**HSEQ Standard**

C5 Confined Space Entry

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**REVISION HISTORY**

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| 1.0 | 01/01/2016 | Drafted Document | Ryan Ispisua |
| 2.0 | Unknown | Unknown | Unknown |
| 3.0 | 05/25/2023 | Bump Test/Shift/Entry Supervisor | Rob Richards/ Ed Dominguez |
| 4.0 | 4/25/2024 | Verify ERT is on siteNotify Main Gate before Entry and give Attendant, Entry Supervisor’s phone numberEntry Supervisor, Attendant, and Entrants review and understand the Rescue Plan before Entry | Rob Richards |
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# Scope and Intent

This procedure applies to all employees and contractors working at all Rio Tinto Minerals – California Operations.

This procedure applies to spaces that are enclosed or partially enclosed, are not intended for continuous occupancy and have the potential during entry, occupancy or exit for one or more of the following:

* A hazardous atmosphere as a result of:
* deficiency or excess oxygen,
* flammable or explosive material, or
* dust, fume, mist, vapor, gas or other contaminants that exceed an occupational exposure limit
* Engulfment from free flowing solids or liquids, an
* Entrapment due to restricted entry of exit

Entry occurs when a part of a person’s body breaks the plane of a confined space.

# Definitions

**Acceptable Entry Conditions –** conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permitted space can safely enter into and work within the space

**Shift –** A shift consists of a 8, 10, or 12 Hour time period as they apply to the employee’s normal shift. If the work will continue past the shift time period a new permit will need to be opened.

**Attendant –** individual stationed outside the permit space who monitors the authorized entrants and who performs duties assigned in the employer’s permit space program

**Authorized Entrant –** employee who is authorized by the employer to enter a permit space

**Blanking and Blinding –** absolute closure of a pipe, line, or duct by fastening of a solid plate that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct without leakage beyond the plate

**Bump Test Certificate –** Document is verification of completed Bump Test. **Document is only valid for one shift. Note: Employees that check out monitors must be confined space qualified**

**Double Block and Bleed –** closure of a line, pipe, or duct by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves

**Emergency –** any occurrence (including any failure of controls or monitoring equipment) or an internal or external event that could endanger entrants

**Engulfment –** surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing

**Entry –** action by which a person passes through an opening into permit space, occurs when any part of their body breaks the plane of the opening

**Entry Supervisor –** person responsible for determining if acceptable entry conditions are present at the permit space where entry is planned, for authorizing entry, overseeing entry operations, and for terminating entry. **Entry supervisor must verify all documentation is current and valid for the shift.**

**Hazardous Atmosphere –** atmosphere that may expose employees to the risk of death, incapacitation, impairment of the ability to self-rescue, injury, and/or acute illness

**Hot Work Permit –** employer’s written authorization to perform operations, such as cutting, welding, grinding, or heating, capable of providing a source of ignition

**Immediately Dangerous to Life or Health (IDLH) –** any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual’s ability to escape unaided from a permit space

**Inerting –** displacement of the atmosphere in a permit space by a non-combustible gas to such an extent that the resulting atmosphere is noncombustible

**Isolation –** process by which a permit space is removed from service and completely protected against the release of energy and material into the space, by such means as: blanking or blinding; misaligning or removing sections of pipes, lines, or ducts; a double block and bleed system; lockout/tagout of all sources of energy; or blocking or disconnecting all mechanical linkage

**Line breaking –** intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure or temperature capable of causing injury

**Oxygen Deficient Atmosphere –** atmosphere containing less than 19.5% oxygen by volume

**Oxygen Enriched Atmosphere –** atmosphere containing more than 23.5% oxygen by volume

**Permit-Required Confined Space Program –** the employer’s overall program for controlling, and where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces

**Permit System –** the employer’s written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry

**PEL –** the Permissible Exposure Limit of a gas or vapor according to OSHA Standards, expressed in part per million of contaminated air.

**Prohibited Condition –** any condition in a permit space that is not allowed by the permit during the period when entry is authorized

**Rescue Service –** personnel designated to rescue employees from permit spaces

**Retrieval System –** equipment (including retrieval line, full-body harness, lifting device/anchorage) used for non-entry rescue of persons from permit spaces

**Testing –** process by which the hazards that may confront entrants of a permit space are identified and evaluated

**Vapor Density –** weight of a gas compared to air (Air=1), vapors with a high density are more dangerous and require better ventilation because they tend to flow along the floor and collect in low places.

# Requirements

Confined spaces at all California Operations will be classified as Confined Spaces in accordance with CalOSHA regulations. One or more of the following must be met to deem that a space is a Permit-Require Confined Space

* Has been identified and documented as such in a risk assessment and,
* Is large enough and so configured that an employee can bodily enter and, perform assigned work and,
* Has limited or restricted entry or exit and,
* Is not intended or designed primarily as a place of work, or for continuous employee occupancy
* Have an atmosphere which contains (or could potentially contain) harmful levels of contaminants, or an unsafe level of oxygen, e.g. following a nitrogen purge
* Contain a material that has the potential for engulfing an entrant
* Excavation deeper than 4’ and not scaled backed to prevent engulfment.
* Have an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section
* Contain any other recognized serious safety or health hazard (i.e. temperature, electrical shock, etc.)

Entry to a confined space is allowed only after a written approval, in the form of a documented Confined Space Permit, Assessment Form, Rescue Plan, and current proof of a calibration/bump test on the gas detector being used.

Requirements for confined space entry include the following:

1. All entry into confined spaces must occur by permit only.
2. For each confined space entry, the Entry Supervisor will designate in advance, as part of the preplanning process, the persons who are to have active roles in the entry operation.
3. Each designated employee will be assigned specific duties, and will be provided with the required training as listed in the training section of this document.
4. The confined space entry team will include, but is not limited to, the following:
* Authorized entrants
* Attendants
* Entry supervisors
1. Anytime a prohibited condition (i.e. isolation control begins to failure, gas detector is alarming, etc.) is detected the Entrant will immediately exit the space. The condition shall be controlled before re-entry will occur.
2. Specific Safe Work Procedures must be developed for work activities which are more hazardous when carried out in a confined space than elsewhere. These activities would include:
* Hot work (cutting and welding)
* Chemical cleaning
* Steam Cleaning
* Hydro cleaning
* Abrasive blasting
* Painting or coating

These work procedures are developed and documented on an as needed basis prior to commencement of the work and are based on the procedures in the Hazardous Work Activity Section of this procedure. All Safe Work Procedure shall be attached to the Confined Space Permit.

1. The attendant shall have no other duties other than those listed in the duties and is to be stationed outside the confined space entry point at all times while personnel are in the space.
2. Where a risk assessment has identified a need for ventilation, this need must be addressed by a documented procedure that shall be attached to the Confined Space Permit.
3. There must be a system to prevent unauthorized entry.
4. Conditions in the permit space must be acceptable for entry throughout the duration of an authorized entry. These conditions must be verified.

# Premitting Process - Confined Space Permit

**Confined Space Permit is only active for one shift**.

Below are the steps for completing the permitting process:

* Step 1 Space identification
* Step 2 Exact location of the job
* Step 3 Description of the work to be performed in the Confined Space
* Step 4 Risk Assessment has been completed for the work to be performed, document on an Assessment Form and attached to the Confined Space Permit. *See* ***Assessment Form*** *below.*
* Step 5 Atmospheric conditions *See* ***Atmospheric Testing*** *below.*
* Step 6 Control Measures
* Step 7 Emergency Rescue Plan *See* ***Rescue Plan*** *below.*
* Step 8 Authority to Enter
* Step 9 Cancellation of the Confined Space Entry Permit

The Entry Supervisor, Attendant, and Entrants shall all sign-in and sign-out of the permit when assuming or are relieved of their duties.

All completed Confine Space Permits shall be returned to the Health and Safety Department for review.

### Assessment Form

A Confined Space Assessment Form reviewed and signed by a member of the Health and Safety Department, or the Emergency Response Team shall be completed and attached to the Confined Space Permit.

Section 1 Confined Space Determination

1. Is the space large enough and so configured that an employee can bodily enter and perform assigned work?
2. Has limited or restricted entry or exit?
3. Is not intended or designed for continuous employee occupancy?

If all three of the questions are “yes” then the space meets the definition of a permit-required confined space.

Section 2 Confine Space Hazards

1. Does space contain or have the potential to contain hazardous contaminants or otherwise have a hazardous or oxygen enriched/deficient atmosphere?
2. Does the space contain material that could fall onto or engulf/entrap an entrant?
3. Is the space configured such that an entrant could be trapped by inwardly converging walls, or by floors that taper downward to a smaller cross section?
4. Does the space include fall hazards and/or complex internal configurations that could create a hazard to the entrant and hamper escape or rescue?
5. Does the space contain mechanical operating components i.e. agitators, grinders, screw conveyors, etc.?
6. Does space contain potential energy sources that cannot be fully controlled through isolation procedures e.g. electrical, hydraulic, pneumatic, or mechanical?

If the answer is “yes” to any of the above questions, additional control measure must be implemented prior to entry.

### Rescue Plan

A Confined Space Rescue Plan reviewed and signed by a member of the Health and Safety Department, or the Emergency Response Team shall be completed and attached to the Confined Space Permit.

This Plan shall identify the following:

* Rescue staging area
* Supplied air entry required, nobody shall enter a confined space using supplied air until a Level 2 Risk Assessment has been completed, except in emergency situations by a trained and competent member of the Emergency Response Team.
* Type of atmosphere
* Space Type
* Means of summoning Rescue Services. The Main Gate shall be called whenever a confined space is entered
* Method of Rescue i.e. internal, external. All internal rescues shall be made only by a trained and competent member of the Emergency Response Team.
* Anchorage
* Description of the Space, this will determine whether the Emergency Response Team needs to be on standby throughout the entry.
* Photos, sketches, or diagram of the space and steps for rescue an entrant.

### Atmospheric Testing

Atmospheric testing for confined space entry is required for two distinct purposes:

* Evaluation of the hazards of the permit space
* Verification that acceptable conditions for entry into the space exist

The gas detectors used to verify that acceptable atmospheric conditions exist are Industrial Scientific MX6 iBrid’s that are configured for reading the following gases:

* Oxygen Concentration – High Alarm (23.5%)/Low Alarm (19.5%)
* Lower Explosive Limit – Alarming at more than 10% explosive gases.
* Carbon Monoxide – Alarming at more than 25 ppm
* Sulfur Dioxide – Alarming at more than 2 ppm
* Hydrogen Cyanide – Alarming at more than 5 ppm
* Hydrogen Sulfide – Alarming at more than 10 ppm

All gas detectors shall be bump tested and/or calibrated before use in the field, documentation of this must be attached to the Confined Space Permit. **Documentation is only valid for one shift.**

Before taking any gas readings the gas detector must be zeroed and peaks cleared, always zero the detector at the site of the confined space entry due to the changes in atmospheric conditions that could affect the readings i.e., temperature, humidity, wind, etc.

The initial air test must be done by a trained and authorized entry supervisor.

Also ensure that all levels of the confined space are tested due to the vapor density of certain gases i.e., sulfur dioxide is heavier than air and will lie towards the bottom of a space, carbon monoxide is about the same weight as air and will be at every level.

# Hazardous Work Procedures

Before any of the following listed activities can be done in a confined space the procedures listed below must be followed. These procedures are in addition to all other confined space procedures and must be followed for work done.

* Hot work
* Chemical Cleaning, Abrasive Blasting, Painting or Coating
* Hydro or Steam Cleaning
* Trenching/Excavations

### Hot Work

* A hot work permit must be obtained. (See Appendix A)
* Prior to commencing work where hot work is to be performed on/with stainless steel materials (surfaces, Inconel, etc.…) within a confined space, the crew is to complete the Critical Risk Management (CRM) Critical Control Checklist (CCC) exposure to dust and fumes.
* The attendant must know how to shut off the welding or other hot work equipment and the shut off must be located near the attendant. If the shut off is not located near the attendant a second full-time attendant must be stationed at the equipment and must be in constant communication with the attendant stationed at the confined space entrance.
* Provisions must be made to prevent flash burns from reflective surfaces.
* The attendant may need additional eye protection to protect from flash burns.
* The need for respiratory protection must be evaluated prior to the start of work by the Health and Safety Department.
* The possibility of hazardous fumes from material in the confined space or on the walls must be evaluated by the Health and Safety Department.

### Chemical Cleaning, Abrasive Blasting, Painting or Coating

* The hazards of the chemical, abrasives, paints, or coatings to be used and any possible reactions with material in the space must be evaluated by the Health and Safety Department.
* The Health and Safety Department must approve all personal protective equipment including respiratory protection and must evaluate the possibility of heat stress.
* The Health and Safety Department must evaluate the need for additional air monitoring instrumentation.
* The Health and Safety Department must evaluate the need for ventilation.
* A waste disposal plan must be agreed upon with the Environmental Department.
* There must be a quick shut off for the chemical that is under the control of the attendant or a second attendant.
* Any hoses used must be protected from contact with sharp edges to prevent damage to the hose.
* Steps must be taken to prevent the splash back of chemicals.
* The SDS (Safety Data Sheets) of the chemicals, abrasive agent, paint, or coating used must be available in the event of an emergency.
* The area around the space must be barricaded and posted as no smoking or hot work if any of the chemicals used are flammable.

### Hydro and Steam Cleaning

* Follow all the requirements of the High-Pressure Water Blasting (HPWB) Procedure.
* The Health and Safety Department must approve all personal protective equipment including respiratory protection and foot protection and must evaluate the possibility of heat stress.
* The attendant must know how to shut off the cleaning equipment and the shut off must be located near the attendant. If the shut off is not located near the attendant a second full-time attendant must be stationed at the equipment and must be in constant communication with the attendant stationed at the confined space entrance.
* The Health and Safety Department must evaluate the need for ventilation.
* Hoses must be protected from sharp edges to prevent damage to the hoses.
* Steps must be taken to prevent splash back.

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### Trenching

* Follow the requirements in the Trenching/Drilling Permit. (See Appendix B)

# Training

The HS Department shall develop and review a standardized training format to meet the requirement for a safe confined space entry.

Competent Person Training shall be provided to each affected employee as follows:

* Before the employee is assigned duties that require a confined space entry.
* Before there is a change in assigned duties.
* Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained.
* Whenever any employee believes that there are deviations from these permit space entry procedures, or inadequacies in the employee's knowledge or use of these procedures.
* The training shall establish employee proficiency in required duties and introduce new or revised procedures for compliance with these standards and procedures, or when future revisions occur.

# Program Review and Record Retention

All completed original Confined Space Work Packages shall be sent to the Health and Safety Department to be retained for at least one year

Records of all training associated with confined space will be kept in the employee’s files and in the training records system.

The Health and Safety Department shall maintain a master list of all confined spaces.

The Health and Safety Department will review the confined space program, using the retained, canceled permits monthly and revise the program as necessary to ensure that employees participating in entry operations are protected from permit space hazards and regulatory compliance.

# Responsibilities

### Management

* Ensure compliance with this Work Procedure.
* Audit to ensure procedures are being followed.

### Health and Safety Department

* Administers the confined space program.
* Review and update the Confined Space Entry procedures
* Review and update the Register
* Audit to ensure procedures are being followed.
* Reviews and signs-off on Assessment Forms and Rescue Plans
* Reviews completed Confine Space documentation for compliance and coaches on any deficiencies noted.

### Entry Supervisors

* **Reviews the Rescue Plan with the team and ensures that they understand it.**
* Knows the hazards that may be faced during entry, including information on the routes of exposure, signs and symptoms, and consequences of the exposure
* Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin
* Terminates the entry and cancels the permits as required when:
* The entry operations covered by the entry permit have been completed
* A condition that is not allowed under the entry permit arises in or near the permit space
* Verifies that rescue services (ERT) are available and that the means for summoning them are operable. **Call the Main Gate to verify ERT will be on-site during the Confined Space work.**
* Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations
* Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained

### Attendants

* **Calls the Main Gate prior to Entry of the Confined Space. Give the Attendant’s, Entry Supervisor’s phone number, and the Confined Space location. This is to ensure that** **the Confined Space can be evacuated in the event of an on-site emergency.**
* **Reviews and understands the Rescue Plan**
* Knows the hazards that may be faced during the entry
* Knows the hazards that may be faced during entry, including information on the routes of exposure, signs and symptoms, and consequences of the exposure
* Is aware of possible behavioral effects of hazard exposure in authorized entrants\
* Continually maintains an accurate count of authorized entrants
* Remains outside the permit space during entry operations until relieved by another attendant
* Communicates with authorized entrants
* Monitors activities inside and outside the space
* Summons rescue and other emergency services
* Performs non-entry rescues as specified by the employer’s rescue procedures
* Performs no duties that might interfere with the attendant’s primary duty to monitor and protect the authorized entrants

### Entrants

* **Reviews and understands the Rescue Plan**
* Knows the hazards that may be faced during entry, including information on the routes of exposure, signs and symptoms, and consequences of exposure
* Properly use equipment as required:
* Testing and monitoring equipment
* Ventilation equipment
* Communication equipment
* Personal protective equipment
* Lighting equipment
* Barricading and shielding equipment
* Safe ingress/egress equipment i.e. ladders
* Rescue and emergency equipment
* Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space
* Alert the attendant whenever:
* `The entrant recognizes any warning signs or symptoms of exposure to a dangerous situation
* The entrant detects a prohibited condition
* Exit from the permit space as quickly as possible whenever:
* An order to evacuate is given by the attendant or the entry supervisor
* The entrant recognizes any warning signs or symptoms of exposure to a dangerous situation
* The entrant detects a prohibited condition
* An evacuation alarm is activated

### Emergency Response Team

* Reviews and signs-off on Assessment Forms and Rescue Plans
* Remain proficient rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified
* Shall conduct one entry rescue exercise annually.

# References and Supporting Documents

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| --- | --- |
| Doc Ref. | Document Title |
| HSEC-B-17 | C5 Confined Space Standard |
|  | C5 Confined Spaces Guidance Note |
| 29 CFR 1910.146 | OSHA Permit-Required Confined Space  |
| Title 8 Section §5156 | CalOSHA Confined Space (Scope, Application, and Definitions |
| Title 8 Section §5157 | CalOSHA Confined Space (Permit-Required Confined Space) |
| Title 8 Section §5158 | CalOSHA Confined Space (Other Confined Space Operations |
| SAF-C5-002 | Confined Space Permit |
| SAF-C5-005 | Assessment Form |
| SAF-C5-004 | Rescue Plan |
| 10-HSEQ-FM-BOR | Hot Work Permit |
| Part #17130279 Revision 14 | Industrial Scientific MX6 iBrid Gas Detector Operation Manual |
|  | HPWB Work Procedure |
|  | Trenching and Drilling Permit |

**END OF PROCEDURE**