



March 2018

LA HERRADURA MINE SONORA, MEXICO

ICMC Recertification Summary Audit Report

Submitted to:

International Cyanide Management Institute
1400 I Street, NW, Suite 550

Washington, DC 20005 USA

Minera Penmont S. de R.L. de C.V.

Callejon Sin Nombre 209 Oeste Entre Ave. N y P

Col. Centro, C.P. 83600

H. Caborca, Sonora MX

Submitted by:

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REPORT



Project Number: 1782419

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Table of Contents

1.0 SUMMARY AUDIT REPORT FOR MINING OPERATIONS.....	1
2.0 LOCATION DETAIL AND DESCRIPTION OF OPERATION	2
2.1 Mine Location	2
2.2 Background	2
3.0 SUMMARY AUDIT REPORT	5
Auditors Findings	5
Name of Other Auditors	5
Dates of Audit.....	5
PRINCIPLE 1 – PRODUCTION	6
PRINCIPLE 2 – TRANSPORTATION.....	7
PRINCIPLE 3 – HANDLING AND STORAGE.....	8
PRINCIPLE 4 – OPERATIONS	11
PRINCIPLE 5 – DECOMMISSIONING	18
PRINCIPLE 6 – WORKER SAFETY.....	19
PRINCIPLE 7 – EMERGENCY RESPONSE	22
PRINCIPLE 8 – TRAINING.....	26
PRINCIPLE 9 – DIALOGUE	29
 FIGURES	
Figure 1: Regional Location Plan	3
Figure 2: Local Location Plan	3
Figure 3: Process Flow Diagram (supplied by La Herradura)	4



1.0 SUMMARY AUDIT REPORT FOR MINING OPERATIONS

Name of Mine: La Herradura Mine

Name of Mine Owner: Fresnillo Plc

Name of Mine Operator: Minera Penmont S. de R.L. de C.V.

Name of Responsible Manager: José Arturo Arredondo Morales

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La Herradura Mine
Name of Facility



Signature of Lead Auditor

March 16, 2018
Date



2.0 LOCATION DETAIL AND DESCRIPTION OF OPERATION

2.1 Mine Location

La Herradura is operated by Penmont, which is a wholly owned subsidiary of Fresnillo.

La Herradura is located in the Altar Desert approximately 80 kilometers (km) northwest of the city of Caborca and 20 km from the coast of the Gulf of California in the state of Sonora, Mexico (Figures 1 and 2). Approximately 1,228 employees and 394 contractors worked at La Herradura in 2017, based on data available from the Fresnillo website. The nearest village (Ejido Juan Alvarez) is located approximately 5 km to the northeast of La Herradura. The Altar Desert is extremely arid and there is no surface water.

2.2 Background

Exploration at La Herradura dates back to 1987. La Herradura began construction in 1997 and began operation in 1998.

La Herradura is an open pit gold mine with a heap leach pad, Merrill Crowe Plant, two pregnant solution ponds, three contingency ponds, and associated pipework. A new underground mine along with a Dynamic Leaching Plant, Tailings Impoundment and Merrill Crowe Plant have been constructed and added to the Penmont's operations. However, these facilities are not connected to La Herradura Merrill Crowe Plant and heap leach facilities, and therefore, they will be separately audited in the future.

La Herradura receives cyanide via isotankers from The Chemours Company Mexicana, S. De R.L. De C.V. (Chemours) that is a subsidiary of The Chemours Company (formerly E.I. DuPont de Nemours and Company), but also occasionally receives solid cyanide in flobins from Chemours as a backup to the isotanker deliveries.

The run-of-mine mineral from the open pit is sent directly to the heap leach pad. The mine has one heap leach pad, which has been sub divided into 12 phases. The leach pad was constructed with a composite liner of compacted clay and geomembrane. Once in the leach pad, a cyanide solution is applied by drip irrigation.

The pipelines between the leach pad and plant are contained within a geomembrane liner. The pump stations are constructed of concrete with leak detection sumps. There are two pregnant solution ponds and three contingency ponds (i.e., Contingency Pond 1, Contingency Pond 6, and the Megapond). The pregnant ponds are double lined (geomembrane) with leak detection, collection, and recovery systems. The contingency ponds are single lined (geomembrane).

The lixiviate (i.e., pregnant solution) from the pad is processed in a Merrill Crowe (Figure 3). This plant has an isotanker system for preparing cyanide, but has retained the former flobin facilities as backup. The isotanker facility has a dilution tank, storage tank, and dosification tank within a single secondary containment, while the flobin facility has a mixing tank, a storage tank, and a dosification tank, also within a single secondary containment. The Merrill Crowe Plant also has a pregnant solution column, filter wash tanks, clarifiers, a deoxygenation tank, a zinc cone, and barren tank. There is no barren pond and no carbon in leach is required due to the composition of the ore. The barren tank is within a separate secondary containment along with the clarifiers and pressure filters. The tanks are constructed of stainless steel and pipelines are constructed with stainless steel, chlorinated polyvinyl chloride (CPVC) and high-density polyethylene (HDPE). The plant, including all areas with tanks, is lined with reinforced concrete. The process facilities also include two concrete sedimentation ponds to manage the washdown solution and sediments from the clarifiers.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT



Figure 1: Regional Location Plan



Figure 2: Local Location Plan

La Herradura Mine
Name of Facility

March 2018
Report No. 1782419

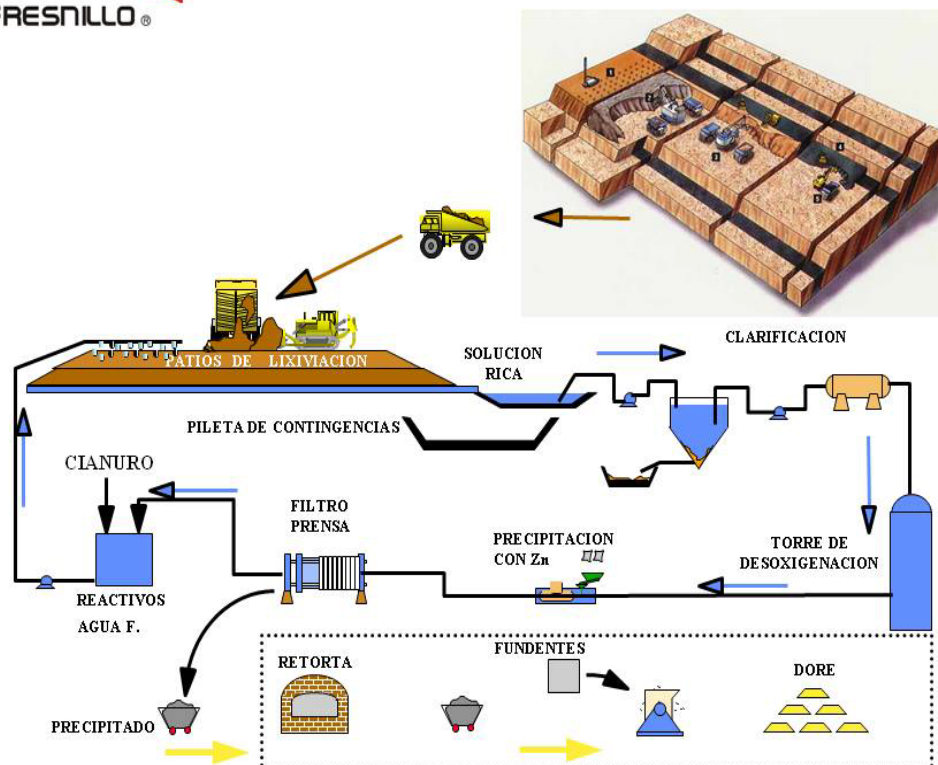
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March 16, 2018
Date





DIAGRAMA GENERAL DE PROCESO



Legend:

- Cianuro – Cyanide
- Patios de Lixiviación – Heap Leach Pad
- Solución Rica – Pregnant Solution
- Torre de Desoxigenación – De-oxygenation Tank
- Filtro Prensa – Filter Press
- Precipitación con Zn – Zinc Cone
- Pileta de Contingencias – Contingency Ponds

Figure 3: Process Flow Diagram (supplied by La Herradura)



ICMC CERTIFICATION SUMMARY AUDIT REPORT

3.0 SUMMARY AUDIT REPORT

Auditors Findings

☒ in full compliance with

La Herradura Mine is:

☐ in substantial compliance with

The International
Cyanide Management
Code

☐ not in compliance with

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

Audit Company: Golder Associates Inc.

Audit Team Leader: Evan Jones, Lead Auditor and Mining Technical Specialist

Email: evanjones@golder.com

Name of Other Auditors

Name, Position	Signature
Ivon Aguinaga, Mining Technical Specialist	
Dante Bolanos of Knight Piésold Inc. participated as an independent auditor on selected aspects of Standards of Practice 4.1.2, 4.3, and 4.8 to avoid a Golder conflict of interest.	

Dates of Audit

The recertification audit was undertaken in over four days from September 25 to 28, 2017.

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

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

La Herradura Mine
Name of Facility

Signature of Lead Auditor

March 16, 2018
Date

March 2018
Report No. 1782419



PRINCIPLE 1 – PRODUCTION

Encourage Responsible Cyanide Manufacturing by Purchasing from Manufacturers that Operate in a Safe and Environmentally Protective Manner

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 1.1**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 1.1, requiring the operation purchase cyanide from manufacturers employing appropriate practices and procedures to limit exposure of their workforce to cyanide and to prevent releases of cyanide to the environment.

During the recertification period, La Herradura purchased cyanide only from Chemours who manufactures it at their plant in Memphis, Tennessee. La Herradura has purchased cyanide under three supply agreements with Chemours during the recertification period (one agreement for the term 2012-2015, an amendment to the 2012 supply agreement for 2016, and a supply agreement for the term 2017-2021). These supply agreements contain language requiring that the cyanide be produced at a facility that has been certified as complying with the Code.

Chemours' production facility and its associated packaging facility have been certified during the recertification period. Their most recent recertification was obtained on July 2016, 2017. As part of the Chemours Mexican Supply Chain, Chemours temporarily stores cyanide and trans-loads cyanide into isotankers at a warehouse in Hermosillo, Sonora. This warehouse has been certified under the production requirements of the Code twice during the mine's recertification period. Its most recent recertification was obtained on September 11, 2017.

No independent distributors have been part of the cyanide supply chain during the recertification period. The auditors reviewed supply agreements, a letter from Chemours on the cyanide supply chain, bills of lading, and invoices to verify compliance.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



PRINCIPLE 2 – TRANSPORTATION

Protect Communities and the Environment during Cyanide Transport

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 2.1**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 2.1, requiring that the operation establish clear lines of responsibility for safety, security, release prevention, training and emergency response in written agreements with producers, distributors, and transporters.

La Herradura purchases cyanide from Chemours who manufactures it at their plant in Memphis, Tennessee. According to Clause 13 of the supply agreement, all of Chemours transportation personnel, distributors, and contract carriers must comply with Code requirements. La Herradura is in full compliance because the entire Chemours supply chain from their plant in Tennessee, through Mexico, and to the mine has been certified. The auditors reviewed the supply agreements and supply chain audit reports on the ICMI website to confirm compliance.

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 2.2**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 2.2, requiring that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management.

La Herradura purchases cyanide from Chemours, who manufactures it at their plant in Memphis, Tennessee. Clause 13 of the contract states that all of Chemours transportation personnel, distributors, and contract carriers must comply with Code requirements. The entire Chemours supply chain from their manufacturing plant in Tennessee, through Mexico, and to the mine has been certified. The auditors reviewed the various supply chain audit reports on the ICMI website to confirm compliance. The auditors also reviewed purchase invoices, bills of lading, and a letter from Chemours on the cyanide supply chain to verify compliance.



PRINCIPLE 3 – HANDLING AND STORAGE

Protect Workers and the Environment during Cyanide Handling and Storage

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 3.1**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura has an isotanker offloading facility and a flobin system. The isotanker system is the primary cyanide offloading system. The flobin system remains as a backup system only (the last mixing with flobins occurred in March 2017 and September 2016, respectively). The isotanker offloading facility consists of below-grade concrete truck ramp with a sump, an at-grade concrete containment facility with a sump, and three cyanide tanks within the concrete containment (i.e., a dilution tank, a storage tank, and a dosification tank). The flobin system consists in a mixing hopper and three cyanide tanks within a concrete containment (i.e., a mixing tank, a storage tank, and a dosification tank). Also, La Herradura has a warehouse for storing the flobins.

No changes in the cyanide unloading, storage and mixing facilities have occurred since the previous Recertification Audit. The isotanker offloading facility were evaluated and found fully compliant during the previous Recertification Audit in 2014. The flobin facility were evaluated and found fully compliant during the 2011 Recertification Audit.

The auditors observed the cyanide unloading, storage and mixing facilities to confirm that they are still in good condition.


The isotankers are offloaded on a below-grade concrete ramp with a sump, thus minimizing the potential for seepage to the subsurface and providing a means to recover any leaked solution. The cyanide tanks of the isotanker system and the flobin system (i.e. dilution, storage, and dosification tanks) are equipped with level sensors and alarms that are monitored from the plant control room. Tank level sensors and alarms are maintained monthly. The tanks were installed on solid concrete bases within secondary containment consisting of reinforced concrete with an industrial sealant, thus providing a competent barrier to leakage. The tanks were also installed within concrete secondary containment with a sump that returns solutions to the process circuit.

Both the isotanker and flobin systems are located away from people and the potential for exposure is negligible. The nearest village (Ejido Juan Alvarez) is located approximately 5 km to the northeast of La Herradura. The potential for exposure via surface water is negligible since La Herradura is located in one of the most arid deserts in North America and, consequently, there is no intermittent or perennial surface water in the vicinity.

The isotanker facility and the flobin facility are in the open air and within the fenced and guarded plant, thus providing adequate ventilation and security. The warehouse to store the flobins is also located within the fenced and guarded plant, and is maintained locked.

The warehouse for the flobins is well ventilated to prevent the buildup of hydrogen cyanide (HCN) gas. The

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

walls are open to the air at the bottom near the concrete floor, the top of the walls is louvered, and the entry gate is chain link fence. A fixed HCN gas monitor is located in the sump at the end of concrete drainage ditch, with the monitor and alarm located adjacent to the warehouse gate. The potential for contact with water of the cyanide flobins is limited by curbs and drainage ditches around the warehouse.

Cyanide flobins are stored by themselves in an area separated from the rest of the warehouse by a chain link wall with a concrete curb as a base. The curb around the cyanide flobin storage area and the concrete floor form a secondary containment for this area to prevent any mixing with any spill that might occur on the other end of the warehouse. Also, there is a dedicated sump in the sloped concrete floor at the end of concrete drainage ditch of the secondary containment for the flobins to collect any spill that might occur within this secondary containment. The auditors also visited the other end of the warehouse and confirmed that no acids or other incompatible materials are stored in this area. The flobins are therefore isolated from other materials.

The auditors observed the warehouse as well as the tanks, and secondary containment of isotanker system and the flobin system to be in good condition.

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 3.2**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:


The operation is in full compliance with Handling and Storage Practice 3.2 requiring that cyanide handling and storage facilities are operated using inspections, preventive maintenance, and contingency plans to prevent or contain releases and control and respond to worker exposures.

The isotanker system is the primary cyanide offloading system. The flobin system remains as a backup system only (the last mixing events with flobins occurred in March 2017 and September 2016, respectively). For both systems, La Herradura has developed and implemented procedures to prevent exposures and releases during unloading and mixing.

The isotanker facility eliminates the potential for improper reuse of containers, as well as the need to manage empty containers. The written procedure for isotanker offloading describes that the top of the isotainer be washed off after disconnecting from the dilution tank. The written procedure also prescribes steps for safe operation of valves and couplings, as well as proper personal protective equipment (PPE) and observation. A separate written procedure describes the measures for cleaning up spilled solution. The auditors observed the initial part of an isotanker offload to verify use of the offloading procedure, the presence of an observer, and use of the proper PPE. The auditors also reviewed completed checklists for isotanker offloads during the recertification period to verify compliance.

Even though the flobin system is a backup, La Herradura has maintained the system in good condition with the capacity to safely mix solid cyanide. La Herradura has tracked the flobins to ensure that the empty flobins are returned to Chemours and not used for other purposes. No plastic bags or liners would require rinsing and disposal. La Herradura has developed written procedures for handling and storing the flobins, mixing the solid cyanide, and cleaning up spills of solid cyanide. La Herradura has also developed and implemented procedures that prescribe that after emptying the flobins into the mixing tank, the operator must knock the sides of the flobin with a metal bar to dislodge any remaining materials into the tank. The operator must then

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date




ICMC CERTIFICATION SUMMARY AUDIT REPORT

replace the sliding door and visually check that it is securely closed. The auditors observed that flobins were stacked no more than two layers high in the warehouse, in accordance with the written procedure. The written procedure for mixing solid cyanide also prescribes the proper PPE, the operation of valves, and the presence of an observer. The auditors reviewed completed checklists for offloading flobins to the warehouse, as well as checklists for mixing solid cyanide, to verify compliance.

La Herradura Mine
Name of Facility

March 2018
Report No. 1782419



Signature of Lead Auditor

March 16, 2018
Date





PRINCIPLE 4 – OPERATIONS

Manage Cyanide Process Solutions and Waste Streams to Protect Human Health and the Environment

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 4.1**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.1, requiring that the operation implement management and operating systems designed to protect human health and the environment including contingency planning and inspection and preventive maintenance procedures.


The La Herradura cyanide facilities (i.e., those with Weak Acid Dissociable (WAD) cyanide greater than 0.5 ppm) are:

- Heap leach pad, consisting of 12 phases
- Process ponds
- Two pregnant solution ponds (Pregnant Pond 1 and Pregnant Pond 2)
- Three contingency ponds (i.e., Contingency Pond 1, Contingency Pond 6, and the Megapond)
- Primary reagent cyanide system, including an isotanker offloading facility with a dilution tank, storage tank, and dosification tank
- Backup reagent cyanide system including a cyanide storage warehouse for flobins and a cyanide preparation facility with a mixing hopper, mixing tank, storage tank, and dosification tank
- Merrill Crowe Plant, including a barren tank, zinc cone, deoxygenation tower, clarifiers, sedimentation cells, and filter presses; reagent-grade cyanide is added at the barren tank and the zinc cone
- Seven booster stations (without tanks)
- Associated pipelines, pumps, valves, and appurtenances

A new underground mine along with a Dynamic Leaching Plant, Tailings Impoundment and a Merrill Crowe Plant has been constructed and added to the Penmont's operations. However, these facilities are not connected to La Herradura Merrill Crowe Plant and heap leach facilities, and therefore, they will be audited as a separate operation and are not included in this audit.

La Herradura has developed and implemented plans and procedures that describe the management and operation of their cyanide facilities. The procedures and plans the safe operation of the entire cyanide system. The procedures include process descriptions and critical control parameters, operating tasks, inspection requirements, PPE requirements, safety and environmental considerations and others. The procedures have been updated, as needed, to reflect changes in procedures and in the cyanide facilities (i.e., the addition of the Pregnant Pond 2 in October of 2015). Verification of the written procedures included review of the procedures and .plans, as well as interviews.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

The procedures also address upset conditions, contingencies, and temporary shutdown of the plant. The procedures include the measures to be taken when the pregnant pond overflows to the contingency ponds, and if the contingency ponds spill to natural ground. The procedures also include upset conditions such as slope failure, pipeline breaks, and spills from pipeline secondary containment. In addition, the procedure for stopping and starting the plant and pads addresses scheduled and unscheduled shutdowns at the plant and pads as well as equipment failures (e.g., pumps, valves, pipelines). This procedure also addresses non-routine temporary closure or cessation of the operations of the plant, ponds, and pads.

La Herradura has developed and implemented inspection and preventive maintenance programs for all the cyanide facilities including: cyanide unloading, mixing and storage facilities; the plant, the heap leach pad, the process ponds, and the booster stations. Inspections are conducted on a daily to weekly basis, as well as per event, depending on the facility and type of inspection, which the auditors consider adequate to assure and document that equipment and facilities are functioning as intended. The inspection covers the cyanide-related tanks and associated secondary containments, pipes, pumps, sumps, heap leach facilities, process and contingency ponds, leak collection systems, wildlife mortality, the cyanide warehouse, the flobin system, and the isotanker system. La Herradura does not perform run-on diversion inspections because the perimeter berms around the leach pad are elevated above the surrounding ground surface, and consequently, run-on diversions are not needed. La Herradura documents inspections, including the date of the inspection, the name of the inspector, items inspected, observations, and corrective actions.

La Herradura uses the MAXIMO system for identifying, assigning responsibility, scheduling and tracking the completion of the preventive maintenance activities and repairs. Specific preventive maintenance programs have been developed for the key cyanide elements. The auditors reviewed the procedures and completed inspection and preventive maintenance records to verify compliance.

La Herradura has prepared a written procedure for management of change that applies to physical and operational changes. The procedure is accompanied by a form for sign-off by the initiator of the requested change and the environmental/safety manager. The auditors reviewed four examples of the completed and signed forms to verify that La Herradura is implementing the written procedure.

La Herradura does not maintain backup power at the site. They have constructed one large pond (the Megapond) and two smaller ponds (Contingency Pond 1 and 6) that provide up to 22 hours of capacity under contingency conditions for draindown time in addition to the design storm event. That amount of time is considered adequate to either restore power or bring in portable generators, given the mine's proximity to vendors in the United States. In addition, La Herradura has the ability to obtain power from another public power source from the Mexican Federal Commission (with a capacity of 34.5 KW) in case of a failure of their primary Mexican Federal Commission power source. With this capacity, La Herradura could operate the critical equipment, including the pond pumps.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 4.2**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Inapplicable because the La Herradura heap leach facilities are not connected to the Dynamic Leaching Plant and its tailings storage facility.

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 4.3**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:


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

Golder prepared the most recent update of the water balance for the heap leach facilities. Therefore, an independent auditor was contracted to review the water balance.

Knight Piésold Review

The existing water balance and operational monitoring practices address climate, operational modifications and provides for maintaining adequate freeboard. The water balance can be considered comprehensive and probabilistic. The water balance considers leaching application rates, a design storm event, representative climate data, diversion of upgradient runoff, and adequate pond sizing. Monitoring is provided to track pond levels and assess freeboard maintenance. The freeboard of Contingency Pond 1 was not approached during upset conditions. No water flow was reported from Contingency Pond 1 to the Mega-pond or Contingency Pond 6. Any water in these two last ponds was reported as accumulation from direct precipitation. The three contingency ponds at La Herradura were designed with 0.5 m of freeboard. Actual versus design-based climate data are compared and will be used to consider changes in the water balance inputs.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

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

☒ in full compliance with

The operation is ☐ in substantial compliance with **Standard of Practice 4.4**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

To restrict wildlife and livestock access, La Herradura has installed a fence around the perimeter of the mine, fences around the ponds and plant, and netting over the headworks to the pregnant ponds and over Pregnant Pond 1. La Herradura provided analytical data that showed WAD cyanide concentrations were less than 50 mg/L in open water in the pregnant pond, contingency ponds, and sedimentation ponds throughout the recertification period. Based on their daily inspections, La Herradura has not experienced any wildlife mortality during the recertification period. La Herradura has implemented written procedures for leaching to prevent over application and leaks, as well as for corrective action if ponding occurs. The auditors did not observe any significant ponding on the leach pad during the site visit. The use of drip irrigation at the leach pad eliminates the potential for overspray.

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

☒ in full compliance with

The operation is ☐ in substantial compliance with **Standard of Practice 4.5**


☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

Standard of Practice 4.5 is inapplicable because there is no surface water near the mine due to the extreme aridity.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date

March 2018
Report No. 1782419



ICMC CERTIFICATION SUMMARY AUDIT REPORT

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

☒ in full compliance with

The operation is ☐ in substantial compliance with **Standard of Practice 4.6**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.6, requiring the operation implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of groundwater.

La Herradura has implemented measures at the cyanide facilities to protect groundwater. These measures include geomembrane lining for the leach pad (composite liner), pregnant ponds (double liner) with leak detection and collection systems, contingency ponds (single liner), and pipeline routes (single liner). The sedimentation cells are concrete lined. The plant floor is constructed of concrete, as are the floors of the new isotanker facility and the backup flobin facility. Secondary containments of the cyanide tanks have a sump pump to return any spilled solution to the process circuit.

The groundwater standard promulgated by the Mexican authorities (PROFEPA) is 0.02 mg/L total cyanide for irrigation use, as indicated on the annual groundwater monitoring tables that La Herradura submits to the regulators and the Environmental Manifest approved by SEMARNAT. La Herradura has installed eight monitoring wells around the leach pad, plant, and ponds, of which four are located downgradient. Two of these wells were installed to monitor the expansion of the heap leach facility to Phase 12. Analytical results from October 2014 to February 2017 showed total cyanide concentrations less than the 0.02 mg/L standard for these wells except for an isolated value of 0.021 mg/L for one of the downgradient wells in January 2015. After this observed isolated exceedance, total cyanide concentrations at this well in all sampling events have been below lab detection limit of 0.012 mg/L or this well was dry. Results for the three other downgradient wells were also below the lab detection limit and/or the wells were dry. Cyanide concentrations are reported to the regulators annually as required.

The heap leach facilities at La Herradura do not backfill tailings in underground workings. Groundwater quality is within standards and remedial action is unnecessary.

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

☒ in full compliance with

The operation is ☐ in substantial compliance with **Standard of Practice 4.7**


☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura has provided secondary containments for the tanks in the isotanker system, the backup flobin system, and the Merrill Crowe Plant. All tanks are installed on solid concrete bases. The secondary containments are constructed of reinforced concrete. The secondary containments have capacity for at least 110 % of the volume of their largest tanks. The capacity of the secondary containments was evaluated during the previous audits in 2014 and 2011, and found fully compliant. There have been no changes to the capacity of these secondary containments during the recertification period and therefore the original findings still hold. All of the secondary containments report to sumps with dedicated pumps to return solutions to the process

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

circuit; accordingly, no written procedures are needed. La Herradura does not have any cyanide-related tanks without secondary containment. All cyanide-related pipelines have been installed with containment measures to collect leaks and prevent releases. The pipelines are constructed within concrete secondary containments, geomembrane lined ditches/areas, or outer HDPE pipe sleeves. Special protection measures for surface water are inapplicable, as there is no surface water due to the extreme aridity. The auditors did not observe any tank or pipeline materials incompatible with cyanide or high pH.

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 4.8**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.8 requiring that operations implement QA/QC procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.

Golder was involved in the construction oversight of the heap leach pad and pond expansions during the recertification period. Therefore, an independent reviewer was contracted to review information where a conflict of interest exists under this Standard of Practice.

Golder Review

Because the previous audits (in 2014 and 2011) evaluated the QA/QC programs for the following facilities, they did not need to be re-evaluated for this recertification audit:

- The cyanide storage warehouse
- The flobin mixing facility
- The Isotanker facility
- The Merrill Crowe Plant
- Phases 1 to 10 of the heap leach pad
- The Pregnant Pond 1, Contingency Pond 1, and Contingency Pond 2
- The modified Megapond (i.e., the modification of the former contingency ponds 2, 3, 4, and 5 into a single pond)

The QA/QC program for the following new and/or modified facilities was evaluated for the 2014 audit cycle:

- Phases 11 and 12 of the heap leach pad
- Pregnant Pond 2
- Repairs to the Pregnant Pond 1

Golder, via its affiliate in Mexico (Geomex), has been involved in the QA/QC for the new or modified cyanide facilities at La Herradura during the recertification period and consequently, a conflict of interest exists and an independent auditor (i.e., Mr. Dante Bolaños of Knight Piésold) was retained.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

La Herradura has retained the QA/QC records referenced in the 2011 and 2014 audits in bookshelves in Safety and Ecology Office Building and/or in electronic copies. The auditors observed the reports and/or review electronic copies of these reports to verify compliance

Knight Piésold Review

Construction Quality Assurance (CQA) documents exist as hard and electronic versions and they are available to demonstrate the facilities have been constructed in general terms according to design drawings and specifications to meet the required standards. These contain evidence of addressing materials suitability, compaction testing and liner installation CQA relative to the leach pads and ponds and pumping area. These documents have been certified by qualified parties such as professional engineers. License numbers were provided for the professional engineers involved in the CQA process.

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

☒ in full compliance with

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

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.9 requiring that operations implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface, and groundwater quality.


La Herradura has implemented written procedures for groundwater and wildlife monitoring; surface water monitoring is inapplicable given the extreme aridity at the site and the absence of surface water.

La Herradura conducts water and wildlife monitoring at established frequencies sufficient to characterize the medium being monitored and to identify changes in a timely manner.

La Herradura monitors groundwater downgradient of the cyanide facilities at a six-month frequency. La Herradura contracted an external analytical laboratory, Analitica de Noroeste, S.A. de C.V, to conduct this monitoring. The groundwater monitoring procedures were prepared by this laboratory, which is certified by the Mexican government. The procedures describe the sampling equipment, calibration of field instruments, sampling collection procedures, QA/QC procedures, preservation, shipping instructions, cyanide species to be analyzed, and chain of custody. This procedure manual contains blank field forms. Conditions at the time of sampling are documented in the field forms. The auditors verified compliance by reviewing the monitoring procedures, examples of completed field forms, and laboratory data from throughout the recertification period.

La Herradura monitors for wildlife mortalities daily at the pad, ponds, and plant in accordance with a written procedure. Inspections are documented on field forms. The auditors reviewed completed forms from throughout the recertification period to verify compliance.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



PRINCIPLE 5 – DECOMMISSIONING

Protect Communities and the Environment from Cyanide through Development and Implementation of Decommissioning Plans for Cyanide Facilities.

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 5.1**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura has developed written procedures related to the decommissioning of cyanide facilities. These procedures are included in the La Herradura Conceptual Closure Plan, most recently updated by SRK Consulting in 2016. The plan includes all current phases of the heap leach pad, the Merrill Crowe Plant, and the process ponds, as well as activities related to disposition of residual chemicals, and decontamination. Appendix C of the plan presents a general schedule for closure, including decommissioning activities.

La Herradura has updated its Conceptual Closure Plan twice during the recertification period. The previous update of the plan was conducted in 2014. Section 10.5 of the plan includes a list of the differences between the 2014 and the 2016 versions of the plan. The auditors reviewed this section to confirm that the plan had been updated to incorporate the changes during the recertification period.

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 5.2**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with the Standard of Practice 5.2 requiring that the site establish an assurance mechanism capable of fully funding cyanide related decommissioning activities.

The Conceptual Closure Plan (updated by SRK in 2016) includes an estimate of the costs to fully fund third party implementation of all closure activities at La Herradura. The closure costs cover the cyanide-related decommissioning measures. The estimated costs have been updated twice during the recertification period to consider closure costs associated with the site expansion. La Herradura provided a 2017 letter from Ernst & Young, an external financial auditor, to verify a self-guarantee mechanism to cover the estimated costs for cyanide-related decommissioning activities. The letter includes the financial auditor's certification number and results from the financial test. The self-guarantee amount for closure is greater than the estimated costs for decommissioning the cyanide facilities.



PRINCIPLE 6 – WORKER SAFETY

Protect Workers' Health and Safety from Exposure to Cyanide

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 6.1**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:


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

La Herradura has procedures and work instructions for the cyanide-related activities at plant, process ponds, leach pads, and other areas where they handle cyanide. The procedures cover cyanide unloading, storage and preparation, plant and leach pad operations, confined spaces, decontamination, and other cyanide-related activities. Each procedure covers the work objective, scope, responsible persons, definitions, risks and hazards, environmental issues, the necessary tools and equipment, PPE, safety equipment, procedural steps, and emergency procedures where relevant. Areas where cyanide is used also have signs listing the PPE requirements. PPE requirements are communicated and reinforced through training and workplace signage. La Herradura completes pre-work inspections using checklists for offloading and mixing of cyanide from flobins and from isotankers.

La Herradura has implemented a procedure and created forms to be used when an operational or process change/modification is proposed. The procedure considers the involvement of process, environmental and safety personnel in the assessment of the proposed changes. The forms describe the change and the controls, and must be signed by the initiator of the requested change and the environmental/safety manager. The auditors reviewed completed change management forms related to the cyanide facilities from throughout the recertification period to verify that La Herradura is implementing the written procedure.

La Herradura provides opportunities for supervisors and workers to provide input to develop, evaluate, and improve health and safety procedures. Procedures are reviewed at least every 2 years and potential improvements or modifications are discussed at meetings including: 1) daily 5-minute pre-work safety meetings; 2) weekly plant and security safety meetings; 3) monthly leader's health and safety talks. Where procedures have been revised or modified, the nature of the changes are reviewed and discussed with workers in these meetings as well. On an ongoing and rotating basis, workers are assigned standard operating procedures (SOPs) to review and present to the group during safety meetings. The auditors reviewed examples of these items from throughout the recertification period to verify compliance.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

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

☒ in full compliance with

The operation is ☐ in substantial compliance with **Standard of Practice 6.2**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura has implemented improved methods to monitor and ensure that pH is higher than the target levels to prevent the formation of HCN as recommended in the operating plans. The work procedures require an operating pH greater than 10 su for the leach solution and greater than 11 su for the mixing solution. The auditors reviewed documentation provided by the cyanide supplier, Chemours, and the results of pH monitoring by operators during offload events to determine that the target pH levels were being met.

La Herradura has installed fixed HCN monitors in areas of potential exposure to cyanide. In addition, operators use portable HCN meters to conduct maintenance work, confined space related work and other cyanide tasks. HCN sensor alarms are set at 4.7 ppm (notification alarm) and 10 ppm (evacuation alarm). Both portable and fixed HCN monitors are maintained, calibrated, and inspected as recommended by the manufacturer, as verified by calibration and maintenance records.

The auditors observed that warning signs are posted in areas where cyanide is used to alert workers that cyanide is present, that smoking, eating, and drinking are not allowed, and that the necessary cyanide-specific PPE must be worn. Pipes carrying cyanide are marked and the direction of flow is indicated with arrows on the pipe. Tanks containing cyanide solutions are clearly marked. Signage warning of confined spaces in tanks has also been placed.

Showers, low-pressure eye wash stations and dry powder fire extinguishers are located at strategic locations throughout the operation and are maintained, inspected and tested on a regular basis. The auditors randomly inspected showers and eyewash stations to verify they were operational. First aid procedures and SDS are available in the workplace and in the control room, as well as the Process, Environmental and Safety Departments. The instructions are in Spanish, the language of the workforce.

La Herradura has implemented procedures that require all incidents and accidents involving cyanide exposure be investigated and evaluated to determine if its programs and procedures to protect worker health and safety and to respond to cyanide exposures are adequate or if changes are necessary. As there were no reported cyanide-related incidents in the recertification period, the auditors verified compliance by reviewing incident reports for other types of incidents that are reported and investigated using the same procedures and tools.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 6.3**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura has water, oxygen, a resuscitator, antidote kits, radios, telephones, and an alarm system for emergency notification readily available for use at cyanide unloading, storage and mixing locations in the plant. Cyanide antidote kits are located in the process control room, the observation room for the isotanker offloading facility, and the site medical clinic. Cyanide antidote kits include amyl nitrite, sodium nitrite, sodium thiosulfate, oxygen, and a first aid kit. In addition, automated external defibrillators and an ambulance are located in the medical clinic. Amyl nitrite is stored at the manufacturer's recommended temperature and is within expiration dates. All operators carry a radio, and other means of communication (such as phones, satellite phones, and internet) are available in multiple locations. The auditors reviewed examples of inspection records from throughout the recertification period to verify that first aid equipment was inspected regularly.

La Herradura has developed written emergency response SOPs and plans for cyanide exposures. These documents include procedures for emergency response equipment preparation, emergency response procedures, and cleanup of solid and liquid cyanide spills and residuals. The procedures and plans address response measures for cyanide exposures and releases, decontamination procedures, evacuation, emergency contact information, clean-up measures, reporting requirements and others.

La Herradura has its own on-site medical clinic staffed with a physician and paramedics to provide first aid or medical assistance to workers exposed to cyanide. La Herradura has developed procedures to transport workers exposed to cyanide to a clinic located in Caborca for further treatment, if needed. On January 2014, La Herradura made an agreement with the Magisterial Clinic of Caborca to treat patients for cyanide poisoning. La Herradura has determined that Magisterial Clinic is adequate, and has qualified medical physicians and the cyanide antidote (sodium thiosulfate and sodium nitrite) to respond to cyanide exposures. Auditors reviewed a copy of the letter sent by Magisterial Clinic, which stated that Dr. Ricardo Romero is trained in hazardous material treatment, including cyanide. The letter also stated that the hospital has medical and paramedic staff trained to provide care to patients with a diagnosis of cyanide poisoning and has adequate equipment to determine cyanide levels in blood. La Herradura arranged for the clinic to receive training from Chemours in cyanide exposure treatment in May 2017, and they also provide the clinic with antidote kits.

La Herradura has conducted cyanide-related mock drills during the recertification period. Drills conducted in 2017 included sodium cyanide leaks and exposures. The auditors reviewed the drill reports to confirm that lessons learned were communicated and corrective actions completed to resolve deficiencies.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



PRINCIPLE 7 – EMERGENCY RESPONSE

Protect Communities and the Environment through the Development of Emergency Response Strategies and Capabilities

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 7.1**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura has developed SOPs, an Emergency Response Plan, and Contingency Plan that together address the potential cyanide failure scenarios for the site-specific environmental and operating circumstances. The Emergency Response Plan addresses accidental releases of cyanide. Emergency response is described in the SOP "Preparation and Response to Emergencies" where they identify the potential emergency situations and the activities and components that must be prepared before the emergency. The plans and SOPs consider the following potential cyanide failure scenarios: catastrophic releases; transportation accidents; releases during mixing, unloading, fires, and explosions; pipe, tank, and valve ruptures; pond overtopping; power outages and pump failures; and heap leach pad failure. Failure of cyanide treatment systems is not addressed because La Herradura does not have a destruct circuit. Segural, Chemours" transporter to the site, has responsibility for transportation accidents until actual delivery of cyanide to the warehouse (flobins) or dilution tank (isotankers), although La Herradura would assist in the event of a transportation accident. The Emergency Response Plan, SOPs and Contingency Plan describe the specific actions to be taken in case of emergency such as the use of cyanide antidotes and first aid measures, first responders, responsibilities, telephone contact lists, call for external help, and recovery after the emergency.

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 7.2**

☐ not in compliance with


Summarize the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 7.2, which requires that the site involve site personnel and stakeholders in the planning process.

La Herradura solicits the input of its workforce and local response agencies in the emergency response planning through safety meetings, training sessions, and mock drills. Workers input in developing and evaluating health and safety procedures is via direct communication between supervisors and operators and during daily 5-minute meetings and monthly safety meetings. La Herradura has involved local response agencies in the cyanide emergency response planning through training sessions and mock drills.

The operation made potentially affected communities aware of the nature of the risks associated with accidental cyanide releases even though La Herradura provided evidence that these communities would not be affected by cyanide releases. La Herradura has established communication channels with the communities located around the mine site through community meetings and through their contractors and brigade members

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

and workforce who live in Ejido Juan Alvarez, Sahuaro, and Caborca. Mine workers and contractors, many of them from Caborca, Juan Alvarez, and Sahuaro, have received cyanide related training as part of the general training required by La Herradura.

The operation involves local response agencies in the cyanide emergency planning and response process. The Caborca Fire Department and Civil Protection authorities participated in the mock drill of 2015, and the Chemours training session in May 2017. Some of La Herradura brigade members are also members of the Caborca Fire Department. La Herradura has a letter of the Magisterial Clinic of Caborca, from January 2014, which states they have the staff and resources to provide emergency aid for cyanide poisoning.

La Herradura solicits the input of various stakeholders in emergency response mock drills conducted with the participation of the Caborca Fire Department, Civil Protection authorities and the La Herradura Emergency Response Team (ERT). Debriefs were conducted to discuss lessons learned and the necessary corrective actions were incorporated into the Emergency Response Plan to keep it current. Contact and agency information in the Contingency Plan is updated regularly.

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

☒ in full compliance with

The operation is ☐ in substantial compliance with **Standard of Practice 7.3**

☐ not in compliance with


Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura designates the personnel and the necessary equipment and resources for emergency response. The Accident Prevention Program, its appendices and the SOP "Preparation and Response to Emergencies" identify the ERT, required training for the emergency responders, include 24-hour contact information for the coordinators and response team members, specify their duties and responsibilities, list the emergency response equipment, include requirements for inspection of emergency response equipment, and describe the role of outside responders. The auditors reviewed the brigade member list, updated in April 2016, with information on its 22 team members: complete name, home address, telephone number, and working area. La Herradura maintains a copy of this list in the Safety Department and with the mine dispatcher.

Through the participation of outside entities in meetings, training sessions, and mock drills, La Herradura has confirmed that these entities are aware of their involvement. La Herradura performed mock drills with the participation of the Caborca Fire Department, Civil Protection authorities, and in coordination with Caborca medical center. La Herradura doctors communicate with the medical staff of the Magisterial Clinic of Caborca. La Herradura has trained the clinic staff in "Hazardous Materials Emergencies and Sodium Cyanide" in May 2017. Local communities do not have a role assigned in the Emergency Response Plan.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date

March 2018
Report No. 1782419



ICMC CERTIFICATION SUMMARY AUDIT REPORT

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

☒ in full compliance with

The operation is ☐ in substantial compliance with **Standard of Practice 7.4**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

The SOP "Preparation and Response to Emergencies" includes a section regarding the internal and external notifications to be made in case of an emergency, followed by a contact list with 24-hour response telephone and radio numbers for emergencies. The list includes the names of internal first responders, security, medical services, regulatory agencies, and the ERT. For external aid, the list contains contact information of the Caborca Fire Department, the Magisterial clinic, police and emergency center at Caborca. The auditor also observed this information available in the Merrill Crowe Plant, in the Safety Department, and the brigade coordinator's office. This SOP also states that the command center for an emergency would be in charge of internal and external communications. The La Herradura public relations manager, who would be involved with any emergency, has contact information of the members of the local communities and the media.

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

☒ in full compliance with

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

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:


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

La Herradura has prepared cyanide response and remediation plans for potential cyanide releases. Section 6 of SOPs "Cleanup of Solid Cyanide Spills" and "Attention to Spills of Cyanide Solutions" describe procedures to recover solid cyanide spills and cyanide solutions. These documents include procedures to neutralize contaminated soils as necessary with hypochlorite solution. The procedures describes how the chemical solution is to be prepared to the appropriate concentration, and what final cyanide concentration will be allowed in residual soil as evidence that the release has been completely cleaned up. Contaminated soil will be disposed of in the leach pad area. La Herradura confirmed the operation only uses bottled water for drinking water supply and stated that well water is brackish.

By interview with environmental personnel, they confirmed there is no surface water at la Herradura and that groundwater table is located at a depth of approximately 100 meters. Therefore, any use La Herradura may make of chemicals (including sodium hypochlorite, ferrous sulfate, or hydrogen peroxide) is at no risk of release into surface waters.

La Herradura has developed plans to sample and monitor soils and groundwater in the event of spills. The SOPs "Cyanide Solution Spills" and "Cleanup of Solid Cyanide Spills" require that contaminated groundwater and/or soils be monitored as necessary after a cyanide spill.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

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

☒ in full compliance with

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

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura reviews and evaluates the cyanide-related elements for emergency response on a regular basis. During the recertification period, La Herradura reviewed emergency plans and procedures at least every two years or when it was necessary, for example after the mock drills exercises or changes in the process. The Contingency Plan is reviewed and updated every year or whenever personnel changes occur in the Emergency Response Team (ERT).

La Herradura conducted several cyanide-related mock drills during the recertification period. These were drills based on likely cyanide release/exposure scenarios, and included both internal and external emergency responders.

La Herradura reviews and updates their emergency procedures at least every two years. The auditors reviewed updates of the major components of the plans and procedures, such as the emergency equipment list and its location, the names of the brigade members, and the emergency contact list. No cyanide-related emergencies had occurred during the recertification period, so most of these updates were identified through the course of routine reviews. La Herradura has procedures in place to conduct reviews following simulated and actual cyanide-related emergencies, and revise procedures as may be needed.

La Herradura Mine
Name of Facility



Signature of Lead Auditor

March 16, 2018
Date



PRINCIPLE 8 – TRAINING

Train Workers and Emergency Response Personnel to Manage Cyanide in a Safe and Environmentally Protective Manner

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 8.1**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura provides cyanide-related training to visitors, contractors, workers, and emergency brigade members. New employees, including contractors and visitors, are required to attend to cyanide training before being able to work or visit the mine site. The general induction training addresses properties of sodium cyanide, as well as the health effects and symptoms of cyanide poisoning. The auditors reviewed the hardcopy and electronic records of the general cyanide training and examples of its exam results for new hires, contractors, and visitors from 2015, 2016 and 2017 to verify compliance.

La Herradura requires workers to complete refresher training annually. The refresher training includes all relevant SOPs, and encompasses cyanide-related operating procedures and emergency procedures. The auditors reviewed examples of training records and training tracking spreadsheets for the recertification period to verify compliance.

La Herradura retains the training records for workers, visitors, and contractors. The auditors reviewed examples of training records for the recertification period, as well as training matrices where La Herradura tracks the attendee name, working area, instructor name, date, and the grade they received.

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 8.2**


☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura provides task training to process staff working in the plant and at the leach pads so that they perform their duties with minimum risk for exposure and releases. The training involves both classroom materials and direct worker supervision while performing the tasks, and comprehension is verified by written exams and supervisor observation. Training elements necessary for each job involving cyanide management are identified in the training materials, which address all the relevant tasks and SOPs. Appropriately qualified personnel provide cyanide task training, and include internal and external trainers as appropriate. Task specific training to new operators is provided by various process area supervisors with years of experience in work

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

process related to cyanide. On-site doctors/paramedics and emergency responders, provide cyanide general training on intoxication and spill response. Chemours has provided additional cyanide related training.

La Herradura requires that all employees be trained before working with cyanide and the staff must be observed and approved by their supervisor before they are able to work independently. Before that time, new staff must be accompanied by more experienced staff. La Herradura evaluates the effectiveness of cyanide task training by written tests and direct supervisor observation. The auditors confirmed compliance by review of records and interviews.

La Herradura tracks the task training and annual refresher training with a series of Excel spreadsheets that list the procedures applicable to each task and worker in the plant and leach pad areas. Training records, either electronic or hardcopy, are retained throughout an individual's employment. The records include the names of the employee and the trainer; the date of training; the topics covered; and test results demonstrating an understanding of the training materials. The auditors reviewed a selection of hardcopy and electronic training records from 2015, 2016 and 2017 and interviewed staff to verify compliance.

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 8.3**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura trains all plant, leach pad, and brigade team personnel in the procedures to be followed if cyanide is released, covering first aid for exposures, control and clean up measures for environmental releases. This task training contains the response for environmental releases via several scenarios, the use of antidotes, and the response to emergencies.


La Herradura cyanide response personnel, including personnel responsible for cyanide related tasks and maintenance, are trained in decontamination and first aid procedures in case of a cyanide emergency. Task specific SOPs, including the "Emergency Response Procedure" describe first aid, decontamination, and remediation procedures for cyanide-related exposures and releases. Site cyanide response personnel have taken part in the mock drills to test and improve their response skills, and have on occasion involved external emergency responders in these drills as well.

La Herradura has a brigade trained in emergency procedures regarding cyanide, including the use of response equipment. The auditor reviewed the training records for mine brigade members to verify they are provided with the required knowledge and are trained to respond to different emergencies that may arise. The brigade undertakes general practices and drills, and receives training consisting of materials relevant to cyanide releases or emergencies including: hazardous materials (Hazmat); sodium cyanide; extinguishers, evacuation routes and emergency exits; protective equipment and fire fighting; compressed air breathing equipment (air pack); and, emergency command.

La Herradura has coordinated the emergency procedures with local responders: fire department, Red Cross, Civil Protection and hospitals in Caborca and with community authorities in Ejido Juan Fernandez and Sahuaro.

La Herradura provides refresher training in the emergency response procedures for cyanide related emergencies response and procedures for cyanide spills to the environment and intoxication. La Herradura requires that all staff working at the cyanide facilities be responsible to respond to cyanide emergencies at

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

least at a basic or first-responder level. All staff are required to receive training in cyanide-related emergency response procedures each year, including basic response measures for exposures and releases.

La Herradura conducted several mock emergency drills during the recertification period, including drills involved external emergency responders such as the fire department, police, and medical clinic. The drills addressed both cyanide release and exposure scenarios. The auditors reviewed records of these drills at the Emergency Response Department. Drills are assessed to identify opportunities for improvement in response procedures, brigade and worker training, communications, and other aspects of emergency response.

Training records are retained throughout an individual's employment documenting the training they receive, including all cyanide related training. The records include the names of the employee and the trainer, the date of training; the topics covered, and test results demonstrating an understanding of the training materials.

La Herradura Mine
Name of Facility



Signature of Lead Auditor

March 16, 2018
Date

March 2018
Report No. 1782419



PRINCIPLE 9 – DIALOGUE

Engage in Public Consultation and Disclosure

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 9.1**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura provides opportunities for stakeholders to communicate issues of concern through school, family, and community tours, as well as via the Fresnillo PLC website and the local office in Caborca. Tours are conducted on a regular basis, and reached an estimated 400 visitors annually during the recertification period. Tours provide informative cyanide materials and describe cyanide use. Visitors are encouraged to ask questions or raise concerns, and personnel from all aspects of the operations are made available to address concerns or provide additional information.

The Fresnillo PLC website at <http://www.fresnilloplc.com/contacts/corporate-offices>, also provides information on cyanide and the Code, as well as contact links for sustainability personnel through whom concerns or inquiries related to La Herradura's use of cyanide can be addressed.

The local office in Caborca is open daily to the general public to answer questions and respond to issues of concern regarding cyanide or other matters.

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 9.2**

☐ not in compliance with


Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura creates opportunities to interact with stakeholder and to provide them with information regarding cyanide management, primarily consisting of school and family tours, and the Fresnillo website. In addition, La Herradura has worked with community agencies to participate in annual Water Day and Safety Week activities. La Herradura has worked with the Caborca Fire Department, Red Cross, Civil Protection, and clinic medical staff on the response to cyanide exposures. The auditors also reviewed a brochure that is provided to visitors on the uses of sodium cyanide in industry.

Penoles has an office in the local city of Caborca, which is used for community meetings and may be visited by stakeholders seeking more information about La Herradura and cyanide use. The Fresnillo website at <http://www.fresnilloplc.com/contacts/corporate-offices> also has contact information and information about the use of cyanide in company operations, including La Herradura.

La Herradura Mine
Name of Facility


Signature of Lead Auditor

March 16, 2018
Date



ICMC CERTIFICATION SUMMARY AUDIT REPORT

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

☒ in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 9.3**

☐ not in compliance with


Summarize the basis for this Finding/Deficiencies Identified:

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

La Herradura provides operational and environmental information regarding cyanide to stakeholders in a variety of formats and venues. The auditors reviewed articles published in different magazines and newspapers of regional circulation that describe La Herradura's mine activities, health and safety care and community relations. During the mine site tours, the public can see the video "La Herradura Mine" describing the mine activities including the process and use of cyanide. This information is also available at the community office in Caborca. The Fresnillo website at <http://www.fresnilloplc.com/contacts/corporate-offices> also provides information about the Code and the use of cyanide at mine sites including La Herradura. Members of the public may pose questions or raise concerns to La Herradura directly in the course of the tours, during meetings, and via contact information provided on the website.

The operation disseminates information on cyanide in a variety of forms, including verbal. The informational video that precedes family and school tours gives a verbal description of cyanide use in the process, as well as video images of the processes. In the course of the tours, verbal information is provided and dialogue with the visitors is encouraged. Community presentations by La Herradura personnel at Water Day and Safety Week are made verbally. At the community office in Caborca, interactions with interested members of the public are generally verbal, with the support of published materials including illustrated brochures that rely on pictorial images as much as text to convey the information. La Herradura has not had any on- or off-site cyanide spills, releases of cyanide, or incidents of exposure to cyanide requiring response or remediation during the recertification period. A La Herradura procedure for spill management states that details of a spill would be reported to PROFEPA within three days of the incident. In the event of an exposure incident, La Herradura would report details of the exposure to the Instituto Mexicano del Seguro Social (IMSS) and Secretaria del Trabajo y Prevision Social (STPS). These federal agencies would make the information available to the public.

La Herradura Mine
Name of Facility


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Report Signature Page

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La Herradura Mine
Name of Facility

March 2018
Report No. 1782419

Signature of Lead Auditor

March 16, 2018
Date

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