International Cyanide Management Code (ICMC) for Gold Processing Plants

TRAINEE TRAINING MANUAL

Trainee edition | 22 October 2026 | Version 1.0

Purpose and audience

For gold plant operators, supervisors, maintenance teams, metallurgists and HSE personnel. Use this manual with supervised practice, approved site SOPs, current safety data sheets (SDS), permits and the emergency response plan (ERP). It provides training, not authority to operate or enter a hazardous area.

SAFETY BOUNDARY

On a cyanide alarm, suspected release or suspected exposure: leave the affected area by the designated safe route, raise the alarm from safety and report to muster. Never attempt an unprotected rescue. Only trained, equipped and authorized responders may enter.

Local approval before delivery

The site training owner must review this material against plant design, cyanide product, ore and water chemistry, language needs, legal requirements and current ICMI documents. Fill in the site worksheet on page 4. Resolve missing information before practical cyanide work.

Source convention

Letters in the source line refer to official ICMI references at the end. Standard of Practice numbers identify the relevant mining requirement. Requirement summaries are paraphrases. Practical examples, cases, learning activities and suggested assessment arrangements are training guidance; they do not add universal Code requirements.

Scope limits

The Code is voluntary and complements law and permits. It covers cyanide management and cyanide-related tailings and leach solutions. It does not certify every aspect of mine safety, tailings structural design or long-term mine rehabilitation. This independently prepared resource is not an ICMI-issued or ICMI-endorsed course.

Source: C; G; L

02 Learning objectives and course route

By the end, trainees should explain the Code and demonstrate safe decisions within their own role.

Learning outcome	How you will demonstrate it
Recognize all nine mining principles	Connect each principle to a plant task and a record.
Recognize cyanide and HCN exposure risks	Explain pH effects, detector limitations and evacuation.
Apply approved controls	Walk through receipt, mixing, maintenance and process checks.
Protect water and wildlife	Trace a credible release pathway and escalation action.
Respond within your authorization	Report, evacuate and describe responder boundaries.
Provide reliable evidence	Complete an inspection and explain defect closeout.

Suggested delivery

Use a full training day or split modules, with additional supervised task instruction and drills as the site requires. Suggested sequence: Code and hazards; receipt and operation; environmental controls; response and accountability; cases and assessment. Allow discussion and breaks for the audience.

Learning agreement

Ask when instructions are unclear. Use stop-work authority when controls are missing. Share practical problems with the supervisor. Never improvise a chemical adjustment, bypass a protective control or enter to investigate an alarm.

PRACTICE / DISCUSSION

Opening activity: In pairs, identify one cyanide task you perform, one credible failure and one record showing that its control works. Revisit your answer after the cases.

Source: C; P 8.1-8.3; G 8

03 Course map and quick navigation

The numbered page references below apply to this edition.

Pages	Topics
4-7	Site worksheet; nine principles; cyanide chemistry; pH and HCN
8-12	Certified supply; transport; receipt; storage; mixing
13-18	Operations; CIL/CIP; heap leach; maintenance; water; environment
19-23	Decommissioning; worker safety; detectors; PPE; emergency response
24-27	Incident reporting; competency; accountability; dialogue
28-30	Audit evidence; certification; shift checklist
31-34	Four practical case studies and debriefs
35-39	Exercises; assessment; answer key; practical sign-off
40-41	Glossary; official references

Working safely with the workbook

Write answers away from operating equipment and exposure areas. Walkdowns require site permission, induction and an escort where required. Use simulations for abnormal conditions; do not release cyanide or defeat an interlock for training.

Companion presentation

The PowerPoint follows this sequence and includes discussion prompts, editable diagrams, comparison tables and assessment discussion. The manual provides the detailed explanations and answer key.

Source: Training design

04 Site-specific information worksheet

Complete with the authorized site trainer before task practice. Blank fields are deliberate and must not be guessed.

Item to confirm	Approved local reference / entry
Site, plant and ERP revision	_____
Emergency number / radio channel	_____
Alarm meanings and safe muster routes	_____
pH operating range, stop criteria and instrument checks	_____
HCN alarm settings and required actions	_____
Detector model, bump test and calibration rules	_____
Task PPE / respiratory protection requirements	_____
Unloading and mixing SOP revision	_____
Isolation / line opening / confined-space permits	_____
Water limits and environmental trigger plan	_____
Medical response arrangements / authorized responders	_____
Reporting owner and external notification matrix	_____

SAFETY BOUNDARY

No universal pH setpoint or gas alarm setting appears in this course. Use the approved values and action rules for the specific task, instrument and site.

Training release

Trainer: _____ Date: _____
Supervisor / local technical review: _____
Trainee confirms location of current SOPs: _____

Source: P 6.1-6.3; G 6; site adaptation

05 The nine mining principles

The official mining principle names below come from the Cyanide Code. Production facilities and transporters have their own separate standards.

No. / principle	Standards	Meaning for a gold plant
1. Production and Purchasing	1.1	Certified cyanide manufacture and purchasing controls
2. Transportation	2.1	Certified transport through the entire delivery chain
3. Handling and Storage	3.1-3.2	Sound facilities and safe receipt, storage and mixing
4. Operations	4.1-4.9	Controlled process solutions, water and waste streams
5. Decommissioning	5.1-5.2	Cyanide closure procedures and adequate funding
6. Worker Safety	6.1-6.3	Exposure prevention, monitoring and medical response
7. Emergency Response	7.1-7.6	Prepared plans, resources, notification and review
8. Training	8.1-8.3	Hazard knowledge, task competence and response training
9. Dialogue and Disclosure	9.1-9.2	Stakeholder engagement and accessible information

How requirements fit together

A principle states a broad commitment. Its Standards of Practice set performance objectives. The Mining Operations Verification Protocol asks how the operation meets them; the Mining Guidance explains context and acceptable approaches. Site procedures turn those objectives into task instructions.

PRACTICE / DISCUSSION

Select a task such as a reagent delivery. Explain why it involves more than one principle: purchasing, transport, handling, worker safety, response and training all interact.

Source: C, mining principles 1-9; P; G

06 Cyanide forms and exposure pathways

A cyanide solution can create both contact and inhalation hazards. Treat all labelled cyanide circuits as hazardous, including recycled and barren solutions.

Term / route	Operational meaning
Sodium cyanide (NaCN)	A common solid or solution reagent. Dust, moisture ingress and dissolved reagent require controls.
Free cyanide	Includes cyanide ion (CN-) and hydrogen cyanide (HCN).
WAD cyanide	Weak-acid dissociable cyanide is an analytical group relevant to environmental management. It differs from free and total cyanide.
Inhalation	HCN gas or cyanide dust can enter through breathing. An HCN gas sensor does not measure every cyanide form.
Skin / eye contact	Splash or contaminated clothing can expose the body; suitable protection and rapid response matter.
Ingestion	Contaminated hands, food or drink can transfer cyanide. Keep eating, drinking and smoking out of cyanide areas.

Recognition and limitations

HCN can impair the body's use of oxygen. Possible signs include headache, dizziness, weakness, nausea, breathing difficulty or collapse. Symptoms vary and can have other causes; suspected exposure needs urgent medical response. Never wait for symptoms or an odour before leaving an alarmed area.

SAFETY BOUNDARY

Smell is unreliable: some people cannot detect the characteristic odour. Clear appearance, lack of smell or a single low instrument reading cannot establish that an area is safe.

Source: F; P 6.1-6.3

07 pH control and HCN formation

Lower pH shifts free cyanide toward dissolved HCN, which can escape into air. Higher pH reduces this tendency but does not remove the need for exposure controls.

1. Acid ingress or loss of alkalinity > 2. Lower solution pH > 3. More free cyanide as HCN > 4. Potential HCN release and exposure

Why site chemistry matters

Temperature, solution chemistry, cyanide concentration, mixing, ventilation and the task affect exposure. Ore variability and saline water can affect achievable operating conditions. The site must determine suitable pH conditions for mixing and production and implement procedures and controls.

Operator checks

Confirm the approved operating envelope and response rules. Check the correct sample point and instrument status. Compare trends and authorized cross-checks if a reading seems inconsistent. Report loss of reagent supply, probe failure, an abnormal trend or HCN indication immediately. Follow the approved safe shutdown or isolation response from a safe position.

SAFETY BOUNDARY

Do not approach an alarmed tank to obtain another sample. Do not add acid to cyanide. Do not improvise alkali additions or override interlocks. Evacuate on an alarm or suspected exposure according to the ERP.

PRACTICE / DISCUSSION

Explain why a normal pH indication does not cancel an HCN alarm. Include sensor location, instrument faults, local pockets, time delay and changing process conditions.

Source: P 6.2; G 6.2, printed pp. 63-66; F

08 Principle 1: Production and Purchasing

Mining Standard 1.1 connects the mine's purchasing decisions to responsible cyanide manufacture.

Requirement summary

Purchase cyanide from manufacturers certified under the Cyanide Code. Check the specific manufacturing facility and its current certification status, rather than relying on a supplier name or corporate membership alone.

Practical controls

Procurement maintains approved sources and verifies current status in the ICMI directory. Contracts and delivery information identify the actual producer and product. A change in source requires the mine's change control and review of any notification obligations before routine acceptance.

Role	Action / evidence
Procurement	Approved source list, dated certification check and purchase documents
Receiving operator	Match shipment identity to authorized delivery documentation; escalate discrepancies
HSE / Code coordinator	Review exceptions and preserve evidence of required notifications
Management	Resolve supply pressure without silently accepting an unapproved arrangement

A supply exception

ICMI requires notification when a certified mine agrees to purchase or transport non-certified cyanide. The current notification page specifies 72 hours after the agreement, with reasons, expected restoration of certified supply and a company contact. The designated company representative handles this; operators escalate immediately.

PRACTICE / DISCUSSION

A new supplier says its company is a signatory. What additional evidence do you need before treating its producing facility as certified?

Source: C 1.1; P/G 1.1; N

09 Principle 2: Transportation

Mining Standard 2.1 covers safe management from the producing facility to the mine using certified transport and clear responsibilities.

The complete chain

Check certification coverage for the relevant supply chain and carriers, including applicable ports, interim storage and transfers. A certified road carrier alone does not demonstrate coverage of the full journey. Establish who manages security, training, release prevention and emergency response at each handover.

1. Certified source > 2. Covered transport and transfer stages > 3. Controlled mine delivery > 4. Documented acceptance

At the mine interface

Use an agreed delivery plan. Confirm the receiving area is ready and the responsible receiver is present. Communicate vehicle positioning, access restrictions, transfer supervision and emergency signals. Drivers and site workers must understand where responsibility passes; a signature alone cannot replace a physical check.

Check	Evidence
Approved chain and status	Contract responsibilities; current directory checks
Shipment identity and integrity	Consignment records; seal / package checks
Delivery readiness	Area inspection; capacity confirmation; competent receiver
Incident arrangements	Contact lists; joint responsibilities; response coordination

SAFETY BOUNDARY

A leaking package or vehicle is an abnormal condition. Keep clear, control access from safety and activate the site response. Do not unload first to avoid a delivery delay.

Source: C 2.1; P/G 2.1

10 Cyanide receipt and unloading

These are pre-task checks, not a universal unloading sequence. Product and unloading systems differ; follow the approved task SOP.

Before transfer	What to verify
People and communication	Authorized, trained personnel; driver briefing; exclusion zone; reliable communication
Shipment	Correct product and destination; documents; package integrity; no unexplained discrepancy
Receiving capacity	Verified available tank capacity or safe storage space; working level indication and overfill protection
Equipment	Correct labelled connection; compatible hoses and fittings; inspections current; containment ready
Exposure controls	Required PPE; functioning monitoring; ventilation and emergency equipment available
Abnormal conditions	Known stop criteria; safe shutdown arrangements; clear escape route

During and after transfer

Maintain required supervision and communication. Watch the approved indications from the safe operating position. Stop under the SOP when a protective condition fails. Secure the system, reconcile received quantity and inspect the area according to the procedure before sign-off. Record defects and hand them over.

SAFETY BOUNDARY

Never improvise a connection, open an unknown valve or bypass a failed level device. Never disconnect a line before the approved isolation, depressurization and verification steps.

PRACTICE / DISCUSSION

Walkdown exercise: identify the actual connection, destination, overfill protection, containment and emergency stop. Explain how you verify each without operating it.

Source: P/G 3.1-3.2; 6.1-6.2

11 Principle 3: Storage facilities and inspections

Standards 3.1 and 3.2 address design and construction, followed by disciplined operation of unloading, storage and mixing facilities.

Facility safeguards

Use accepted engineering design and construction QA/QC. Provide suitable containment, materials compatibility and safeguards against leaks or overfilling. Locate and manage facilities to reduce exposure risks to people and water. Keep storage secure and adequately ventilated as designed.

Solid reagent storage

Keep packages dry and protected against damage. Separate cyanide from acids, strong oxidants and other incompatible materials according to the SDS and site design. Keep food, drink, feed and personal items out. Respect approved stacking limits, access aisles and handling equipment.

Solution storage

Identify tanks and pipes, contents and flow direction. Inspect containment, tank condition, valves, pipe supports and level protection on the required schedule. Keep sumps and drainage under controlled management; do not open a bund drain simply because water looks clear.

Defect	Required decision
Wet / damaged package	Hold the task, isolate the area safely and report for authorized assessment
Containment crack or leaking valve	Raise a defect; assess operating restrictions and repair priority
Blocked eyewash access	Correct before exposure work under local rules
Unknown liquid in bund	Treat as potentially contaminated until authorized characterization and disposition

PRACTICE / DISCUSSION

Name the owner, due date and closeout evidence for a storage defect. An inspection tick without follow-up does not show control.

Source: P/G 3.1-3.2; 6.2

12 Mixing and reagent preparation

Only competent, authorized workers may mix cyanide using the approved installation and sequence.

Before mixing

Confirm product, batch requirement and receiving capacity. Inspect handling devices and containment. Verify the specified water and alkalinity conditions, instrument readiness, ventilation, monitors and protective interlocks. Confirm emergency equipment and communication. Apply the site's task observation or buddy requirements.

Controlled task execution

Follow the exact SOP order, quantities, addition method and hold points. Use engineered dust and splash controls. Keep packages and lifting equipment within the approved method. Maintain the required pH controls and observations. Record process checks; stop safely when a required condition fails.

After mixing

Confirm the batch meets approved release criteria. Secure the equipment and manage residues, rinsate and empty containers under the documented procedure. Prevent unauthorized reuse of containers. Preserve disposal or return records as applicable. Report spills and abnormal batches, including those retained within containment.

SAFETY BOUNDARY

This course intentionally gives no mixing recipe. Do not use it to determine reagent quantities, pH targets, treatment chemistry or gas alarm settings. No mixing or cleanup continues through an alarm.

PRACTICE / DISCUSSION

Tabletop: the monitor fails its required check before a batch and production needs reagent. State the immediate decision, escalation owner and evidence needed before restart.

Source: P/G 3.2; 6.1-6.2; 8.2

13 Principle 4: Operations requirements

Nine Standards of Practice connect reliable plant operation to protection of people, wildlife and water.

Standard	Requirement summary	Typical evidence
4.1	Operating systems, inspections, maintenance and contingencies	SOPs, work orders, change reviews
4.2	Minimize cyanide use and cyanide in mill tailings	Metallurgical control records
4.3	Comprehensive water management	Water balance, pond level records
4.4	Protect birds, wildlife and livestock	Wildlife controls and inspections
4.5	Protect fish and wildlife from surface-water discharges	Discharge / receiving-water monitoring
4.6	Protect beneficial uses of groundwater from seepage	Seepage controls and borehole data
4.7	Prevent or contain spills from tanks and pipelines	Containment and pipeline checks
4.8	Verify construction quality against engineering standards	QA/QC and as-built records
4.9	Monitor wildlife and surface / groundwater effects	Sampling SOPs, results and trends

Operational discipline

Work within documented assumptions and operating limits. Review changes before installation or implementation. Link each abnormal trend to a responsible person and response. Contingencies must address plausible loss of power, water imbalance, equipment failure or interruption of normal treatment.

PRACTICE / DISCUSSION

Trace a solution line from its source to its destination. Identify containment, monitoring and the failure response at each interface.

Source: C 4.1-4.9; P/G 4

14 CIL and CIP: controls at the circuit

CIL combines leaching and carbon adsorption in the same tanks. CIP separates leaching from the later carbon adsorption stage. Both retain cyanide hazards in slurry and solution.

1. Ore slurry and alkalinity control > 2. Leaching with controlled cyanide addition > 3. Carbon adsorption: CIL together / CIP later > 4. Tailings management and water return

Routine checks

Use validated pH and cyanide measurements at approved points. Track dosing, levels, flow and agitation as the circuit requires. Inspect tank containment, pumps, screens, transfer lines and return-water routes. Metallurgists adjust operating strategies through approved controls, considering ore variability and tailings performance.

Exposure locations

Tank tops, dosing points, screen cleaning and sample stations can present splash or HCN risks. Use installed access, guarding, monitoring and approved sampling tools. Keep away from open, agitated slurry unless the task and access are authorized.

Carbon handling interfaces

Wet carbon and associated solutions can carry cyanide. Acid washing near cyanide-bearing carbon creates an important incompatibility risk. Apply dedicated segregation, verified isolation and the approved wash / elution procedures. Do not infer safety from a stream's name or economic value.

PRACTICE / DISCUSSION

A blocked interstage screen raises a tank level. Discuss overflow containment, safe process control, access authorization and the maintenance handover. Do not propose reaching into equipment or bypassing protection.

Source: F; P/G 4.1-4.2; 4.7; 6.1-6.2

15 Heap leach: solution management

Heap leach applies cyanide solution to ore on an engineered pad and collects solution for recovery. The large solution inventory and weather exposure require active water control.

1. Controlled irrigation > 2. Ore on lined leach pad > 3. Solution collection and recovery > 4. Barren solution return

Field observations

Inspect authorized irrigation areas for ponding, damaged lines, erosion and unexpected flows. Check pond levels, available storm storage and operational freeboard against the site trigger plan. Monitor collection drains, leak detection and pumps as designed. Report wildlife access, damaged barriers and unusual seepage.

Rainfall and power loss

Update operational decisions using the approved water balance and weather response. Allow for solution draining from the heap after irrigation stops. Confirm backup power or pumping arrangements and the safe response to loss of containment capacity. Operators must escalate early, before a design limit is reached.

Observation	Safe decision
Solution outside a collection route	Keep clear; report location and apparent flow path
Unexpected pond rise	Escalate against trigger plan; apply authorized contingency
Wildlife in contact with solution	Notify environmental staff; avoid entering the hazard
Spray / damaged irrigation pipe	Control from a safe location only under approved instructions

SAFETY BOUNDARY

A barren solution still contains cyanide. A stopped irrigation pump does not prove that the pad or downstream line has drained or is safe for maintenance.

Source: F; P/G 4.1; 4.3-4.7; 4.9

16 Maintenance and management of change

Maintenance exposes people when containment is deliberately opened. Every handover must address residual cyanide and stored energy.

1. Task risk review and permit > 2. Verified isolation and decontamination > 3. Authorized work and monitoring > 4. Controlled handback and restart

Before line opening or equipment work

Identify contents and interconnected systems. Apply the site isolation and lockout procedure, including pressure, gravity flow, electrical and mechanical energy. Drain and decontaminate using approved methods into a controlled destination. Verify the specified acceptance criteria; elapsed time or an empty gauge alone is insufficient.

Confined spaces and hot work

Apply the relevant permit, atmospheric testing and rescue arrangements. An HCN monitor does not replace oxygen or other gas measurements required by the permit. Tanks and pits may contain multiple hazards. Keep acids and incompatible cleaning agents away from residual cyanide.

Changes require review

A new ore blend, reagent supplier, pipe route, pump, control logic, alarm configuration or water source can alter cyanide risk. Use management of change to evaluate safety and environmental effects, revise engineering and SOPs, train affected people and verify readiness before restart.

PRACTICE / DISCUSSION

Work-order exercise: list the isolation references, residual chemical checks, permit authorization, waste destination and handback checks you need for a cyanide pump seal replacement.

Source: P/G 4.1; 4.7-4.8; 6.1; 8.2

17 Water balance, tailings and containment

A comprehensive water program anticipates inputs, storage and outputs so the plant can avoid unintended releases.

Water management model

The site water balance considers precipitation, evaporation, process inputs, reclaim and discharge, plus credible extremes, seepage and operational uncertainties. Operators use measured levels and flow data to check whether actual conditions match the plan. The model supports decisions; it does not replace field observation.

Control	Operator contribution
Pond capacity and freeboard	Record levels correctly; respond to early triggers
Storm readiness	Check diversion channels and approved contingency capacity
Tailings and reclaim system	Inspect lines and pumping availability; report abnormal return flows
Treatment / detoxification	Track approved performance measures and escalation criteria
Secondary containment	Keep drains controlled; report leakage and loss of usable capacity
Pipeline protection	Inspect crossings, supports, leak detection and isolation arrangements

Treatment performance

A treatment plant requires its own validated process controls. Do not assume treatment eliminates all cyanide species or all other hazards. Confirm sampling methods, analytical species and release criteria. Off-specification results need the approved hold, recycle or contingency response.

SAFETY BOUNDARY

Never release water because it looks clean or a pond is nearly full. Use authorized water routing and discharge decisions; report declining capacity early.

Source: P/G 4.1-4.7; 4.9

18 Environment: wildlife, surface water and groundwater

Protection depends on the cyanide species, exposure route and receiving environment. Site permits and Code criteria must both receive appropriate review.

Wildlife and livestock

Use the site's approved solution management, access restrictions and other protective measures. Inspect and maintain barriers and other controls. Record animal observations and deaths; environmental staff assess and investigate them. Do not dismiss deaths as unrelated without evidence.

Surface water and seepage

Follow the monitoring and response plans for direct or indirect discharges and seepage. Track potential pathways from ponds, heaps, tailings and pipelines to water users and ecosystems. Check results against the correct location, cyanide species, units and criteria; a process sample cannot substitute for a receiving-water sample.

Reliable monitoring requires	Why it matters
Qualified sampling design	Locations and frequency must reveal relevant changes
Written collection and preservation methods	Handling can affect cyanide results
Chain of custody and laboratory QA/QC	Maintains traceability and confidence
Documented conditions and trend review	Helps distinguish real change and directs response
Assigned action owner	Converts a result into timely protection

SAFETY BOUNDARY

The ERP must prohibit treatment chemicals such as hypochlorite, ferrous sulfate or hydrogen peroxide for cyanide in natural surface water or where they could reach it. These chemicals can worsen harm. Escalate to the authorized environmental response team.

Source: P/G 4.4-4.6; 4.9; 7.5

19 Principle 5: Decommissioning

Standards 5.1 and 5.2 require planned cyanide decommissioning and financial assurance.

What the plan addresses

Plan for the cyanide facilities at the end of use: remaining reagent and solution inventories, rinsing and decontamination, residues and contaminated equipment, relevant water management and verification of completion. Define a schedule, responsible roles and criteria for safe handover. Update the plan as facilities change.

Funding responsibilities

Estimate the cost for a third party to perform cyanide-related decommissioning. Maintain an appropriate financial assurance mechanism. The protocol calls for cost estimate review at least every five years and when plan revisions affect cyanide decommissioning activities. Financial assurance arrangements require management and appropriately qualified review.

Trainee role	Useful contribution
Operator	Accurate chemical inventory and identification of retained solution
Maintenance	Equipment and pipe records; verified decontamination status
Metallurgy / environment	Residual cyanide characterization and monitoring requirements
Management / finance	Current plan, cost estimate and assurance evidence

Temporary shutdown

Care and maintenance is not an excuse to abandon cyanide controls. Review staffing, monitoring, water storage, security and emergency readiness while cyanide remains. Use the site shutdown and restart procedures.

PRACTICE / DISCUSSION

Identify one redundant pipe or vessel at your plant. What proof would you need before removing its cyanide label or releasing it for reuse?

Source: P/G 5.1-5.2; 4.1

20 Principle 6: Worker Safety

Standards 6.1-6.3 connect task risk control, exposure monitoring and effective response to worker exposures.

Exposure prevention

Identify tasks and locations with credible cyanide contact, gas or dust exposure. Use process and engineering controls first, supported by procedures, access control and appropriate PPE. Include worker input when developing and reviewing practices.

Workplace safeguards

Provide required signs and labels, SDS and instructions in workforce languages. Identify cyanide tanks and pipe flow direction. Maintain emergency showers, low-pressure eyewash and suitable fire equipment. Control eating, drinking, smoking and open flames in cyanide areas. Follow identification requirements for high-strength cyanide solution.

Medical readiness

Maintain communication and appropriate first-aid resources, oxygen, resuscitation equipment and antidote arrangements under medical direction. Inspect availability and expiry status. Confirm trained onsite capability and arrangements for safe transport to a receiving facility able to treat cyanide exposure.

SAFETY BOUNDARY

Only trained and authorized personnel provide rescue, decontamination or medical treatment within their scope. Antidote selection and administration require medical protocols. Never enter a contaminated atmosphere to help without the required team, respiratory protection and authorization.

PRACTICE / DISCUSSION

Point out the nearest safe communication point, emergency shower / eyewash, exit route and muster location during an approved walkdown. Explain how an alarm changes your route.

Source: P/G 6.1-6.3

21 Gas detectors: readiness and limitations

Monitoring supports exposure control. It does not protect a worker from cyanide by itself.

Check	Required understanding
Correct instrument	HCN sensor and suitable range for the task; required additional sensors
Pre-use condition	Battery, sensor status, inlet, display and physical condition
Function / bump test	Challenge and verify response under manufacturer and site instructions
Calibration	Verify or adjust measurement against a known standard under the prescribed method
Position and response	Wear / locate correctly; understand response time, sampling lines and interferences
Alarm / fault	Follow site actions; a fault or over-range display cannot demonstrate safe air

Records and ownership

The Mining Verification Protocol requires HCN monitoring equipment maintenance, testing and calibration as the manufacturer directs, with records retained for at least three years. The instrument owner controls settings and service status. Operators do not alter settings or disable alarms to finish a job.

Limits and alarms

Exposure evaluation criteria in the protocol are not automatic universal alarm settings. Competent site personnel must establish alarms and actions using the applicable legal and occupational hygiene requirements, instrument capability and risk assessment. Confirm your approved settings on the worksheet.

SAFETY BOUNDARY

On a cyanide alarm, leave by the safe route and report. Do not silence and continue. A zero reading at one position does not prove the whole area or a confined space is safe.

Source: P/G 6.2, especially protocol questions 2-4

22 PPE and safe work boundaries

Select PPE for the specific cyanide form, concentration, exposure route and task using the SDS and approved assessment.

Protection	Practical boundary
Eyes and face	Use the specified splash eye protection and face protection; verify fit and condition
Skin	Use compatible gloves, clothing and boots; inspect integrity and manage contamination
Respiratory protection	Use only under the site respiratory program with correct equipment, training and fit requirements
Emergency entry	Requires a trained, authorized team, suitable positive-pressure supplied-air protection / SCBA as specified, and rescue support
Personal monitor	Use where required; it warns but does not filter or supply air

Before and after the task

Inspect the required items and confirm compatibility. Know safe removal and decontamination steps to prevent secondary exposure. Manage contaminated clothing and equipment under site instructions. Wash before entering clean areas. Replace defective PPE and report it.

Unknown atmospheres

Do not assume a cartridge respirator is suitable for an unknown concentration, oxygen deficiency or emergency rescue. These conditions require specialist assessment and the appropriate supplied-air arrangements. General operators evacuate and summon the response team.

PRACTICE / DISCUSSION

For your task, locate the approved PPE selection. Explain its limitations and identify a condition that means you stop before starting.

Source: P/G 6.1-6.3; site respiratory protection program

23 Principle 7: Emergency Response

The ERP must match credible site scenarios and available capabilities. General operators raise the alarm and evacuate; authorized responders control entry and intervention.

Standard	What preparedness includes
7.1	Plans for credible gas, solid and solution releases and exposure scenarios
7.2	Worker and relevant stakeholder participation in planning
7.3	Named roles, alternates, equipment and committed resources
7.4	Internal and external notification and reporting procedures
7.5	Remediation methods, endpoints and environmental monitoring
7.6	Exercises, evaluation and revision of response arrangements

1. Recognize danger > 2. Evacuate and alarm from safety > 3. Muster and account for people > 4. Authorized response and controlled recovery

Immediate operator response

Do not enter the plume or spill. Use a designated safe route, considering wind and site instructions; avoid crossing the affected area. Give the emergency contact the location, apparent event, affected people and your safe position. Account for yourself at muster and report missing persons without returning.

SAFETY BOUNDARY

No unprotected rescue. No re-entry until the authorized incident command gives clearance based on the ERP. Do not delay evacuation to collect samples, stop a local pump or retrieve belongings.

Recovery

Incident command coordinates medical support, isolation, environmental protection and communications. Authorized specialists verify cleanup and monitoring criteria before restart. Review lessons, repair controls and document release to service.

Source: P/G 7.1-7.6; 6.3

24 Incident reporting and investigation

Report exposures, alarms, spills, near misses, wildlife incidents and control failures immediately through the site system. Do not wait for a final laboratory result to report a concern.

A useful first report

State who is reporting, the exact location and time, what you observed, apparent injuries or missing people, alarm information and known hazards. Distinguish observation from assumption. Give information from a safe position and do not return for a photograph or measurement.

ICMI significant incidents

The current ICMI notification page includes exposure requiring emergency response action; unpermitted releases to natural surface water or offsite; onsite releases requiring response; transport releases requiring response; multiple wildlife fatalities credibly linked to cyanide; and theft. Notify the site reporting owner promptly so the company can evaluate obligations.

Timing and channels

ICMI requests initial notification within 24 hours of occurrence and further salient information within seven days. The designated company representative uses the current ICMI channel. Legal, permit, medical and community notification duties may differ and run in parallel. The site reporting matrix must identify who does what and when.

Investigation and closeout

Preserve records safely, including instrument logs, work permits, interviews and maintenance history. Investigate failed controls and underlying causes. Assign corrective actions with owners and dates; verify effectiveness and communicate lessons. Protect personal information while making required disclosures.

PRACTICE / DISCUSSION

Draft a two-sentence first report of a contained mixing spill. Include only facts known from safety. Who takes over external reporting?

Source: N; P/G 6.2; 7.4; 7.6; 9.2

25 Principle 8: Training and competency

Standards 8.1-8.3 cover hazard awareness, competent task performance and response training appropriate to role.

Competency pathway

Provide induction and cyanide hazard instruction to all relevant personnel, including contractors and visitors as appropriate. Give task instruction before independent cyanide work, using competent trainers and clear learning elements. Evaluate learning through questions and observed performance. Retrain when tasks change and provide required refreshers.

1. Hazard understanding > 2. Supervised task practice > 3. Demonstrated competence > 4. Authorization and periodic review

Group	Evidence of competence
Operators	Correct checks, safe task execution and response to a failed control
Maintenance	Isolation, decontamination, permits and safe handback
Supervisors / metallurgists	Abnormal trend decisions, change review and escalation
Responders	Role-specific drills, equipment skills and medical coordination
Contractors	Induction plus task authorization and oversight

Training records

Record the trainee and trainer, date, topics or task elements, evaluation method and outcome. Retain records as the applicable protocol and site system require. Attendance is evidence of participation; it cannot alone demonstrate competent performance.

PRACTICE / DISCUSSION

Teach-back: explain the actions for an HCN alarm without looking at the manual. Then locate the approved local procedure and check your explanation.

Source: P/G 8.1-8.3

26 Accountability and shift communication

The following allocation is a practical model. Confirm actual names, authority and alternates at your site.

Role	Accountability
Plant manager	Resources, approved controls, operating decisions and corrective-action oversight
Supervisor	Safe staffing, task authorization, defect escalation and shift handover
Operator	Pre-use checks, compliant operation, truthful logs and prompt stop / report
Maintenance / engineering	Integrity, verified isolation, planned work and controlled handback
Metallurgist	Validated process control strategy, chemistry review and approved changes
HSE / occupational hygiene	Exposure assessment, detector / PPE systems and incident support
Environment / tailings team	Water, wildlife and monitoring response within assigned authority
ERP lead / medical lead	Prepared response capability and authorized intervention
Procurement / Code coordinator	Certified supply evidence and applicable ICMI reporting
Training owner	Task standards, evaluations, refreshers and competence records

A complete handover

Include abnormal pH or HCN trends, instrument faults, active permits, isolated equipment, containment capacity, off-specification results, weather contingencies and unresolved defects. Name the next owner and required action. Use a read-back for critical instructions.

PRACTICE / DISCUSSION

Choose a defect crossing two departments. Identify the decision owner, who performs the work and who verifies closure. Avoid leaving it as “maintenance informed.”

Source: Practical allocation supporting P/G 4.1; 6; 7.3; 8

27 Principle 9: Dialogue and Disclosure

Standards 9.1 and 9.2 require opportunities for dialogue and appropriate public access to cyanide information.

Dialogue that people can use

Identify stakeholders who may have questions or be affected by cyanide management. Provide accessible ways to ask questions and raise concerns. Use suitable languages and formats, including verbal communication where literacy or access limits written material. Record concerns, responses and follow-up.

Appropriate disclosure

Make relevant operational and environmental information available. The verification process checks public information on cyanide management and required incident disclosures. Certification summaries and auditor credentials appear in the ICMI directory; a plant should know where to find its own current status.

Worker responsibility

Record and refer a concern through the authorized channel. Give accurate information within your role. Do not speculate about causes or promise safety before an assessment. Urgent safety information must reach the emergency reporting system immediately; routine communications processes must not delay protection.

Stakeholder question	Responsible response approach
“Is the water safe?”	Refer to authorized monitoring evidence and responsible technical personnel
“What happened last night?”	Route to the incident communication owner for verified information
“How can we raise a concern?”	Provide the approved contact and explain follow-up arrangements

PRACTICE / DISCUSSION

Role play a community question about a reported spill. Practice acknowledging the concern, recording details and referring it without making unsupported claims.

Source: P/G 9.1-9.2; C 9

28 Audit evidence: proof in daily work

Auditors compare documents, field observations and interviews. A written procedure needs evidence that people use it.

Control	Evidence chain
Certified supply	Source / chain status check; contract; matched shipment
Safe mixing	Current SOP; trained worker; batch checks; direct observation
Reliable detectors	Identified device; test / calibration history; correct worker response
Plant integrity	Inspection finding; risk response; repair order; verified closeout
Water protection	Water balance; field readings; trigger action; monitoring results
Emergency readiness	ERP; equipment checks; drill record; completed improvements
Competence	Task standard; instruction; observed evaluation; authorization
Facility construction	Design / QA/QC / as-built evidence or qualified review as allowed

Evidence quality

Use dates, asset identifiers, locations, results and named owners. Preserve original records and legitimate corrections. Explain gaps honestly. Never backdate a checklist or create a record claiming a check that did not happen.

Audit interviews

Describe what you actually do, show where the instruction is and explain your response to abnormal conditions. If you do not know, say so and identify the responsible person. A justified not-applicable finding requires a technical explanation, not an empty box.

PRACTICE / DISCUSSION

Evidence exercise: “All detectors work.” List three different types of evidence needed to test this claim and one possible contradiction.

Source: G General Guidance 3-5; P 4.1; 4.8; 6.2; 8

29 Certification overview

A company becoming a signatory and an individual operation achieving certification are distinct steps.

1. Signatory designates operation > 2. Independent audit against applicable protocol > 3. Evidence-based findings and reports > 4. ICMI completeness review and public status

Finding	Meaning
Full compliance	All applicable Standards of Practice meet the required performance objectives
Substantial compliance	Qualifying deficiencies meet specific criteria; conditional certification requires a corrective action plan
Non-compliance	The operation cannot hold certification on that finding; prescribed correction and audit procedures apply

Corrective actions and audit timing

Substantial compliance requires good-faith effort, readily correctable deficiencies and no immediate or substantial risk. Its agreed corrective-action period cannot exceed one year from publication of the Summary Audit Report. Certification depends on the formal process, not a training score.

Ongoing assurance

The usual recertification site inspection is due within three years of ICMI's public announcement of the previous certification. Ownership changes and pre-operational situations have separate timing rules. Recertification considers implementation during the intervening period. The Code coordinator should consult the current certification process for the exact case.

Public transparency

ICMI reviews report completeness and supporting detail; the lead auditor makes the substantive compliance finding. Public summaries and credentials allow stakeholders to review the basis of certification. Certification does not replace permits or legal compliance.

Source: S II-III; G General Guidance 8-12

30 A practical shift checklist

Use with the approved site checklist. These prompts do not replace task-specific criteria or required inspection frequencies.

Stage	Questions to answer
Before the shift	What changed? Which alarms, faults, permits and defects remain open?
Before entering	Am I authorized? Is my monitor ready? Do I know the exits and muster?
Before a cyanide task	Is the SOP current? Are required controls and emergency equipment ready?
During operation	Are trends, levels and flows within the approved envelope?
During inspection	Any leaks, damaged containment, abnormal pond levels or wildlife concerns?
At a failed control	Have I stopped or withdrawn as required and informed the right person?
After the task	Is the equipment secure and the work / waste properly recorded?
At handover	Does the next shift know the condition, owner and required action?

SAFETY BOUNDARY

An alarm, suspected release or exposure requires immediate safe withdrawal and reporting. No unprotected rescue. Never substitute a checklist tick for a physical check.

PRACTICE / DISCUSSION

Individual reflection: write one improvement you will make on your next shift, the person who can help, and the record that will show completion.
Action: _____
Owner / date: _____
Evidence: _____

Source: Practical prompts supporting P/G 3; 4; 6; 7; 8

31 Case 1: A delivery under production pressure

Fictional tabletop case. A cyanide delivery arrives near shift change. One package looks wet and the supplier documentation names a different producing facility.

Your task

Discuss the first safe actions, what information must be checked and who can authorize acceptance. Consider the driver, receiving operator, supervisor, procurement and HSE roles. Work from a safe position; do not open or handle the suspect package for the exercise.

PRACTICE / DISCUSSION

Record your decisions:

1. Immediate action and area control: _____
2. Shipment / certification evidence needed: _____
3. Decision owner and escalation: _____
4. Record and handover requirements: _____

Debrief / model reasoning

Pause normal receipt and keep clear of the suspect package. Apply the site abnormal-delivery and emergency response procedure according to the apparent condition. Raise the discrepancy immediately. Confirm actual producer, relevant certified transport coverage and package condition through authorized personnel. Hold acceptance until the responsible site authority resolves the issue.

Evidence and learning

Retain consignment details, the safe observation, certification review, incident / defect record and acceptance or rejection decision. Production pressure does not justify unapproved handling. The company reporting owner evaluates non-certified supply and significant-incident notification duties as applicable.

Principles connected

1 Production and Purchasing; 2 Transportation; 3 Handling and Storage; 6 Worker Safety; 7 Emergency Response; 8 Training.

Source: Fictional case applying P/G 1-3; 6-8; N

32 Case 2: Falling pH and an HCN alarm

Fictional tabletop case. A CIL pH trend falls after loss of alkalinity supply. A worker's HCN monitor alarms near a screen and a colleague suggests taking another sample first.

PRACTICE / DISCUSSION

Discuss and record:

1. What must the worker do immediately? _____
2. How will the control room receive the report? _____
3. Who may investigate in the affected area? _____
4. What evidence supports a later restart? _____

Debrief / model reasoning

Leave the affected area by the designated safe route and raise the alarm from safety. Report to muster and account for people. Do not delay for a sample, approach the source or re-enter to rescue. The control room follows the approved safe process response without exposing personnel. Authorized responders assess the atmosphere under the ERP.

Technical review after stabilization

Review alkalinity supply, actual chemistry, pH instrument condition, monitor records, dosing and interlocks. Normalization of one reading cannot alone authorize re-entry. The designated authority verifies atmospheric and process conditions, repairs, controls and readiness before restart.

Learning point

The trend helps explain a possible mechanism, but an alarm drives immediate protective action. Workers do not need to prove the cause before evacuating. Do not invent a new pH target or gas setting to solve the case.

Principles connected

4 Operations; 6 Worker Safety; 7 Emergency Response; 8 Training. Preserve logs, witness accounts and relevant work records for investigation.

Source: Fictional case applying P/G 4.1; 6.2; 7; 8

33 Case 3: Storm inflow at a heap leach

Fictional tabletop case. A forecast storm becomes heavier than expected. Pond levels rise, one return pump is unavailable and a downstream ditch begins flowing.

PRACTICE / DISCUSSION

Group task:
1. Which safe observations and trend data matter? _____
2. Which approved contingency decisions need escalation? _____
3. How will downstream receptors receive protection? _____
4. Which response would create an additional hazard? _____

Debrief / model reasoning

Escalate against the water trigger plan before containment capacity is exhausted. Use the approved water balance, pond levels, rainfall and heap drain-down expectations. The responsible team evaluates authorized irrigation changes, pumping and storage contingencies. Do not enter flowing solution or improvise a discharge route.

Environmental response

Report suspected escape and the apparent drainage path from safety. Authorized personnel implement receptor protection, notifications and monitoring. Do not add hypochlorite, peroxide or ferrous sulfate to natural water or a drainage where the chemicals could reach it. Record observations and distinguish suspected impacts from confirmed results.

Evidence and review

Keep level and weather records, pump defect history, contingency decisions, monitoring chain of custody and notification records. Review why available capacity and backup arrangements did or did not match the site plan.

Principles connected

4 Operations; 7 Emergency Response; 9 Dialogue and Disclosure, supported by 8 Training.

Source: Fictional case applying P/G 4.3-4.9; 7.5; 9

34 Case 4: Pump maintenance and a collapsed worker

Fictional tabletop case. A crew prepares to open a cyanide pump. Isolation evidence is incomplete. A person collapses near the equipment and another worker wants to rush in.

PRACTICE / DISCUSSION

Discuss:

1. What prevents the original job from starting? _____
2. What is the bystander's immediate response? _____
3. Who controls rescue and medical care? _____
4. What must change before work resumes? _____

Debrief / model reasoning

The job cannot begin with incomplete isolation verification. On collapse, assume a hazardous exposure is possible: leave the affected area, raise the emergency alarm and report the exact location from safety. Prevent further entry from a safe position if possible. Never attempt an unprotected rescue.

Responder boundary

Only the trained and authorized response team enters with appropriate atmospheric assessment, respiratory protection and rescue support. Qualified personnel provide decontamination and medical care under the ERP and medical protocols. General workers muster and provide information; they do not administer improvised treatment.

Before restart

Incident command and the responsible operating authority require verified safe conditions. Investigate exposure potential, permit and isolation failures, residual chemicals and equipment status. Revalidate the work scope, isolation, decontamination criteria, permits, competence and handback. Preserve records honestly.

Principles connected

4 Operations; 6 Worker Safety; 7 Emergency Response; 8 Training. The urgency of rescue makes disciplined entry control essential.

Source: Fictional case applying P/G 4.1; 6.1-6.3; 7; 8

35 Trainee exercises and worksheets

Complete in a classroom or authorized safe area. The trainer provides the current local procedures and sample records.

Exercise A: Release pathway map

Draw a real circuit using labelled boxes for source, transfer, containment and destination. Add the route a leak could take to workers, soil, surface water and groundwater. Mark detection, isolation and escalation points. Explain one single failure and one combined failure.

Exercise B: Record review

Review a fictional inspection showing “pump leak” on three successive shifts with no work-order number. Identify what is missing. Draft an improved entry with time, asset, safe observation, immediate control, named owner and closeout evidence. Never fabricate a historical repair.

Exercise C: Detector teach-back

Using an approved training instrument, demonstrate pre-use inspection and the required function-check process under supervision. Explain calibration status, alarm actions and a fault response. Do not use test gas or change settings without the trainer's authority.

Exercise D: Local emergency route

On a site map, mark your work area, communication points, designated escape routes and muster locations. Discuss how wind or an affected route changes the choice. Rehearse a factual radio report. Do not enter a restricted area for the exercise.

PRACTICE / DISCUSSION

Reflection space:
Most important control for my role: _____
A control I need to understand better: _____
Question for the supervisor: _____
Follow-up owner and due date: _____

Source: Training exercises supporting P/G 4; 6; 7; 8

36 Knowledge assessment

Answer without the key, then discuss your reasoning. The site sets its pass standard and remediation requirements before delivery.

01. What is the exact name of Mining Principle 1?

Answer: _____

02. Does a supplier being a signatory prove the actual producing facility is certified? Explain.

Answer: _____

03. What happens to the tendency to form HCN when pH falls?

Answer: _____

04. Where do you obtain the correct operating pH range and HCN alarm actions?

Answer: _____

05. Your HCN monitor alarms. What are your immediate actions?

Answer: _____

06. A worker collapses in a suspected cyanide atmosphere. May you enter wearing ordinary splash PPE?

Answer: _____

07. How does a bump / function test differ from calibration?

Answer: _____

08. Name four controls to verify before unloading.

Answer: _____

09. What prevents safe cyanide maintenance when a pump has stopped but remains connected?

Answer: _____

10. How do CIL and CIP differ?

Answer: _____

Source: Assessment based on C; P; G; S; N

37 Knowledge assessment continued

These questions test decisions and understanding. Completing this assessment alone does not authorize cyanide work.

11. Which water management factors matter during heavy rain at a heap leach?

Answer: _____

12. May responders add hypochlorite to a stream to treat a cyanide release?

Answer: _____

13. What information makes a first incident report useful?

Answer: _____

14. What ICMI notification timing applies to significant incidents?

Answer: _____

15. What evidence demonstrates competence beyond attendance?

Answer: _____

16. Name three kinds of evidence used in a Code audit.

Answer: _____

17. How do full compliance and substantial compliance differ?

Answer: _____

18. What does Principle 5 require besides a decommissioning procedure?

Answer: _____

19. Who should receive a community concern about cyanide?

Answer: _____

20. What is the usual Code recertification interval, and what starts it?

Answer: _____

Source: Assessment based on C; P; G; S; N

38 Answer key and discussion

Use these model answers after the assessment. Accept equivalent correct explanations that agree with current approved site requirements.

Question	Model answer
1	Production and Purchasing.
2	No. Verify the specific producing facility and relevant certification status; verify transport coverage separately.
3	More free cyanide exists as HCN, increasing potential for gas release; exposure also depends on conditions.
4	The current approved site SOPs, instrument / exposure-control rules and ERP, confirmed with the responsible supervisor.
5	Leave by the designated safe route, raise the alarm from safety, report to muster and account for yourself. Do not re-enter.
6	No. Never attempt an unprotected rescue. Summon the trained, equipped and authorized response team from safety.
7	A function test checks response under the specified method; calibration verifies or adjusts measurement against a known standard. Follow manufacturer instructions.
8	Any four suitable controls: authorized personnel, correct shipment, receiving capacity, correct connections, containment, functional monitoring, required PPE, communication or emergency readiness.
9	Stored energy, pressure, gravity flow and residual cyanide may remain. Require verified isolation, decontamination and permits.
10	CIL combines leaching and carbon adsorption in the same tanks; CIP adsorbs onto carbon after a separate leaching stage.

Suggested evaluation approach

Treat evacuation, no unprotected rescue and use of approved site values as critical understanding. A wrong answer requires correction and re-evaluation before relevant work. This is a training recommendation; the site defines its assessment and authorization rules.

Source: C; P/G 1-8; F

39 Answer key and practical sign-off

Written knowledge must connect to observed safe performance.

Question	Model answer
11	Pond levels and available capacity, rainfall and inflows, heap drain-down, pumping / backup availability and approved water contingencies.
12	No. The response plan must prohibit such treatment in natural surface water or where chemicals could reach it; escalate to authorized environmental responders.
13	Location, time, observed event, people affected, alarm / known hazards, safe reporter location and contact; distinguish facts from assumptions.
14	The current ICMI page requests initial notice within 24 hours of occurrence and further salient information within seven days. The designated company owner handles this; other duties may differ.
15	Observed task evaluation, knowledge / abnormal-condition checks and role authorization supported by records.
16	Documents / records, field observations and interviews.
17	Full compliance meets all applicable standards. Substantial compliance meets specific qualifying conditions and requires an agreed corrective action plan for conditional certification.
18	A current cost estimate and financial assurance mechanism for cyanide-related decommissioning, with the required reviews.
19	The approved dialogue / communication owner; urgent safety concerns also go immediately to the emergency reporting system.
20	The next site inspection is normally due within three years of ICMI publicly announcing the previous certification; special cases have separate rules.

Practical evaluation record

Trainee / role: _____ Assessor / date: _____
Task and SOP revision: _____
Observe: preparation; controls; safe execution; abnormal-condition response; records.
Outcome / gaps: _____
Remedial instruction and reassessment: _____
Authorization owner and restrictions: _____

Source: P/G 4-9; S; N

40 Glossary

Use the exact analytical and operating definitions in the site's approved procedures and laboratory methods.

Term	Meaning in this course
CIL / CIP	Carbon-in-leach / carbon-in-pulp; gold adsorption process arrangements
CN- / HCN	Cyanide ion / hydrogen cyanide
Free cyanide	Cyanide ion plus hydrogen cyanide
WAD cyanide	Weak-acid dissociable cyanide; an analytical grouping
Total cyanide	An analytical measure of cyanide species recovered by the specified method
Barren / pregnant solution	Solution after / before gold recovery; both may contain cyanide
ICMI / ICMC	International Cyanide Management Institute / International Cyanide Management Code
SOP / SDS / ERP	Standard operating procedure / safety data sheet / emergency response plan
PPE / SCBA	Personal protective equipment / self-contained breathing apparatus
QA/QC	Quality assurance / quality control
Secondary containment	A protective system intended to retain a primary-system release
Freeboard	Vertical separation between liquid level and the defined containment elevation
Water balance	Accounting / prediction of water inputs, storage and outputs
Management of change	Review and authorization of changes before implementation
CAP	Corrective Action Plan under the applicable certification process
Certification / signatory	An operation's verified status / a company's program commitment
Muster	Designated safe assembly and personnel accountability process

Source: C; P; G; F; S

41 Official references and version control

Official ICMI sources verified on 22 October 2026. Recheck the library and notification page before each course revision.

C | The Cyanide Code, June 2021

https://cyanidecode.org/wp-content/uploads/2025/03/01-The-Cyanide-Code-JUNE-2021.pdf

P | Mining Operations Verification Protocol, June 2021

https://cyanidecode.org/wp-content/uploads/2025/03/14-Mining-Verification-Protocol-JUNE-2021.pdf

G | Guidance for Use of the Mining Operations Verification Protocol, June 2021

https://cyanidecode.org/wp-content/uploads/2025/03/15-Mining-Guidance-JUNE-2021.pdf

S | Signatory and Certification Process, December 2022

https://cyanidecode.org/wp-content/uploads/2025/03/02-Signatory-and-Certification-Process-DECEMBER-2022.pdf

N | Notifications to ICMI, current web page

https://cyanidecode.org/notifications-to-icmi/

F | Cyanide Facts: chemistry, use and effects

https://cyanidecode.org/cyanide-facts/

L | ICMI Document Library: current program documents

https://cyanidecode.org/becoming-a-signatory/becoming-a-participant/document-library/

Reading locations

Code: mining principles and Standards of Practice. Protocol and Guidance: numbered standards match the modules in this manual. Guidance General Guidance sections explain evidence and audit findings. Certification Process sections II-III cover timing and findings; Notifications covers current incident and supply reporting.

Editorial control

This manual paraphrases requirements and adds original training examples. The Code PDF calls Principle 1 “Production and Purchasing”; the Mining Guidance contents uses “Production and Purchase.” This course follows the Code's principle name. ICMI's current library lists the linked 2021 and 2022 documents despite their older publication dates.

Before local release

Review local law, permits and site procedures with the responsible technical owners. Confirm the worksheet, current source versions, role assignments, translated instructions and practical assessment arrangements. Record the local reviewer, approval date and next review date.

Source: L; C; P; G; S; N; F