meetings.

GQM supervisors observe and assess the competency of workers performing their work tasks. These periodic assessments serve to evaluate the effectiveness of the task training program. GQM does not currently document these evaluations.

In the auditor's professional judgment, at the time of this 2018 ICMC audit, GQM did not provide adequate evidence demonstrating that it retains records of the initial cyanide-related task training provided to workers. Therefore, the auditor requested that GQM implement a program to properly document and retain records of

training provided for cyanide-related tasks. Please refer to **Corrective Action Request GQM-ICMC-CAR-08** in **Attachment A**. The auditor recommends that the training records include the names of the employee and the trainer, the date of training, the topics covered, and if the employee demonstrated an understanding of the training materials.

Standard of Practice 8.3

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

The operation is in	<input type="checkbox"/> Full Compliance	with Standard of Practice 8.3.
	<input checked="" type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

In accordance with its *Risk Management Plan*, GQM conducts sodium cyanide safety training annually for plant operations personnel and trains affected employees annually in the relevant emergency response procedures and the Incident Command System. GQM includes this training as a component of its annual MSHA refresher program and uses MSHA Form 5000-23 along with sign-in sheets to document this training. General procedures for cyanide spills and HCN gas releases include immediate evacuation to an area upwind of the release and notification of the area supervisor and the Safety Coordinator. The Safety Coordinator or senior manager will then ensure that employees have evacuated to a safe area, notify the appropriate personnel and authorities, and implement the Incident Command System. Steps to safely contain and control spills by closing valves, restricting the flow of spilled material with berms, dikes or other appropriate measures, based on the nature of the release, should be taken only if it is safe to do so. Workers participate in routine response drills to ensure they are able to perform these tasks when required.

GQM does not have designated First Responders or an Emergency Response Team; however, the GQM Safety Coordinator provides training to ensure that process personnel are familiar with the use of the necessary first aid and response equipment; e.g., medical oxygen, emergency shower/eyewash stations, fire extinguishers and SCBA. During this 2018 ICMC audit, GQM provided evidence of training provided for medical oxygen; however, documentation of training for use of the SCBA equipment was not available. Therefore, the auditor requested that GQM implement a program to properly document and retain records of training provided for the use of emergency response equipment, which includes the SCBA units. Please refer to **Corrective Action Request GQM-ICMC-CAR-09** in **Attachment A**.

The primary involvement of outside stakeholders in cyanide-related emergencies is ambulance response and administration of the antidote by paramedics and/or physicians (with the ambulance service and at the hospital). In November 2015, a Cyanco representative conducted cyanide safety training to GQM management and outside

agencies prior to commencement of operations. Outside agencies that attended include Kern County Sherriff's Office, Kern County Fire Department, California Highway Patrol, Antelope Valley Hospital and Hall Ambulance. Please refer to ICMC Standard of Practice 6.3 above, regarding additional involvement with participating ambulance services and hospital facilities.

GQM conducted a cyanide-related mock drill in April 2018 for training purposes to determine if personnel have the knowledge and skills required for effective response and so that training procedures can be revised if deficiencies are identified. Although outside responders did not participate in the drill, GQM plans to involve them in future drills that simulate a cyanide release or exposure that would trigger their involvement in order to keep the responders familiar with their emergency response roles.

GQM uses MSHA Form 5000-23 along with sign-in sheets and mock drill reports to document emergency response training, which includes the names of the employee and the trainer, the date of training, and the topics covered. With the exception of training records for the use of emergency response equipment, GQM provided documentation demonstrating that it retains records of the emergency response training provided. Nonetheless, the auditor recommended that QGM enhance its training program to better document emergency response training. Training records should demonstrate that GQM provided initial and refresher training in response to cyanide exposures and releases for appropriate personnel; made designated response personnel familiar with implementation of the emergency response plans; and required designated responders to demonstrate their understanding of the training material.

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9.0 DIALOGUE

Engage in public consultation and disclosure.

Standard of Practice 9.1

Provide stakeholders the opportunity to communicate issues of concern.

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 9.1.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

GQM provides several means for stakeholders to communicate issues of concern regarding cyanide use and management at the Soledad Mountain operation. Those discussed during this 2018 ICMC audit include:

- community outreach presentations and meetings;
- chamber of commerce meetings;
- open-house events (at the mine site);
- tours of the Soledad Mountain operation;
- GQM office location in Mojave (until early 2017);
- local community events;
- corporate website; and
- regulatory Public Meetings associated with recent permitting and development of the mine.

Over the past 15-plus years, GQM has been developing and securing regulatory permits for the Soledad Mountain operation and recently began operations in January 2016, announcing full commercial production on December 19, 2016. Thus, the mine just recently completed the public review processes associated with federal, state and county permitting, which solicit input from affected communities and stakeholders regarding all aspects of the operation. GQM also held numerous community outreach presentations and meetings during this time and operated out of an office located in the nearby town of Mojave until early 2017.

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Upon receiving regulatory approval, GQM held several open-house events at the mine site; i.e., at construction kick-off, construction completion and commissioning. Local dignitaries, agencies, and chambers of commerce attended.

GQM is active in the Mojave chamber of commerce, which is the governing body of Mojave. The chamber holds two board meetings and one public meeting monthly. GQM has given five presentations about the Soledad Mountain operation over a three-year period. Additionally, the company is involved in a number of local community events and donated land in Mojave for use as a visitor center and mini-park.

GQM provides stakeholders with ongoing opportunities to communicate concerns regarding the operation’s use of cyanide. Examples of opportunities for stakeholders to raise issues of concern include GQM’s “open-door” policy for responding to inquiries, providing site tours, and having GQM staff available to interact with stakeholders at chamber of commerce meetings and local community events. Finally, the GQM corporate website provides a telephone number for the corporate office.

Standard of Practice 9.2

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

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 9.2.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

Please see ICMC Standard of Practice 9.1 above. The forums discussed, provide various opportunities for GQM personnel to interact with stakeholders and provide them with information regarding cyanide management practices and procedures.

Standard of Practice 9.3

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

The operation is in	<input checked="" type="checkbox"/> Full Compliance	with Standard of Practice 9.3.
	<input type="checkbox"/> Substantial Compliance	
	<input type="checkbox"/> Non-Compliance	

Discussion of the basis for this Finding and any Identified Deficiencies:

GQM developed a *Cyanide Fact Sheet*, primarily for dissemination during public meetings associated with federal, state and county permitting processes. The fact sheet describes the cyanide compound and its various uses, the

risks associated with cyanide, the cyanidation process used in mining, the different forms of cyanide and the associated transportation methods (including those used at Soledad Mountain), and GQM's involvement with the ICMC.

The corporate website does not provide written information regarding the cyanide management activities at Soledad Mountain and GQM did not provide any written materials other than the *Cyanide Fact Sheet*, which does not necessarily provide an educational overview of cyanide-related activities and management practices and is not specific to the Soledad Mountain operation. Therefore, the auditor requested that GQM develop written descriptions of how activities are conducted and how cyanide is managed at Soledad Mountain for dissemination at the mine office, at locations in local communities, at public forums or meetings, libraries, local government offices, on websites, or through other means. As evidence of implementation, the auditor requested a copy of the written materials.

Following the field component of this ICMC audit, GQM provided an electronic copy of an informational brochure, which includes a description of the operation and its use of cyanide. GQM placed the brochure in its main office and at the Mohave public library and chamber of commerce. GQM also disseminates information in verbal form via open meetings, presentations, tours and civic events, as discussed under ICMC Standard of Practice 9.1 above.

Although the level of technical detail is not appropriate for all audiences, the written regulatory permits and permit applications associated with the Soledad Mountain operation provide detailed descriptions of all aspects of the operation and are public record.

Since beginning operations in January 2016, the Soledad Mountain operation has not experienced any cyanide exposures or releases, which are subject to listing under this ICMC Standard of Practice. Nonetheless, in accordance with the *Waste Discharge Requirements*, GQM has specific reporting requirements for unintentional releases. The *Waste Discharge Requirements* stipulate notification and reporting requirements when evidence of discharges are discovered during routine monitoring of the leak detection sumps, vadose zone lysimeters and groundwater monitoring wells. According to regulations promulgated under the Comprehensive Environmental Response Compensation and Liability Act, release of a reportable quantity of a listed hazardous material to the environment in any 24-hour period requires immediate reporting to the National Response Center.

GQM must also submit scheduled reports to the RWQCB on a quarterly and annual basis. Written reports submitted to regulatory agencies become public information. Contact information for the agencies and other sources referenced above, where the public can access information regarding cyanide releases or exposure incidents that may occur at the Soledad Mountain operation, is provided below for easy reference:

California Regional Water Quality Control Board, Lahontan Region (RWQCB)

15095 Amargosa Road, Building 2, Suite 210

Victorville, CA 92394

Phone: (760) 241-6583

Website: www.waterboards.ca.gov/lahontan/

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National Response Center

2100 2nd Street, SW

Washington, DC 20593-0001

Phone: (202) 267-2675 or toll free (800) 424-8802

Website: www.nrc.uscg.mil

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10.0 REFERENCES

WEBSITE REFERENCES

International Cyanide Management Code (ICMC). 2018. www.cyanidecode.org

Golden Queen Mining Company, LLC. 2018. www.goldenqueen.com

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