



INTERNATIONAL CYANIDE MANAGEMENT INSTITUTE

Mining Operations

Pre-Operational Verification Protocol

For The International Cyanide Management Code

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Introduction

The Code allows for conditional certification of an operation that is not yet active but that is sufficiently advanced in its planning and design phases so that its site plans and proposed operating procedures can be audited for conformance with the Code's Principles and Standards of Practice. This Verification Protocol is used by a third-party auditor in assessing whether a pre-operational mining operation of a Signatory to the International Cyanide Management Code can be conditionally certified based on the expectation that it will meet the Principles and Standards of Practice of the Code. For this audit to be acceptable for this purpose it must be conducted by auditors meeting the third-party auditor criteria of the International Cyanide Management Institute.

Since a pre-operational audit cannot evaluate on-the-ground compliance with the Code, mines seeking pre-operational conditional certification are expected to have written documentation of proposed design and operating plans and procedures available for the auditor's review whenever practical. Design drawings, draft operating procedures, draft emergency response plans and draft training plans will provide an auditor with the best evidence that the operation can be expected to be in full compliance with the Code's Principles and Standards of Practice. However, it is recognized that an operation seeking pre-operational certification may not have progressed to a point where this degree of planning has been completed. In such a case, in lieu of design drawings, proposed operating procedures, or other draft management plans, an operation may provide its commitment to implement measures consistent with the Principles and Standards of Practices of the Code. Such commitments can be in form of process descriptions, cyanide management plans, and other written statements of intent that conclusively demonstrate that, once the facility has been constructed and is in operation, and the actions to which it has committed are implemented, the operation will comply with the Code's Principles and Standards of Practices. The commitment must include sufficient detail for the auditor to be confident in such a finding.

Operations are encouraged to use this Verification Protocol as a template in preparing a Cyanide Management Plan that would describe how the operation planned to address each element and reference the existing documentation available for review. Although such a plan is not required in order to comply with the Code, it would guide the operation in addressing all elements required for Code compliance during the planning and design stages of the project, and aid an auditor in evaluating an operation that has not been built and therefore cannot be visually inspected.

The goal of this Protocol is to encourage and support a thorough and probing inquiry by the auditor. This Protocol is structured to require that an auditor provide detailed responses, sufficient to provide a clear justification for the findings. Full responses are necessary for each question; "yes", "no" or "not applicable" answers are not sufficient. The auditor must describe the specific evidence to support the findings that a mine using cyanide is expected to meet the Code provisions. Information must be provided on the documents reviewed.

This Protocol is not meant to limit the inquiries made by an auditor in the conduct of an audit or the actions taken by a mining operation to manage its cyanide operations in a responsible manner or to implement the provisions of the Code.

It also is not intended to suggest, with respect to any of the Principles or Standards of Practice that there is only one way for a mining operation to meet the goals of the Code. While the questions posed in the Protocol are based on the measures typically appropriate to meet the Principles and Standards of Practice as discussed in the Code's Implementation Guidance, a mining operation may use alternative means to meet a particular Code provision. Familiarity with the Implementation Guidance is essential to place each Protocol question in the appropriate context, understand the intent and expectation of performance for each Standard of Practice and evaluate the measures to be taken by an operation to meet the Standard. Site specific conditions and local regulatory requirements may play a significant role in determining the approaches used by an operation. The auditor's detailed descriptions of the evidence that supports a finding is particularly important to demonstrate how alternative methods have satisfied the Code provisions.

A mining operation is expected to develop and implement a number of written management systems or procedures addressing water balance, fluid management, worker health and safety, training, emergency response, and monitoring and reporting, as well as various operating practices. These plans can take any form including but not limited to formalized manuals, standard operating procedures, checklists, signs, work orders and training materials. None of these need be limited solely to issues involving cyanide management. The intent of the Code is that management systems and procedures demonstrate that the operation understands the practices necessary to manage cyanide in a manner that prevents and controls releases to the environment and exposures to workers and the community.

The audit should determine if an operation's plans, procedures and management systems, when implemented, may reasonably be expected to meet the performance goals of the Standards of Practice. Disputes over specific assumptions, calculations or procedures should be avoided unless the issue has a significant bearing on the operation's ability to comply with the Code.

The Protocol requires the auditor to make a finding regarding whether or not the operation is expected to be in full compliance with each of the Standards of Practice once it becomes operational. Being in full compliance does not necessarily require an affirmative answer to all individual Verification Protocol questions under a particular Standard of Practice. An operation may utilize alternative means that are consistent with the Principles and Standards of Practice, but are not specifically identified in the Audit Protocol or Implementation Guidance, or a particular question in the Audit Protocol may not be applicable for site-specific reasons.

A pre-operational facility cannot be conditionally certified unless the auditor finds that, based upon the proposed plans, designs, procedures, and/or commitments, the operation is expected to be in full compliance with all Principles and Standards of Practice. If not fully compliant, the auditor must identify the specific aspects of the proposed plans, designs, procedures and commitments that have been judged to be inconsistent with the Principles and Standards of Practice. However, unlike a verification audit of an operational facility, pre-operational

certification cannot result in conditional certification of an operation that is only in substantial compliance. The auditor can pre-operationally certify the operation once it has provided the additional or revised information necessary to demonstrate that it is expected to be in full compliance.

A pre-operational facility found in full compliance is conditionally certified, subject to an on-site audit to confirm that the operation has been constructed and is being operated in compliance with the Code. The confirmatory audit must follow the Code Certification Process as an initial verification with the exception that the 3-year time frame between becoming a signatory and submitting the audit report to ICMI does not apply. The on-site confirmatory audit must be conducted within one year of a mine's first receipt of cyanide at the site.

Verification Protocol

- 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.*

1. Has the operation committed to require in all contract(s) with the cyanide manufacturer(s) or distributor(s) that the cyanide be produced at a facility that has been certified as in compliance with the Code??
2. Has the mining operation committed to require any independent distributor(s) from which it purchases cyanide to provide evidence that the cyanide shipped to the mining operation is from a certified manufacturer(s)?

Finding: If it implements the commitments it has made, is the operation expected to be in full compliance with Standard of Practice 1.1? Explain the basis for the finding.

- 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.*

1. Has the mining operation committed to enter into written agreements between the operation, the cyanide producer, distributor, and transporters designating responsibility for the following, as applicable?
 - a) Packaging as required by the United Nations for international shipments and by the political jurisdiction(s) the shipment will pass through
 - b) Labeling in languages necessary to identify the material in the political jurisdiction(s) the shipment will pass through, and as required by these jurisdiction(s) and by the United Nations (for international shipments)
 - c) Addition of colorant dye to high strength liquid cyanide prior to delivery at the mining operation, and addition of dye to solid cyanide prior to or at the time of mixing (*Note: This item will become auditable as of July 1, 2019. Companies are encouraged to include this requirement in agreements prior to that date, and for audits conducted prior to July 1, 2019, auditors are asked to note within the Detailed Audit Findings Report whether this requirement is already included in agreements*)
 - d) Storage prior to shipment
 - e) Evaluation and selection of routes, including community involvement
 - f) Storage and security at ports of entry

- g) Interim loading, storage and unloading during shipment
 - h) Transport to the operation
 - i) Unloading at the operation
 - j) Safety and maintenance of the means of transportation (e.g., aircraft, vessels, vehicles, trains, etc.) throughout transport
 - k) Task and safety training for cyanide transporters and handlers from its point of manufacture to the gold mining operation
 - l) Security throughout transport
 - m) Emergency response throughout transport
2. Will the written agreement specify that the designated responsibilities extend to any subcontractors used by the producer, distributor, transporter or the operation for transportation-related activities?

Finding: If it implements the commitments it has made, is the operation expected to be in full compliance with Standard of Practice 2.1? Explain the basis for the finding.

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

1. Has the mining operation committed to require by contract that cyanide be transported to its site by transporter(s) that are certified as being in compliance with the Code?

Finding: If it implements the commitments it has made, is the operation expected to be in full compliance with Standard of Practice 2.2? Explain the basis for the finding.

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.*

Note: Also see questions 1, 2, 4 & 6 under Standard of Practice 4.7 and all questions under Standard of Practice 4.8 for additional items applicable to handling and storage of cyanide.

1. Has the mining operation committed, or provided engineering drawings showing that its facilities for unloading, storing and mixing cyanide will be designed and constructed in accordance with cyanide producers' guidelines, applicable jurisdictional rules and/or other sound and accepted engineering practices for these facilities?
2. Has the mining operation demonstrated or committed that unloading and storage areas for liquid and solid cyanide will be located away from people and surface waters? If not, has the

operation evaluated the potential for releases to surface water and/or human exposure, and designed precautions to minimize these potentials?

3. Do design drawings demonstrate or has the operation committed that liquid cyanide will be unloaded on a concrete or other surface that can minimize seepage to the subsurface?
4. Do design drawings demonstrate or has the operation committed that the cyanide unloading area is designed and will be constructed to contain, recover or allow remediation of any leakage from the tanker truck?
5. Do design drawings demonstrate or has the operation committed to install and operate a method to prevent the overfilling of cyanide storage tanks, such as a level indicator and high-level alarm?
6. Do design drawings or other documentation demonstrate or has the operation committed that cyanide mixing and storage tanks will be located on a concrete or other surface that can prevent seepage to the subsurface?
7. Do design drawings or other documentation demonstrate or has the operation committed that secondary containments for cyanide storage and mixing tanks will be constructed of materials that provide a competent barrier to leakage?
8. Has the mining operation provided design drawings or committed that cyanide will be stored:
 - a) With adequate ventilation to prevent the build-up of hydrogen cyanide gas?
 - b) In a manner designed to minimize the potential for contact of solid cyanide with water (e.g., under a roof, off the ground, or in specially designed containers)?
 - c) In a secure area where public access is prohibited, such as within the fenced boundary of the plant or within a separate fenced and locked area?
 - d) Separately from incompatible materials such as acids, strong oxidizers and explosives and apart from foods, animal feeds and tobacco products with berms, bunds, walls or other appropriate barriers that will prevent mixing?

Finding: If it implements the commitments it has made, is the operation expected to be in full compliance with Standard of Practice 3.1? Explain the basis for the finding. Consider the responses to questions 1, 2, 4 & 6 under Standard of Practice 4.7 and all questions under Standard of Practice 4.8 as they pertain to unloading, storage and mixing of cyanide.

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.

Note: See questions 1, 3, & 6-8 under Standard of Practice 4.1, and question 3 under Standard of Practice 4.7 for additional items applicable to operation of unloading, storage and mixing facilities.

1. With respect to empty cyanide containers, has the operation prepared draft procedures or committed to develop procedures to accomplish the following:
 - a) Prevent empty cyanide containers from being used for any purpose other than holding cyanide?
 - b) Rinse empty cyanide drums, plastic bags and liners with water three times and add the rinse water to the cyanidation process or otherwise dispose of it in an environmentally sound manner?
 - c) Crush empty cyanide drums prior to disposal in a landfill and burn or otherwise dispose of empty wooden crates in an environmentally sound manner?
 - d) Clean any cyanide residue from the outside of cyanide containers that are returned to the vendor and securely close them for shipment?

2. Has the operation prepared draft procedures or committed to developing and implementing plans or procedures to prevent exposures and releases during cyanide unloading and mixing activities such as those listed below?
 - a) Operation of all valves and couplings for unloading liquid cyanide and mixing solid or liquid cyanide;
 - b) Handling cyanide containers without rupturing or puncturing;
 - c) Limiting the height of stacking of cyanide containers;
 - d) Timely clean up of any spills of cyanide during mixing;
 - e) Providing for safe unloading of liquid cyanide and manual mixing of solid cyanide by requiring appropriate personal protective equipment and having a second individual observe from a safe area, or remote observation by video;
 - f) Addition of colorant dye to solid cyanide prior to or at the point of mixing into solution. *(Note: This item will become auditable as of July 1, 2019. Companies are encouraged to adopt this practice prior to that date, and for pre-operational audits conducted prior to July 1, 2019, auditors are asked to note within the Detailed Audit Findings Report if the practice has already been incorporated into draft procedures)*

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 3.2? Explain the basis for the finding. Consider the responses to questions 1, 3, & 6-8 under Standard of Practice 4.1, and question 3 under Standard of Practice 4.7 as they pertain to unloading, storage and mixing of cyanide.

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

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

1. Has the operation prepared draft plans or committed to prepare written management and operating plans or procedures for cyanide facilities including unloading, mixing and storage facilities, leach plants, heap leach operations, tailings impoundments, and cyanide treatment, regeneration and disposal systems?

2. Has the operation committed to include in its procedures, or prepared draft plans or procedures that identify the assumptions and parameters on which the facility design will be based and any applicable regulatory requirements (e.g., freeboard required for safe pond and impoundment operation; the cyanide concentrations in tailings on which the facility's wildlife protection measures will be based) as necessary to prevent or control cyanide releases and exposures consistent with applicable requirements?
3. Has the operation committed to include in its procedures, or prepared draft plans or procedures that include the standard practices necessary for the safe and environmentally sound operation of the facility including the specific measures needed for compliance with the Code, such as inspections and preventive maintenance activities?
4. Has the operation prepared a draft procedure or committed to develop a procedure to identify when changes in a site's processes or operating practices may increase the potential for the release of cyanide and to incorporate the necessary release prevention measures?
5. Has the operation prepared draft procedures or committed to prepare cyanide management contingency procedures for situations when there is an upset in a facility's water balance, when inspections and monitoring identify a deviation from design or standard operating procedures, and/or when a temporary closure or cessation of operations may be necessary?
6. Has the operation prepared draft inspection forms or procedures or committed to inspect cyanide facilities on an established frequency sufficient to assure and document that they are functioning within design parameters?
7. Has the operation prepared draft inspection forms or procedures or committed to inspect the following at unloading, storage, mixing and process areas, as applicable to the site?
 - a) Tanks holding cyanide solutions for structural integrity and signs of corrosion and leakage
 - b) Secondary containments for their integrity, the presence of fluids and their available capacity, and to ensure that any drains are closed and, if necessary, locked, to prevent accidental releases to the environment
 - c) Leak detection and collection systems at leach pads and ponds, as required in the design documents
 - d) Pipelines, pumps and valves for deterioration and leakage
 - e) Ponds and impoundments for the parameters identified in their design documents as critical to their containment of cyanide and solutions and maintenance of the water balance, such as available freeboard and integrity of surface water diversions
8. Has the operation prepared draft inspection forms or procedures or committed to document inspections, including the date of the inspection, the name of the inspector, any observed deficiencies, and the nature and date of corrective actions?

9. Has the operation developed a draft preventive maintenance program or committed to implement preventive maintenance programs and to document these activities to ensure that equipment and devices function as necessary for safe cyanide management?
10. Has the operation prepared a draft emergency power procedure or committed to have necessary emergency power resources to operate pumps and other equipment to prevent unintentional releases and exposures in the event its primary source of power is interrupted?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 4.1? Explain the basis for the finding. Consider the responses to questions 1, 3, & 6-8 as they apply to unloading, storage and mixing tanks and pipelines and include them in the finding section of the Verification Protocol for Standard of Practice 3.2.

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

1. Has the operation determined the appropriate cyanide addition rates or committed to conduct a program to determine appropriate cyanide addition rates in the mill?
2. Has the operation developed a draft strategy or committed to implement a strategy to control its cyanide addition as necessary when ore types or processing practices change cyanide requirements?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 4.2? Explain the basis for the finding.

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

1. Has the operation drafted or committed to develop a comprehensive, probabilistic water balance?
2. Has the operation prepared draft procedures or committed to develop operating procedures that incorporate inspection and monitoring activities to implement the water balance and prevent overtopping of ponds and impoundments and unplanned discharge of cyanide solutions to the environment?
3. Has the operation prepared a draft water balance or committed to develop a water balance that consider the following in a reasonable manner and as appropriate for the facilities and environment?
 - a) The rates at which solutions are applied to leach pads and tailings that are deposited into tailings storage facilities

- b) A design storm duration and storm return interval that provides a sufficient degree of probability that overtopping of the pond or impoundment can be prevented during the operational life of the facility
 - c) The quality of existing precipitation and evaporation data in representing actual site conditions
 - d) The amount of precipitation entering a pond or impoundment resulting from surface runoff from the upgradient watershed, including adjustments as necessary to account for differences in elevation and for infiltration of the runoff into the ground
 - e) Effects of potential freezing and thawing conditions on the accumulation of precipitation within the facility and the upgradient watershed
 - f) Solution losses in addition to evaporation, such as the capacity of decant, drainage and recycling systems, allowable seepage to the subsurface, and allowable discharges to surface water
 - g) The effects of potential power outages or pump and other equipment failures on the draindown from a leach pad or the emergency removal of water from a facility
 - h) Where solution is discharged to surface waters, the capacity and on-line availability of necessary treatment, destruction or regeneration systems
 - i) Other aspects of facility design that can affect the water balance, such as the assumed phreatic surface in a tailings storage facility
4. Has the operation provided engineering drawings that demonstrate that ponds and impoundments have been designed with adequate freeboard above the maximum design storage capacity determined to be necessary from water balance calculations, or committed to such a design?
 5. Has the operation committed to measuring precipitation, comparing the results to design assumptions and revising operating practices as necessary?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 4.3? Explain the basis for the finding.

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

1. Has the operation committed to implementing measures (i.e., fencing, filling in collection ditches with gravel, and covering or netting solution in ponds and impoundments) to restrict access by wildlife and livestock to all open waters where WAD cyanide exceeds 50 mg/l?
2. Has the operation committed to apply leach solutions in a manner designed to avoid significant ponding on the heap surface and limit overspray of solution off the heap liner?

Finding: If it implements the commitments it has made, is the operation expected to be in full compliance with Standard of Practice 4.4? Explain the basis for the finding.

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

1. Will the operation have a direct discharge to surface water? If so, has the operation committed to limit the discharge to no greater than 0.5 mg/l WAD cyanide and has it incorporated technology into its design that will meet this limit?
2. Has the operation provided information regarding the anticipated quality of any direct discharge and characteristics of the receiving water body to demonstrate that the concentration of free cyanide downstream of any established mixing zone will be 0.022 mg/l or lower?
3. Has the operation provided documentation that its facilities have been or will be designed in a manner that will limit any indirect discharge to surface water so that it will not result in a concentration of free cyanide in excess of 0.022 mg/l downstream of any established mixing zone?

Finding: If it implements the commitments it has made, is the operation expected to be in full compliance with Standard of Practice 4.5? Explain the basis for the finding.

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

1. Has the operation presented design and/or proposed operating information regarding specific water management techniques or other measures to manage seepage to protect the beneficial use(s) of ground water beneath and/or immediately down gradient of the operation?
2. If the operation intends on using mill tailings as underground backfill, has it assessed the potential impacts of residual cyanide on worker health and on the beneficial uses of ground water and identified measures as necessary to address them, or committed to such an assessment and implementation of the necessary mitigative measures?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 4.6? Explain the basis for the finding.

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

1. Do design drawings demonstrate or has the operation committed that spill prevention or containment measures will be provided for all cyanide unloading, storage, mixing and process solution tanks?
2. Do design drawings or other documentation demonstrate or has the operation committed that secondary containments for cyanide unloading, storage, mixing and process tanks will be

sized to hold a volume greater than that of the largest tank within the containment and any piping draining back to the tank, and with additional capacity for the design storm event?

3. Has the operation prepared draft procedures or committed to develop and implement procedures to prevent discharge to the environment of any cyanide solution or cyanide-contaminated water that is collected in a secondary containment area?
4. Has the operation prepared draft procedures or committed to develop and implement spill prevention or containment measures for all cyanide process solution pipelines to collect leaks and prevent releases to the environment?
5. Has the operation conducted evaluations of areas where cyanide pipelines will present a risk to surface water for special protection needs or committed to such evaluations?
6. Do design drawings or other documentation demonstrate or has the operation committed that cyanide tanks and pipelines will be constructed of materials compatible with cyanide and high pH conditions?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 4.7? Explain the basis for the finding. Consider the responses to questions 1, 2, 4 & 6 as they apply to unloading, storage and mixing tanks and pipelines and include them in the finding section of the Verification Protocol for Standard of Practice 3.1. Consider the response to question 3 as it applies to cyanide unloading, storage and mixing tanks and pipelines and include it in the finding section of the Verification Protocol for Standard of Practice 3.2.

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.

1. Has the operation committed to implement quality control and quality assurance programs during construction of all new cyanide facilities including cyanide unloading, storage, mixing facilities and other cyanide facilities?
2. As part of its quality control and quality assurance programs, has the operation committed to address the suitability of materials and adequacy of soil compaction for earthworks such as tank foundations and earthen liners, the installation of synthetic membrane liners used in ponds and leach pads, and for construction of cyanide storage and process tanks?
3. Has the operation committed to retain quality control and quality assurance records for construction of its cyanide facilities?
4. Has the operation committed to have appropriately qualified personnel review cyanide facility construction and provide documentation that the facility has been built as proposed and approved?

Finding: If it implements the commitments it has made, is the operation expected to be in full compliance with Standard of Practice 4.8? Explain the basis for the finding. Consider the responses to all questions as they apply to unloading, storage and mixing tanks and pipelines in the finding section of the Verification Protocol for Standard of Practice 3.1.

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

1. Has the operation prepared a draft monitoring procedures or committed to develop written standard procedures for monitoring activities?
2. Has the operation had draft monitoring procedures developed by appropriately qualified personnel or committed to have its sampling and analytical protocols developed by such an individual?
3. Has the operation developed draft sampling procedures, or committed to develop sampling procedures that include the following: how and where samples should be taken; sample preservation techniques; chain of custody procedures; shipping instructions; and cyanide species to be analyzed?
4. Does a draft sampling manual require, or has the operation committed to prepare a sampling manual that will require that sampling conditions (e.g., weather, livestock/wildlife activity, anthropogenic influences, etc.) and procedures be documented in writing?
5. Has a draft sampling program been developed that requires monitoring, or has the operation committed to monitor for cyanide in discharges of process water to surface water and in surface and ground water down gradient of the site?
6. Has a draft inspection form been developed for, or has the operation committed to inspect for and record wildlife mortalities related to contact with and ingestion of cyanide solutions?
7. Has the operation specified the frequencies of monitoring activities that are adequate to characterize the medium being monitored and to identify changes in a timely manner?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 4.9? Explain the basis for the finding.

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.*

1. Has the operation developed a conceptual plan or committed to decommission cyanide facilities at the cessation of operations?
2. Has the operation committed to include an implementation schedule in its decommissioning plan?
3. Has the operation committed to review its decommissioning procedures for cyanide facilities during the life of the operation and revise them as needed?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 5.1? Explain the basis for the finding.

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

1. Has the operation developed an estimate of the cost to fully fund third party implementation of the cyanide-related decommissioning measures as identified in its site decommissioning or closure plan, or committed to include such an estimate in the plan it will develop?
2. Has the operation committed to review and update the cost estimate at least every five years and when revisions to the plan are made that effect cyanide-related decommissioning activities?
3. Is the operation required by the applicable jurisdiction to establish a financial mechanism to cover the estimated costs for cyanide-related decommissioning activities as identified in its decommissioning and closure strategy? If so, no further demonstration is required to comply with this Standard of Practice.
4. If the applicable jurisdiction does not require a financial guarantee, has the operation committed to establishing a mechanism other than self-insurance or self-guarantee to cover estimated costs for the cyanide-related decommissioning activities as identified in its decommissioning and closure strategy? If so, no further demonstration is required to comply with this Standard of Practice.
5. If the applicable jurisdiction does not require a financial guarantee and the operation intends on establishing self-insurance or self-guarantee as a financial assurance mechanism, has the operation committed to provided a statement by a qualified financial auditor that it has sufficient financial strength to fulfill this obligation as demonstrated by an accepted financial evaluation methodology?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 5.2? Explain the basis for the finding.

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.*

1. Has the operation prepared draft procedures or committed to developing procedures that describe how cyanide-related tasks such as unloading, mixing, plant operations, entry into confined spaces, and equipment decontamination prior to maintenance should be conducted to minimize worker exposure?
2. Do the draft procedures require, or has the operation committed that its procedures will require the use of personal protective equipment where necessary, and address pre-work inspections, emergency response, cyanide monitoring, communications and documentation?
3. Has the operation prepared draft procedures or committed to develop procedures to review proposed process and operational changes and modifications for their potential impacts on worker health and safety, and incorporate the necessary worker protection measures?
4. Has the operation prepared draft procedures for, or committed to soliciting and actively considering worker input in developing and evaluating health and safety procedures?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 6.1? Explain the basis for the finding.

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.*

1. Has the operation determined or committed to determine the appropriate pH for limiting the evolution of hydrogen cyanide gas during mixing and production activities?
2. Where the potential exists for significant cyanide exposure, has the operation prepared draft procedures for or committed to ambient or personal monitoring devices to confirm that controls are adequate to limit worker exposure to hydrogen cyanide gas and sodium, calcium or potassium cyanide dust to 10 parts per million on an instantaneous basis and 4.7 parts per million continuously over an 8-hour period, as cyanide?
3. Has the operation identified areas and activities where workers may be exposed to cyanide in excess of 10 parts per million on an instantaneous basis and 4.7 parts per million continuously over an 8-hour period and drafted procedures or committed to require use of personal protective equipment in these areas or when performing these activities?
4. Has the operation drafted procedures or committed to maintain, test and calibrate hydrogen cyanide monitoring equipment as directed by the manufacturer, and retain records for at least one year?

5. Has the operation drafted procedures or committed to place warning signs where cyanide is used advising workers that cyanide is present, and that smoking, open flames and eating and drinking are not allowed, and that, if necessary, suitable personal protective equipment must be worn?
6. Has the operation committed to using dyed high strength cyanide solution? (*Note: This item will become auditable as of July 1, 2019. Companies are encouraged to adopt this practice prior to that date, and for pre-operational audits conducted prior to July 1, 2019, auditors are asked to note within the Detailed Audit Findings Report if there is a commitment to this practice*)
7. Has the operation committed to locate showers, low-pressure eye wash stations and dry powder or non-acidic fire extinguishers at strategic locations throughout the operation and to maintain, inspect and test them on a regular basis?
8. Has the operation drafted procedures or committed to post signs, labels, etc. to alert workers that unloading, storage, mixing and process tanks and piping contain cyanide and to designate the contents and direction of flow in pipes carrying cyanide process solution?
9. Has the operation drafted procedures or committed to make MSDS, first aid procedures or other informational materials on cyanide safety available in the language of the workforce in areas where cyanide is managed?
10. Has the operation drafted procedures or committed to develop and implement procedures to investigate and evaluate cyanide exposure incidents to determine if the operation's programs and procedures to protect worker health and safety and to respond to cyanide exposures, are adequate or need revising? Has it prepared draft or sample procedures for this evaluation?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 6.2? Explain the basis for the finding.

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

1. Has the operation drafted procedures or committed to have water, oxygen, a resuscitator, antidote kits and a radio, telephone, alarm system or other means of communication or emergency notification readily available for use at cyanide unloading, storage and mixing locations and elsewhere in the plant?
2. Has the operation drafted procedures or committed to inspect its first aid equipment regularly to ensure that it is available when needed, and to store, test and/or replace materials such as cyanide antidotes as directed by their manufacturer to ensure that they will be effective when needed?

3. Has the operation developed written emergency response plans or procedures or committed to develop procedures to respond to cyanide exposures?
4. Has the operation committed to have its own on-site capability to provide first aid or medical assistance to workers exposed to cyanide?
5. Has the operation drafted procedures or committed to develop procedures to transport workers exposed to cyanide to locally available qualified off site medical facilities?
6. Has the operation committed to make formalized arrangements with local hospitals, clinics, etc., so that these providers are aware of the potential need to treat patients for cyanide exposure?
7. Has the operation drafted procedures or committed to conduct periodic mock emergency drills to test response procedures for various cyanide exposure scenarios, and to incorporate the lessons learned from the drills into response planning?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 6.3? Explain the basis for the finding.

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.*

1. Has the operation drafted an Emergency Response Plan or committed to develop an Emergency Response Plan to address potential accidental releases of cyanide?
2. Has the operation drafted procedures that consider, or committed to consider in its Emergency Response Plan, the potential cyanide failure scenarios appropriate for its site-specific environmental and operating circumstances, including the following, as applicable?
 - a) Catastrophic release of hydrogen cyanide from storage or process facilities
 - b) Transportation accidents
 - c) Releases during unloading and mixing
 - d) Releases during fires and explosions
 - e) Pipe, valve and tank ruptures
 - f) Overtopping of ponds and impoundments
 - g) Power outages and pump failures
 - h) Uncontrolled seepage
 - i) Failure of cyanide treatment, destruction or recovery systems
 - j) Failure of tailings impoundments, heap leach facilities and other cyanide facilities
3. Has the operation drafted procedures that describe, or committed that the Plan will describe specific response actions (as appropriate for the anticipated emergency situations) such as

clearing site personnel and potentially affected communities from the area of exposure, use of cyanide antidotes and first aid measures for cyanide exposure, control of releases at their source, and containment, assessment, mitigation and future prevention of releases?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 7.1? Explain the basis for the finding.

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

1. Has the operation drafted procedures to involve, or committed to involve its workforce and stakeholders, including potentially affected communities, in the cyanide emergency response planning process?
2. Has the operation drafted procedures or committed to make potentially affected communities aware of the nature of their risks associated with accidental cyanide releases, and consult with them directly or through community representatives regarding appropriate communications and response actions?
3. Has the operation drafted procedures or committed to involve local response agencies such as outside responders and medical facilities in the cyanide emergency planning and response process?
4. Has the operation drafted procedures or committed to engage in consultation or communication with stakeholders to keep the Emergency Response Plan current?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 7.2? Explain the basis for the finding.

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

1. Has the operation drafted procedures that include, or committed to include the following cyanide-related elements:
 - a) Designation of primary and alternate emergency response coordinators who have explicit authority to commit the resources necessary to implement the Plan?
 - b) Identification of Emergency Response Teams?
 - c) Requirements for appropriate training for emergency responders?
 - d) Call-out procedures and 24-hour contact information for the coordinators and response team members?
 - e) Specific duties and responsibilities of the coordinators and team members?
 - f) List emergency response equipment, including personal protection gear, available along transportation routes and/or on-site?
 - g) Procedures to inspect emergency response equipment to ensure its availability?

- h) Description of the roles of outside responders, medical facilities and communities in the emergency response procedures?
- 2. Has the operation drafted procedures or committed to confirm that outside entities included in the Emergency Response Plan will be made aware of their involvement and will be included as necessary in mock drills or implementation exercises?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 7.3? Explain the basis for the finding.

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

- 1. Has the operation drafted procedures or committed to include procedures and contact information for notifying management, regulatory agencies, outside response providers and medical facilities of the cyanide emergency?
- 2. Has the operation drafted or committed to include procedures and contact information for notifying potentially affected communities of the cyanide related incident and any necessary response measures, and for communication with the media?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 7.4? Explain the basis for the finding.

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.

- 1. Has the operation prepared draft descriptions of, or committed to describe specific remediation measures in the Plan as appropriate for the likely cyanide release scenarios, such as:
 - a) Recovery or neutralization of solutions or solids?
 - b) Decontamination of soils or other contaminated media?
 - c) Management and/or disposal of spill clean-up debris?
 - d) Provision of an alternate drinking water supply?
- 2. Has the operation drafted procedures, or committed to develop procedures to prohibit the use of chemicals such as sodium hypochlorite, ferrous sulfate and hydrogen peroxide to treat cyanide that has been released into surface water?
- 3. Has the operation drafted procedures or committed to address the potential need for environmental monitoring to identify the extent and effects of a cyanide release, and include sampling methodologies, parameters and, where practical, possible sampling locations?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 7.5? Explain the basis for the finding.

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

1. Has the operation drafted procedures or committed to review and evaluate the cyanide related elements of its Emergency Response Plan for adequacy on a regular basis?
2. Has the operation drafted procedures or committed to conduct periodic mock cyanide emergency drills as part of the Emergency Response Plan evaluation process?
3. Has the operation drafted procedures or committed to evaluate and revise the Emergency Response Plan after any cyanide related emergency requiring its implementation?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 7.6? Explain the basis for the finding.

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.*

1. Has the operation drafted procedures or committed to train all personnel who may encounter cyanide in cyanide hazard recognition?
2. Has the operation drafted procedures or committed to conduct periodic refresher cyanide hazard recognition training?
3. Has the operation drafted procedures or committed to retain records of cyanide hazard recognition training?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 8.1? Explain the basis for the finding.

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.*

1. Has the operation drafted procedures or committed to train workers to perform their normal production tasks, including unloading, mixing, production and maintenance, with minimum risk to worker health and safety and in a manner that prevents unplanned cyanide releases?

2. Has the operation drafted procedures or committed to identify the training elements necessary for each job involving cyanide management in a training plan or other training materials?
3. Has the operation drafted procedures or committed to employ only appropriately qualified personnel to provide task training related to cyanide management activities?
4. Has the operation drafted procedures or committed to train employees prior to allowing them to work with cyanide?
5. Has the operation drafted procedures or committed to provide refresher training on cyanide management to ensure that employees continue to perform their jobs in a safe and environmentally protective manner?
6. Has the operation drafted procedures or committed to evaluate the effectiveness of cyanide training by testing, observation or other means?
7. Has the operation drafted procedures or committed to retain records throughout an individual's employment documenting the training they receive? Will the 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?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 8.2? Explain the basis for the finding.

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

1. Has the operation drafted procedures or committed to train all cyanide unloading, mixing, production and maintenance personnel in the procedures to be followed if cyanide is released?
2. Has the operation drafted procedures or committed to train site cyanide response personnel, including unloading, mixing, production and maintenance workers, in decontamination and first aid procedures? Will these personnel take part in routine drills to test and improve their response skills?
3. Has the operation drafted procedures or committed to train Emergency Response Coordinators and members of the Emergency Response Team in the procedures included in the Emergency Response Plan regarding cyanide, including the use of necessary response equipment?
4. Has the operation drafted procedures or committed to make off-site Emergency Responders, such as community members, local responders and medical providers, familiar with those elements of the Emergency Response Plan related to cyanide?

5. Has the operation drafted procedures or committed to retain records documenting cyanide training, including the names of the employee and the trainer, the date of training, the topics covered, and how the employee demonstrated an understanding of the training materials?
6. Has the operation drafted procedures or committed to conduct regular refresher training for response to cyanide exposures and releases?
7. Has the operation drafted procedures or committed to conduct periodic simulated cyanide emergency drills for training purposes? Will the drills simulate both worker exposures and environmental releases?
8. Has the operation drafted procedures or committed to evaluate cyanide emergency drills from a training perspective to determine if personnel have the knowledge and skills required for effective response? Will training procedures be revised if deficiencies are identified?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 8.3? Explain the basis for the finding.

9. DIALOGUE: Engage in public consultation and disclosure.

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

1. Has the operation drafted procedures or committed to provide the opportunity for stakeholders to communicate issues of concern regarding the management of cyanide?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 9.1? Explain the basis for the finding.

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

1. Has the operation drafted procedures or committed to provide opportunities for interacting with stakeholders and providing them with information regarding cyanide management practices and procedures?

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 9.2? Explain the basis for the finding.

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

1. Has the operation drafted procedures or committed to develop written descriptions of how their activities are conducted and how cyanide is managed, and will these descriptions be available to communities and other stakeholders?
2. If a significant percentage of the local population is illiterate, has the operation drafted procedures or committed to disseminate information on cyanide in verbal form?
3. Has the operation drafted procedures or committed to make information publicly available on the following confirmed cyanide release or exposure incidents and identified the method(s) to be used?
 - a) Cyanide exposure resulting in hospitalization or fatality
 - b) Cyanide releases off the mine site requiring response or remediation
 - c) Cyanide releases on or off the mine site resulting in significant adverse effects to health or the environment
 - d) Cyanide releases on or off the mine site requiring reporting under applicable regulations
 - e) Releases that are or that cause applicable limits for cyanide to be exceeded

Finding: If it implements the commitments it has made and the plans and procedures it has prepared, is the operation expected to be in full compliance with Standard of Practice 9.3? Explain the basis for the finding.