



Fatal Risk Management

Operator Reference Guide (v4.0)



Fatality Prevention Program

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What is Fatal Risk Management?

- It is a set of tools to enhance our Fatality Prevention Program

Fatal Risk Management is a simple set of symbols, questions, and mobile software to help us further enhance our Fatality Prevention Program.

- A set of visual symbols of the 25 fatal risks faced by our employees

Through analysis of company and industry incidents we have identified 25 fatal risks that are present in our operations. For each fatal risk we created a symbol to represent the presence of that hazard.

- A standardized set of critical controls to help keep you safe

For each fatal risk we identified, there is a list of the critical controls necessary to prevent a serious injury or fatality. We also provided a set of short questions to facilitate discussion about the best way to implement each control.

- Empowerment for operators and supervisors to "Stop the Work"

Safety is the responsibility of every employee. Fatal Risk Management is about empowering everyone to "Stop the Work" if a critical control is missing or ineffective.

How Do I Use Fatal Risk Management?

Step 1 - Identify the Risks

Identify the Fatal Risks that may be present in your job task. Be reasonable and focus on the fatal risks you are most likely to encounter during your task. Many tasks will have multiple fatal risks, but don't go overboard trying to pick as many as possible.

Step 2 - Review the Controls

This booklet contains the critical controls and verification questions to ask for each fatal risk. Review the information in the booklet to help you plan how to complete the task safely.

Step 3 - Communicate the Work Plan

Have a conversation with your co-workers/team/crew about how you will implement each of the critical controls. Talk about it in your tailgate meeting, in the field, or during a job. It's all about communication and understanding how to complete a task safely.

Step 4 - Stop the Work if Necessary

"Stop the Work" immediately if you realize that a critical control is missing or not correctly implemented.



Exposure to thermal, overpressure and fragment hazards associated with explosives.

Critical Control	Am I Implementing the Control Effectively?
General	<ul style="list-style-type: none"> - Do all personnel working with explosives have the proper training, licensing and accreditations? - Is licensing documentation current and properly updated if licensing conditions have changed? - Have blasting SOP's been developed, readily available and reviewed according to policy?
Storage of Explosives & Access Control	<ul style="list-style-type: none"> - Is the explosive storage area routinely inspected and properly secured with adequate fencing and signage? - Is the explosive storage area free of potential ignition sources? - Is proper documentation kept and maintained at the explosives storage facility?
Explosives Transportation & Vehicle Inspections	<ul style="list-style-type: none"> - Has a pre-shift inspection been completed on transportation vehicles prior to operation? - Are all day boxes locked while transporting explosives? - Have all routes that will be used to get to the blast site been inspected prior to transporting explosive material? - Are detonators kept separate from explosives or blasting materials? - Are explosive transportation boxes constructed and maintained according to regulations?
Communication & Clearing	<ul style="list-style-type: none"> - Has a pre-blast meeting been held to ensure all parties understand assignments and responsibilities. - Is sufficient warning announced prior to blasting and are all calls being used to ensure all parties are aware of a blast? - Has a qualified and responsible FCX employee been present and involved with blocking assignments? - Has all personnel been cleared of the blast area prior to installing initiation devices? - Has all effected equipment been relocated to a safe position to prevent damage from potential fly rock? - Is the lightning detection system functioning and fully operational?

Critical Control	Am I Implementing the Control Effectively?
Blast Site Access Control & Work Execution	<ul style="list-style-type: none"> - When explosives or initiating systems are present, is the blast site secured against unauthorized personnel access? - In the case of any foreign metals in the blast holes, has proper communication been established and location documented? - Following the completion of loading activities, is any unused explosive material transported to a secure location?
Management of Misfires	<ul style="list-style-type: none"> - Before reentering a blast zone, has the area been cleared of any gasses? - Has the blast area been inspected and cleared for misfires prior to resuming normal operations? - Are personnel adhering to the 30 minute wait period before entering the blast area after a misfire or suspected misfire and has the misfire or suspected misfire been communicated to mining personnel? - Have barricades been placed a minimum of 30' from the center of the misfire location and is signage in place to notify personnel of the misfire? - If the misfire can be recovered, have the misfire products been safely disposed of? - Are shovel and loader GPS systems operational so that misfires can be properly communicated?

**Scan the QR code below to access
Blasting**



Exposure to thermal, overpressure and fragment hazards associated with explosives.

Critical Control	Am I Implementing the Control Effectively?
Storage of Explosives & Access Control	<ul style="list-style-type: none"> - Are powder and cap magazine gates properly bonded for grounding and covered with a spark reducing coating? - Are explosive, blasting agents and detonator storage areas kept locked and secured when unattended? - Are explosives and detonators (caps) stored in separate areas?
Explosives Transportation & Vehicle Inspections	<ul style="list-style-type: none"> - Have all other shaft operations been stopped during hoisting of explosives or detonators (caps)? - Are explosives and detonators (caps) hoisted on separate hoist trips? - Has the vehicle being used to transport explosives been properly inspected? - Are all personnel handling explosives authorized by all appropriate national or local regulatory authorities? - Is smoking and vaping prohibited when handling, using and transporting explosives? - Are detonators (caps) kept separated from explosive and blasting agents until loaded in round?
Communication & Clearing	<ul style="list-style-type: none"> - Has the drift been properly demarcated prior to loading rounds to prevent unauthorized entry? - Have all personnel directly involved been instructed as to their responsibility, the location and size of the blast? - Are all personnel verified to be cleared of the blast zone before initiating blast? - Are guards posted prior to initiating blast to ensure no one enters the blast area? - Is the imminent blast communicated to personnel on site prior to initiating the blast?

Critical Control	Am I Implementing the Control Effectively?
Communication & Clearing Continued	<ul style="list-style-type: none"> - Has permission to blast been given by all responsible parties? - Has the designated wait time elapsed before entering the blast area?
Blast Site Access Control & Work Execution	<ul style="list-style-type: none"> - Has all mobile equipment been cleared of the blast zone including where there may be potential breakthrough? - Are personnel using spark resistant tools when handling explosives?
Management of Misfires	<ul style="list-style-type: none"> - Prior to inspecting for misfires in the blast area has air monitoring been conducted? - Are blast areas being inspected for misfires by a minimum of two competent employees post blast? - Are appropriate procedures being followed when misfires are discovered?

**Scan the QR code below to access
Blasting**



Exposure to a hazardous environment in a confined space.

Critical Control	Am I Implementing the Control Effectively?
Entry Permit Execution	<ul style="list-style-type: none"> - Has the space been evaluated using the permit to determine if the space is a Permit Required Confined Space? - Have the Confined Space Permit requirements been verified and are they understood by the entry team?
Atmospheric Monitoring	<ul style="list-style-type: none"> - Are proper air monitoring procedures being followed throughout the entry?
Energy Isolation	<ul style="list-style-type: none"> - Have all energy sources been identified, isolated, dissipated, locked out, and tried out?
Access and Working Surface	<ul style="list-style-type: none"> - Have fall from height, engulfment, safe access, working surfaces, falling object hazards been addressed?
Ventilation	<ul style="list-style-type: none"> - Is proper ventilation being provided (consider air flow requirements, adjacent work, e.g. generator exhaust, welding fumes, etc.)?
Communication	<ul style="list-style-type: none"> - Have proper communication practices been put in place?
Evacuation & Rescue	<ul style="list-style-type: none"> - Is there a dedicated Entry Attendant and do they know when to evacuate the confined space? - Is there an emergency plan designed and prepared for the confined space?

Scan the QR code below to access
Confined Space



**Contact with
Molten
Material**
Smelter & Rod Mills

Critical Control	Am I Implementing the Control Effectively?
Cooling Element Monitoring	<ul style="list-style-type: none"> - Have the required inspections on the cooling system been completed? - Has cooling water been established on the shaft furnace and/or vertical furnace? - Has adequate flow and temperature on the cooling elements been confirmed and do personnel know what to do if it is out of spec? - Have all hoses and fittings been inspected to ensure no leaks on the tap plates?
Eng. Molten Metal Conveyance Systems	<ul style="list-style-type: none"> - Have the fixed transport systems been inspected to ensure that they are in good operating condition and free of any foreign materials?
Water and Molten Metal Segregation	<ul style="list-style-type: none"> - Has the area below the furnaces been inspected to ensure they are free of standing water? - Are charged materials controlled to prevent explosive bath positions? - Has the system been purged to ensure water will not enter the vessel? - Are launders and converter aisles free of water? - Are hot pots being used to prevent explosion?
Fire Suppression Systems	<ul style="list-style-type: none"> - Does the equipment that interacts with molten metal have a fire suppression system installed and is it in good working order? - Are the fire suppression nozzles free of blockage and pointed in the right direction to facilitate an escape from a fire?
Furnace and Taphole Integrity	<ul style="list-style-type: none"> - Has a visual inspection for defects on the tap hole(s) been conducted along with all other required operational inspections? - Is a redundant tapping machine available and operational? - Are tap hole plugs and supplies available and in good condition? - Do personnel have the proper training to Oxy lance and drill a taphole? - Are refractory repair schedules being met and do inspections indicate that they are effective? - Are tap hole replacement procedures for cool down times and notification requirements followed? - Is the tapping machine drill steel properly aligned to prevent damage to the tap plate and tap hole? - Has the Oxy lance and all connections been inspected prior to use?

Furnace and Taphole Integrity Continued	<ul style="list-style-type: none"> - Are warning lights and barricades in place for active tapping? - Are the spill containment systems maintained and effective? - Are all areas below furnaces and tap holes free of any accumulated water or foreign material?
Hot Metal PPE	<ul style="list-style-type: none"> - Has all Hot Metal PPE been inspected prior to use, free from modifications and is the PPE being worn correctly?
Pot Level Control	<ul style="list-style-type: none"> - Are visual checks of the pot level taking place during the fill? - Are all automatic and manual level controls working properly? - Is adequate freeboard being maintained in the pot and is the pot on a level surface?
Chemistry & Process Controls	<ul style="list-style-type: none"> - Are temperatures within upper and lower limits? - Are samples collected and sent to the lab per established procedures? - Are furnace levels monitored according to the SOP requirements? - Are temperatures monitored according to the SOP requirements? - Are the established furnace process controls maintaining stable furnace conditions? - Are charged materials added per SOP requirements?
Access Control	<ul style="list-style-type: none"> - Are controls for restricting access of people and vehicles in place? - Have crossing gates been provided at vehicle crossing locations of the slag hauler, and are they closed during molten metal hauling operation? - Is equipment locked out/secured prior to personnel entry into molten metal discharge areas? - Are signs & procedures in place to keep people out of hazardous areas?
Cooling System Integrity	<ul style="list-style-type: none"> - Has the over-filled pot been cooled per the established SOP? - Have the molds been inspected to ensure no water can come into contact with molten material? - Have vessels been inspected for any hot spots? - Has the system been purged to ensure water will not enter the vessel?

**Scan the QR code below to access
Contact with Molten Material**



Critical Control	Am I Implementing the Control Effectively?
Water and Molten Material Segregation	<ul style="list-style-type: none"> - Have the steam connection lines been properly evacuated for moisture? - Are temperature and pressure gauges functioning properly? - Are transport and storage vessels dry and free from water?
Storage of Product and Material	<ul style="list-style-type: none"> - Are all level indications functioning properly? - Are all isolation valves functioning properly? - Have all tanks been identified and labeled properly? - Has pre-shift inspections been conducted on all storage tanks?
PPE	<ul style="list-style-type: none"> - Has all required PPE been inspected prior to use, free from modifications and is the PPE being worn correctly?
Access Controls	<ul style="list-style-type: none"> - Are controls for restricting access of people and vehicles in place? - Are signs and procedures in place to keep people out of hazardous areas?
Eng. Molten Material Conveyance Systems	<ul style="list-style-type: none"> - Have the fixed transport systems been inspected to ensure that they are in good operating condition and free of any foreign materials?
Fire Suppression Systems	<ul style="list-style-type: none"> - Are fire alarm systems and detection systems functioning properly? - Are fire extinguishers readily available in the work areas?
Guarding	<ul style="list-style-type: none"> - Is all guarding in place and been inspected prior to work starting?

Scan the QR code below to access
Contact with Molten Material



Exposure to the risk of drowning in natural or manmade bodies of water or other vats, cells, vessels and open containers of liquid.

Critical Control	Am I Implementing the Control Effectively?
Barriers & Segregation	<ul style="list-style-type: none"> - Is access to the area restricted by physical barriers and are the controls to pass the barriers posted? - Is the possibility of an inrush of solution/material controlled and/or accounted for? - Does the signage in the area clearly display the appropriate and adequate information for the area?
Flotation PPE	<ul style="list-style-type: none"> - Is PPE readily accessible, in good condition, and in accordance with manufacturer's specifications? - Is PPE being worn properly?
Access Control	<ul style="list-style-type: none"> - Is safe access established?
Access Equipment & Vehicles	<ul style="list-style-type: none"> - Have the equipment inspections been performed? - Are the equipment/access vehicles being maintained to OEM standards? - Is the operation of the equipment within the safe operating capacities?
Emergency Response	<ul style="list-style-type: none"> - Has a rescue plan been established, approved and communicated? - Are the proper responding personnel notified and available to respond in the event of an emergency? - Do all personnel in the work area understand the rescue plan and what role they serve?

Scan the QR code below to access
Drowning



**Contact with machinery/moving parts
(entanglement, crushing, pinching, penetrating and cutting forces)**

Critical Control	Am I Implementing the Control Effectively?
Barriers and Segregation	- Has flagging and barricading been properly installed to alert personnel of the hazards present?
Equipment Integrity	- Are interlocks, emergency stops and pull cords functioning properly?
Guarding	- When working around operating equipment, is the guarding sufficient to protect employees from entanglement?
Human Factors	- Is loose jewelry, clothing, hair, and other personal items tied back so that they do not get tangled in the equipment? - Is proper hand/body placement being observed to stay out of the line of fire?
Job Execution	- Are safe distances being maintained when working around unguarded moving equipment and are procedures clearly understood? - Have escape routes been considered if something was to go wrong? - Is the work process streamlined to minimize exposure to an entanglement hazard?
Energy Isolation	- Have all energy sources been identified, isolated and de-energized prior to starting work? - Have proper LOTOTO procedures been followed and completed?

Critical Control	Am I Implementing the Control Effectively?
Mechanical Blocking	<ul style="list-style-type: none"> - Have devices installed to prevent unintentional movement been inspected for proper installation?
Work Completion	<ul style="list-style-type: none"> - Have any installed blocking devices been removed? - Has guarding or barricades been properly replaced and secured? - Have all employees been accounted for and notified of start-up?

Scan the QR code below to access Entanglement and Crushing



Exposure to electrical shock or arc flash.

Critical Control	Am I Implementing the Control Effectively?
Switching Procedures	<ul style="list-style-type: none"> - Are the ground isolators working? - Is there access to up-to-date drawings? - Have all affected parties been notified? - Has an SOP and/or Risk Assessment been established and reviewed for the work that is taking place? - Has a JSA been conducted and reviewed prior to performing work? - Have the switching procedures been reviewed, approved and communicated?
Labeling & Energy Identification	<ul style="list-style-type: none"> - Are arc flash rating labels up-to-date and reviewed by a competent person? - Is the equipment and isolation point(s) required labeling present and the information accurate and legible? - Are personnel using any electrical drawings for the work that is being performed?
Energy Isolation	<ul style="list-style-type: none"> - Are personnel trained for the task at hand? - Have personnel verified if there is any stored or residual energy? - Has the load been removed or reduced to a proper switching level prior to energy isolation? - Have all potential energy sources been identified? - Is an ECC required for the task/work being performed? - Is the equipment maintained and in good condition? - Has any energized work taking place been reviewed and approved?

Critical Control	Am I Implementing the Control Effectively?
Electrical PPE	<ul style="list-style-type: none"> - Has the correct PPE been selected, inspected and worn properly prior to work starting? - Is the arc flash protection PPE adequate per the labeling?
Barriers & Segregation	<ul style="list-style-type: none"> - Are the barriers adequate for the protection of all personnel? - Have all evacuation points been identified and communicated?
Emergency Response	<ul style="list-style-type: none"> - Has a rescue plan been developed and reviewed? - Have personnel been trained to respond to someone that is being electrocuted?

**Scan the QR code below to access
Exposure to Electrical Hazards**



Working at height where the danger of falling exists.

Critical Control	Am I Implementing the Control Effectively?
Fall Protection System	<ul style="list-style-type: none"> - Has the fall protection harness been properly inspected prior to use? - Has the right fall protection been selected for the task? - Are proper tie off/anchor points readily available and allow for 100% tie off at all times?
Fixed Work Platforms & Scaffolding	<ul style="list-style-type: none"> - Has the scaffolding/work platform been approved and inspected prior to use by a qualified and competent person? - Is the scaffolding protected from any potential impact by equipment?
Mobile Platforms	<ul style="list-style-type: none"> - Has the mobile platform been approved for the work and inspected by a competent person? - Do the operating conditions (weather, ground conditions) allow for safe operation of the mobile platform?
Leading Edges and Open Holes	<ul style="list-style-type: none"> - Have all leading edges and/or open holes been properly guarded or hard barricaded? - Have adequate protection systems been installed and inspected?
Emergency Response	<ul style="list-style-type: none"> - Has a rescue plan been reviewed and approved by the team?

Scan the QR code below to access
Fall from Heights



Exposure to falling objects (e.g. tools, material, equipment, structures, etc.).

Critical Control	Am I Implementing the Control Effectively?
Barriers and Segregation	<ul style="list-style-type: none"> - Are the barricades/flagging appropriate for the hazard(s) present and placed 360 degrees around the hazard(s)? - Is the work area protected by barricading or flagging at enough distance to prevent objects/materials from impacting personnel on a lower level?
Overhead Structure	<ul style="list-style-type: none"> - Does the overhead structure show signs of degradation/impact that could compromise its integrity? - Is the work platform(s) maintained in good condition? (e.g. toe boards, continuous work surface, no holes in grating, etc.) - Is guarding sufficient to catch any materials that may have the potential to fall?
Work Execution	<ul style="list-style-type: none"> - Has the work execution been reviewed to eliminate the need for personnel to work below active work areas? - If people are working below, are proper protections and PPE in place and being used? - Are tool lanyards in use when people need to be working below the work area? - When pausing/completing a job, have potential objects that could fall been properly secured or removed (consider environmental factors such as wind)?

Scan the QR code below to access
Falling Objects



Exposure to thermal, particulate, gas or vapor hazards from a fire.

Critical Control	Am I Implementing the Control Effectively?
Escape Routes	<ul style="list-style-type: none"> - Are walkways, pathways and exit routes free and clear of debris? - Are exit routes properly identified and posted?
Pre Work Planning, Inspections & Communication	<ul style="list-style-type: none"> - Are extinguishers easily accessible at exit locations and the size/style appropriate for the area? - Is the appropriate PPE available and being used for the hazards present? - Has a JSA/JRA/HASP been completed and reviewed prior to work starting? - Have LOTOTO and isolation points been identified to ensure that flammable gases/liquids are mitigated from being a hazard? - Have pre-op inspections been completed prior to work starting work? - Has a communication method been established for the employees involved in work execution?
Hot Work & Fire Watch	<ul style="list-style-type: none"> - Has the fire watch received training, understand the workflow and any associated risks? - Has a dedicated fire watch been assigned to the work? - Have communication paths been identified for the fire watch? - Have the proper permits been completed prior to work and properly closed out after the work?
Storage of Product & Material	<ul style="list-style-type: none"> - Have all products/materials been identified, properly labeled and stored in good order? - Have incompatible products and materials been separated or stored away from each other and properly secured? - Have stored materials been protected from any hot work?

Critical Control	Am I Implementing the Control Effectively?
Storage of Product & Material Continued	<ul style="list-style-type: none"> - Are chemical off-loading points secured so that materials/products/reagents are not off loaded in the wrong area(s).
Proper Use & Disposal of Chemicals, Materials and Product	<ul style="list-style-type: none"> - Are personnel properly trained to handle the product/chemical or material? - Has the proper PPE been identified and is it in use? - Have chemicals/products/materials been properly disposed of? - Are the proper tools being used for the identified material/product being handled?
Barriers & Segregation	<ul style="list-style-type: none"> - Has the proper barricading for the type of work been completed been established and is it properly labeled? - Has the work, hazards and duration of work been communicated to all affected personnel?
Emergency Response	<ul style="list-style-type: none"> - Have rescue services, if applicable, been notified of the work being completed? - Has a rescue or emergency response plan been reviewed and established? - Are employees trained to respond to a fire and how/where to evacuate?
Fire Suppression Systems	<ul style="list-style-type: none"> - Do suppression systems provide adequate coverage and have they been inspected/tested? - Have the fire containment devices been verified, tested and are the inspection tags updated?
Detection and Alarms	<ul style="list-style-type: none"> - Have the smoke alarms and detection systems been inspected, tested and tags updated? - Are fire control panels, if applicable, in working order, tested and inspected? - Do the employees know what the alarms and tones mean?

Scan the QR code below to access Fire

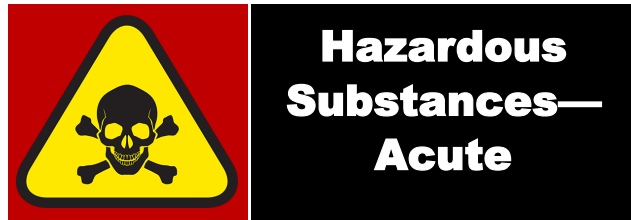


Exposure to failure of natural slopes and temporary or permanent slopes which are excavated or constructed in relation to mining activities or associated supporting infrastructure.

Critical Control	Am I Implementing the Control Effectively?
Verification Systems/ Monitoring System	<ul style="list-style-type: none"> - Are monitoring systems in place and in working condition? - Have personnel received any notifications from dispatch or geotechnical groups that any issues are present in the area of work? - Are evacuation procedures established and understood by all personnel?
Visual Inspections & Reporting	<ul style="list-style-type: none"> - Is the angle of repose for stockpiles within acceptable limits? - Are berms at adequate heights and thickness to keep equipment from going through? - Have area inspections for ground conditions been conducted prior to work commencing? - If adverse ground conditions are noted, were the conditions addressed and/or reported prior to work starting?
Slope Planning & Building	<ul style="list-style-type: none"> - Do personnel understand the construction methods and design parameters that will maintain ground stability in order to prevent ground hazards from developing? - Are controls in place to keep the below work area clear of personnel/equipment so slope construction can proceed? - Are the equipment operators qualified and competent to execute the work at hand?

Excavation & Trenching	
Critical Control	Am I Implementing the Control Effectively?
Excavation & Trenching	<ul style="list-style-type: none"> - Is proper barricading and segregation established with adequate signage to keep all unauthorized personnel out of the work area? - Have protections and safeguards been installed to prevent collapsing? - Have entry and exit routes been established and are they adequate for the work at hand? - Have all utilities been identified, demarcated and documented by using the sites approved process?

**Scan the QR code below to access
Ground Failure**



Workplace exposure to substances that are immediately toxic, asphyxiating or corrosive (e.g. H2S gas, NO2 gas, CO gas, concentrated acids, caustic, etc.).

Critical Control	Am I Implementing the Control Effectively?
Atmospheric Monitoring	<ul style="list-style-type: none"> - Is personal air monitoring equipment in use, functioning properly, and within the designated breathing zone, where required?
Emergency Response	<ul style="list-style-type: none"> - Do I understand the evacuation procedures if an alarm (both personal and/or stationary) is triggered? - Can I recognize an upset condition that may warrant evacuation if no alarms are present?
Engineering Controls	<ul style="list-style-type: none"> - Are proper process controls (pH, temperature, cell voltage, ventilation, etc.) systems (including backups) functioning properly to prevent unintended release of hazardous substances? - Are chemical connections unique / locked to prevent mixing of incompatible materials? - Are eyewash stations / safety showers / wind socks available and functioning properly?
Storage and Distribution	<ul style="list-style-type: none"> - Are chemical process lines / storage containers in good condition and/or monitored through instrumentation to verify proper function (e.g. leak detection)? - Are high hazard process lines clearly labeled to indicate substance and flow direction?
Handling Requirements	<ul style="list-style-type: none"> - Are proper loading / unloading procedures being followed?

Critical Control	Am I Implementing the Control Effectively?
Work Practices	- Have I reviewed the SDS and do I understand the information (e.g. safe handling requirements, emergency safety procedures)?
PPE	- Is proper PPE for the task / area being used or quickly available (e.g. escape respirators)?
Barriers and Segregation	- Are restricted areas clearly signed and demarcated?

**Scan the QR code below to access
Hazardous Substances Acute**



Hazardous Substances— Chronic

Workplace exposure to substances that can cause lethal disease over time (e.g. silica, arsenic, lead, welding fumes, asbestos, acid mist, etc.).

Hazardous Substances Chronic General

Critical Control	Am I Implementing the Control Effectively?
Handling Requirements	<ul style="list-style-type: none"> - Do employees understand all of the chronic health hazards in the area? - Has the hazard been identified on a pre-task assessment or documented on the Workplace Exam? - Are physical controls (i.e. barriers) and signage in place to prevent unauthorized access? - Are personnel authorized to work in the area where the hazardous substance is present? - Is the lunchroom free of PPE and clean to help prevent the spread of contaminants?
PPE	<ul style="list-style-type: none"> - Are employees wearing the right level of respiratory protection for the work that is being performed? - Have employees ensured that the PPE is in good condition prior to use?
Engineering Controls	<ul style="list-style-type: none"> - Are break rooms or offices under positive pressure, sourced from clean air, and functioning properly?

Hazardous Substances Chronic Acid Mist

Engineered Controls	<ul style="list-style-type: none"> - Are there adequate mist suppressant controls in place to help reduce exposures? - Do employees understand the operational conditions required to achieve acceptable mist levels? - Is mist suppressant being added at the correct dosage? - Have employees verified that ventilation is providing adequate airflow?
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Hazardous Substances Chronic Silica & Heavy Metals	
Critical Control	Am I Implementing the Control Effectively?
Handling Requirements	<ul style="list-style-type: none"> - Are employees using vacuum systems or wet methods instead of shoveling, sweeping, or air lancing, where feasible?
Engineered Controls	<ul style="list-style-type: none"> - Do employees know what effective dust control looks like?
PPE	<ul style="list-style-type: none"> - Are employees wearing the right protective clothing?
Hazardous Substances Chronic Metal Fumes	
Handling Requirements	<ul style="list-style-type: none"> - Does the employee know the type of material they are welding on? - Has the surface been cleaned or have contaminants been removed prior to welding or cutting?
Engineered Controls	<ul style="list-style-type: none"> - Have exposures to other employees in the area been controlled? - Are fumes effectively controlled using localized exhaust ventilation, downdraft tables, or natural ventilation to help minimize or eliminate fume exposure?

Scan the QR code below to access Hazardous Substances Chronic



Interaction with unmanned, fixed and rotary wing aircraft.

Critical Control	Am I Implementing the Control Effectively?
Operator Competency	<ul style="list-style-type: none"> - Do all personnel have the required competency to operate this vehicle/equipment and perform this task (current operator license from appropriate aviation authority (FAA, TC, DGCA, etc.), Freeport-McMoRan training certificate, etc.)? - Are personnel fit for duty (compliant with drug and alcohol policy, well rested and free from fatigue, free from stressful work-related or personal concerns that could potentially distract them from working safely)? - Has a pre-operational inspection of the drone been completed prior to use and action taken where critical (safety) items have been identified?
Aircraft Suitability & Maintenance	<ul style="list-style-type: none"> - Is the appropriate drone type being used for the work purpose and flight conditions? - Are replacement LiPo batteries being stored properly during transport to the field (certified storage box, etc.)? - Is a fire extinguisher readily available in the field? - Does the drone meet all maintenance and airworthiness requirements? - Is the drone registration number and paperwork readily available?
UAS/UAV Pre Mission Planning	<ul style="list-style-type: none"> - Have launch path and land/return path been evaluated during route planning? - Does mission plan account for aircraft failsafe/return home/loiter contingencies? - Have applicable authorities (site leads, program manager, air traffic control, etc.) been contacted as necessary and authorization been provided? - Is software/firmware updated with the most recent version available?

Critical Control	Am I Implementing the Control Effectively?
UAS/UAV Pre Mission Planning Continued...	<ul style="list-style-type: none"> - Are non-participants briefed and excluded from launch/land/loiter areas? Note: all personnel in the flight path must be protected by structures or stationary vehicles. - Will line of sight be maintained throughout the flight where an injury could result from an accident? - In the event of a return to home contingency, will the flight path be clear of all obstacles and hazards, and can line of site be maintained? - Is a visual observer present if necessary? - Has a plan been developed to ensure unauthorized people/equipment will not enter the flight path/exclusion zone? - Are ground conditions adequate (stable, demarcated, approved pad, etc.) for aircraft in use? - Has a plan been developed to address inadequate conditions? Note: Consider improved/unimproved landing surface conditions. - Can the flight be conducted within the limitations of the drone (e.g. weather conditions, etc.)? - Is a plan in place in the event of weather degradation?
Communication	<ul style="list-style-type: none"> - Have all personnel confirmed that they are competent in the use of the positive communication devices available at the work/activity location? - Do all personnel have access to positive communication devices? - Is there an air traffic monitoring device in use? Note: a portable VHF receive only device is the only acceptable device for monitoring.

**Scan the QR code below to access
Interaction with Aircraft - Unmanned**



Interaction with manned, fixed and rotary wing aircraft.

Critical Control	Am I Implementing the Control Effectively?
Operator Competency	<ul style="list-style-type: none"> - Do all personnel have the required competency to operate this vehicle/equipment and perform this task (current operator license from appropriate aviation authority (FAA, TC, DGCA, etc.), Freeport-McMoRan training certificate, etc.)? - Are personnel fit for duty (compliant with drug and alcohol policy, well rested and free from fatigue, free from stressful work-related or personal concerns that could potentially distract me from working safely)? - Have personnel conducted a pre-operational inspection of the aircraft prior to use and taken action where critical (safety) items have been identified?
Aircraft Suitability & Maintenance	<ul style="list-style-type: none"> - Is the appropriate aircraft being used for the work purpose and flight conditions? - Have maintenance logs, weight and balance sheet, risk assessment, weather conditions, fuel status, and mission profile been reviewed, assessed, and approved? - Has other mission-related equipment been inspected and verified current / suitable for mission execution? (sling, cargo nets, etc.) - Is emergency equipment readily available on-board aircraft? - Does the aircraft meet all maintenance and airworthiness requirements?

Critical Control	Am I Implementing the Control Effectively?
UAS/UAV Pre Mission Planning	<ul style="list-style-type: none"> - Has primary and alternate flight route planning been conducted? - Does mission plan account for emergency conditions or contingencies enroute? - Have all passengers received an aircraft safety orientation and flight briefing? - Can the flight be conducted within the limitations of the aircraft (e.g. weather conditions, etc.)? - Is a plan in place in the event of weather degradation?
Communication	<ul style="list-style-type: none"> - Are Flight Operations and Flight Following confirmed operational? - Are all inter-cockpit communication devices available and operational for passengers?

Scan the QR code below to access Interaction with Aircraft - Manned



Exposure to loss of control of a load suspended by a crane (fixed or mobile), hoist, forklift, boom or other lifting equipment.

Critical Control	Am I Implementing the Control Effectively?
Pre-Shift Inspection	<ul style="list-style-type: none"> - Has a proper pre-shift inspection of the lifting equipment been completed?
Barriers & Segregation	<ul style="list-style-type: none"> - Are appropriate barricades erected around the lift to keep personnel out of the fall zone?
Communication	<ul style="list-style-type: none"> - Has a designated form of communication been established? - Have all personnel in a potential fall zone been notified?
Lifting Execution	<ul style="list-style-type: none"> - Has a critical lift plan and permit been completed and communicated, where required? - Has the weight, shape, and center of gravity of the load been verified and is it within the lifting capacity of the crane? - Are the appropriate lifting devices chosen and have they been inspected for the work environment/load?
Lifting Points	<ul style="list-style-type: none"> - Are lifting points in accordance with ASME or equivalent standards?
Pre-lift Meeting	<ul style="list-style-type: none"> - Has the lift team properly assessed the day of lift conditions? - Are tag lines, push/pull sticks available for use, where required?

Scan the QR code below to access
Lifting Operations



Personnel Hoisting

Contact with, exposure to, or unintended consequences related to the movement of people or equipment via hoisting or aerial tramways.

Critical Control	Am I Implementing the Control Effectively?
Pre-Shift Inspection	<ul style="list-style-type: none"> - Has the basket and all rigging been inspected for any damage? - Has a pre-op inspection of the crane been performed? - Has a unoccupied trial lift been performed (at 125 % of rated capacity) with the basket and rigging?
Barriers and Segregation	<ul style="list-style-type: none"> - Has the work area been barricaded or flagged off to prevent non-authorized entry?
Lifting Execution	<ul style="list-style-type: none"> - Has a lifting plan and/or pre lift meeting taken place to review the planned lift? - Has the man basket/personnel hoisting form been completed? - Are proper tie off procedures being used by personnel?

Scan the QR code below to access
Personnel Hoisting



Rail Collision

Locomotive, rolling stock, or other rail equipment colliding with or being hit by other vehicles, buildings, or equipment.

Critical Control	Am I Implementing the Control Effectively?
Access Control	<ul style="list-style-type: none"> - Have switches and derailleurs been inspected for proper operation? - Do personnel have the proper authorization to access the area(s)? - Are safe distances from the rail being adhered to?
Fit for Duty & Fatigue Management	<ul style="list-style-type: none"> - Are all personnel fit for duty and has leadership completed fit for duty checks?
Operator Competency	<ul style="list-style-type: none"> - Are operators up to date on all pertinent competencies?
Communication	<ul style="list-style-type: none"> - Are established communication devices in good working order and do all personnel on the rail have means of communication? - Are employees aware/trained of what actions need to take place if communication system(s) are lost?
Scheduling, Segregation & Rail Movement Control	<ul style="list-style-type: none"> - Has communication of scheduled rail movements been established between all rail crews and verified with the dispatcher? - Are train horns being used during rail movement? - Are derailer/rail switches set properly? - Is all rail equipment properly secured if being moved/pushed with another piece of equipment? - Are all adequate methods of stop controls implemented per the area requirements?
Signaling and Signage	<ul style="list-style-type: none"> - Are the required signals and signage in working order, legible and current with policies? - Are "clear" points visible and clearly demarcated?

Scan the QR code below to access
Rail Collision



Rail Impact on Person

Locomotive, rolling stock, or other rail equipment coming into contact with a person.

Critical Control	Am I Implementing the Control Effectively?
Access Control	<ul style="list-style-type: none"> - Are all present personnel authorized to be in the area? - Have all segregation points been established? - Have all "on rail" vehicles and rolling stock been reported to controllers? - Are safe distances from the rail being adhered to?
Fit for duty & Fatigue Management	<ul style="list-style-type: none"> - Are all personnel fit for duty and has leadership completed fit for duty checks? - Is the maintenance log book for the equipment up to date? - Has a pre-operational inspection been completed and all equipment free of defects?
Operator Competency	<ul style="list-style-type: none"> - Are operators up to date on all pertinent competencies?
Communication	<ul style="list-style-type: none"> - Are established communication devices in good working order and do all personnel on the rail have means of communication? - Are employees aware/trained of what actions need to take place if communication system(s) are lost? - Has all personnel received training on communication procedures?

Critical Control	Am I Implementing the Control Effectively?
Scheduling, Segregation & Rail Movement Control	<ul style="list-style-type: none"> - Has communication of scheduled rail movements been established between all rail crews and verified with the dispatcher? - Are all adequate methods of stop controls implemented per the area requirements? - Are train horns being used during rail movement? - Are derailleurs / rail switches set properly? - Have the rail cars been secured properly? - Is the work area protected/secured by a derailer or
Signaling and Signage	<ul style="list-style-type: none"> - Are the required signals and signage in working order, legible and current with policies? - Are "clear" points visible and clearly demarcated?

**Scan the QR code below to access
Rail Impact on Person**



Uncontrolled Release of Energy

Exposure to stored energy from pressure (e.g., pneumatic systems, steam, tires, etc.); Items under tension or compression (e.g., mooring lines, springs, counterweights, etc.).

Critical Control	Am I Implementing the Control Effectively?
Energy Isolation	<ul style="list-style-type: none"> - Have all potential sources of energy been verified, isolated and de-energized? - Has a state of zero energy been confirmed for all identified isolation points? - Have all potential control points been locked out with a site approved lock, employee identification tag and the system(s) tried out to verify that system has been de-energized? - Have all utilities (visible and concealed) been identified, demarcated and documented by using the sites approved process?
Barriers & Segregation	<ul style="list-style-type: none"> - Has the work area been adequately barricaded to keep all personnel out of harms way in the event that uncontrolled energy is released? - Have the barricades, barriers or guarding system(s) been inspected to ensure that the strength and integrity matches the potential hazards?
HDPE Handling	<ul style="list-style-type: none"> - Have all personnel involved with HDPE pipe handling received the required training? - Has all HDPE pipe been stored according to the HDPE Pipe Handling Policy and Guidelines? - Has the equipment being used to maneuver the pipe been verified for adequate lifting and pulling capacities? - Are all personnel maintaining a minimum distance of 50' from the HDPE pipe while it is being moved?
Pressure Vessels & Relief Valves (PRV's)	<ul style="list-style-type: none"> - Has the pressure vessel(s) undergone a thorough inspection and been certified by a competent individual? - Is there any visible damage to the pressure vessel(s) or the supporting structure? - Are the relief valve(s) arranged so that, in the event that the valve(s) opens, personnel will not be in the line of fire? - Has the relief valve(s) undergone a thorough inspection and been certified by a competent individual?

Critical Control	Am I Implementing the Control Effectively?
Pressure Vessels & Relief Valves (PRV's) Continued...	<ul style="list-style-type: none"> - Are all pressure gauges in working order and displaying pressures within permitted limits? - Do in-field instrumentation readings match the information displayed on computer monitoring/operating programs?
Mechanical Integrity of Hoses, Pipes & Equipment	<ul style="list-style-type: none"> - Have the piping, hoses and equipment connections been inspected for overall condition and mechanical integrity?
Tire Handling	<ul style="list-style-type: none"> - Has the wheel and tire assembly been inspected for any damage? - Has the tire been deflated to the correct pressure prior to any work commencing? - Is there an approved safety barrier/tire cage being used? - Is a serviceable inflation/deflation instrument being used and is the instrument properly calibrated? - Are tires inflated with a remote inflation line? - Are there risk management signs and/or JSA/JRA forms for outside personnel to review and sign off on prior to entering the area?
Tensioned Line Management	<ul style="list-style-type: none"> - Have tensioned lines been inspected prior to use for overall condition? - Does the tensioned line have the necessary strength/capacity rating?

**Scan the QR code below to access
Uncontrolled Release of Energy**



Exposure to toxic atmosphere or oxygen deprivation underground.

Critical Control	Am I Implementing the Control Effectively?
Refuge Chamber	<ul style="list-style-type: none"> - Is there a properly stocked refuge chamber within a 30 min walk of the work area? - Do personnel know the primary and secondary escape-ways to the portal or a refuge chamber from their work areas? - Can personnel access the sealing materials and do they know what to do with them? - Do personnel know the contents available in the emergency box? - Are personnel familiar with refuge chamber roles and responsibilities and where to access the checklist? - Are personnel familiar with the communication systems and how to reach the surface for help?
Self-Rescuer	<ul style="list-style-type: none"> - Do personnel have a self-rescuer on person or is it within 25 feet? - Have all self-rescuers been inspected to verify good working condition? - Do personnel understand when to put on and how to properly don a self-rescuer?
Ventilation	<ul style="list-style-type: none"> - Are ventilation systems functioning properly?

Critical Control	Am I Implementing the Control Effectively?
Gas Monitoring	<ul style="list-style-type: none"> - Is personal air monitoring equipment in use, functioning properly, and within the designated breathing zone, where required? - Do personnel understand the evacuation procedures if an alarm (both personal and/or stationary) is triggered? - Can personnel recognize an upset condition that may warrant evacuation if no alarms are present? - Do personnel understand the ventilation flows and fresh air sources in their work area and the fans that supply that air flow? - Are restricted areas locked to prevent unauthorized access?

Scan the QR code below to access Underground Hazardous Atmosphere



Underground Inrush

Exposure to crushing forces or oxygen deprivation caused by the sudden ingress of liquids or solids underground.

Critical Control	Am I Implementing the Control Effectively?
Draw-Point Management and Control	<ul style="list-style-type: none"> - Is draw control plan understood and being followed for draw points?
Barriers and Segregation	<ul style="list-style-type: none"> - Are drifts with potential inrush hazards being identified at entry points?
Ore Passes, Draw-Points, Chutes & Raise Controls	<ul style="list-style-type: none"> - Do personnel know how to identify potentially hazardous draw-points? - Have all affected employees been notified when processing wet muck? - Are proper ratios of wet and dry muck being mixed in the ore pass to avoid plugging of chutes? - Are controls in place for loading from wet chutes? - Are hung chutes ribboned and tagged? - Are procedures being followed to prevent too many buckets being placed into mud raises? - Is top of mud raise locked when not in use or when mucking out the bottom? - Is bottom of mud raise locked to prevent access when dumping into the top?

Scan the QR code below to access
Underground Inrush



Underground Rock Fall

Exposure to rock that falls from the back or
sidewalls underground.

Critical Control	Am I Implementing the Control Effectively?
Engineered Support Systems	<ul style="list-style-type: none"> - Are ground control systems in place? - Is work area free from rock slabs, baskets, severely corroded bolts, or expanding/changing cracks in the shotcrete? - Are support bolts showing signs of loading?
Geo Technical Inspections and Monitoring Systems	<ul style="list-style-type: none"> - Are areas of loose ground that cannot be corrected immediately ribboned and tagged to prevent unauthorized entry, supervision notified and noted on the work place exam?
Ground Control Management Plan	<ul style="list-style-type: none"> - Do personnel understand not to work under unsupported ground? - Has the area been inspected for adverse ground conditions? - When entering restricted areas are all ground control guidelines being followed? - Has a quarterly scaling plan been executed in your work area?
Scaling	<ul style="list-style-type: none"> - Has a work place exam been conducted including inspection of ground conditions? - Has all loose ground been mitigated? - Do personnel understand how to scale the back, ribs and to only use a scaling bar? - Is a clear escape route maintained during scaling? - Has adequate clean up been performed after scaling?

Scan the QR code below to access
Underground Rock Fall



Underground Shaft Hoisting

Exposure to falling objects, Entanglement and crushing hazards in a shaft

Critical Control	Am I Implementing the Control Effectively?
Engineered Hoisting Systems	<ul style="list-style-type: none"> - Are PMs performed, log books completed as well as reviewed, and signed by the supervisor - weekly? - Are chairs set before loading material onto the service cage? - Are cage procedures being followed and all personnel trained on the operation of the cage? - When personnel are on top of the cage performing inspections, is the cage only moving in a downward direction? - Are all personnel on top of the cage inside the hand-rails while the cage is in motion?
Barriers and Segregation	<ul style="list-style-type: none"> - Are mantrips prohibited when hoisting explosives or compressed gas cylinders? - Are warning signs posted at each station during shaft work? - Are flammable or combustible materials stored greater than 100ft from the shaft opening? (excludes daily use)
Communication	<ul style="list-style-type: none"> - Has the hoist operator confirmed communications to the conveyances? - Is there a Hoistman available to hear signals and the phone while personnel are underground? - Has the hoist operator communicated with previous shift about hoist conditions?

Scan the QR code below to access
Underground Shaft Hoisting



Vehicle Collision or Rollover

**Collision with another vehicle or fixed/
moving object; Driving over an edge; Rolling
over.**

Critical Control	Am I Implementing the Control Effectively?
Pre-Operational Check	<ul style="list-style-type: none"> - Have any issues identified on the pre-shift inspection been addressed and is the equipment/vehicle safe to operate? - Has the work area been inspected to identify any hazardous conditions and controls implemented where necessary? - Is the equipment functioning properly and being operated within design limits?
Human Factors	<ul style="list-style-type: none"> - Is the operator fit for duty? - Are seatbelts being worn properly?
Operator Competency	<ul style="list-style-type: none"> - Is the operator authorized to be working in the area? - Is the operator of the equipment/vehicle driving to the current and expected environmental conditions? - Are proper parking procedures being adhered to?
Road Design and Condition	<ul style="list-style-type: none"> - Are travel ways in good condition to safely operate equipment/vehicles? - Are equipment and light vehicle segregation protocols well defined and in use?
Communication	<ul style="list-style-type: none"> - Are clear communication processes established and being used properly? - Is signage visible and are hazards clearly marked?

Scan the QR code below to access
Vehicle Collision or Rollover



Vehicle Impact on Person

Person struck by vehicle/mobile equipment.

Critical Control	Am I Implementing the Control Effectively?
Pre-Shift Inspection	<ul style="list-style-type: none"> - Have any issues identified on the pre-shift inspection been addressed and is the equipment/vehicle safe to operate? - Is the equipment functioning properly and being operated within design limits?
Human Factors	<ul style="list-style-type: none"> - Is the operator fit for duty?
Operator Competency	<ul style="list-style-type: none"> - Is the operator of the equipment/vehicle driving to the current and expected environmental conditions?
Road Design and Condition	<ul style="list-style-type: none"> - Are segregation protocols between equipment/vehicles and ground personnel well defined and in use? - Is sufficient lighting available in congested areas?
Communication	<ul style="list-style-type: none"> - Is positive communication taking place to make people aware of tasks taking place that could create hazards?
Ground Personnel	<ul style="list-style-type: none"> - Are ground personnel using the designated walkways (if provided) as designed? - Are ground personnel wearing proper PPE (reflective vest) when working around equipment? - Are ground personnel in a position that could be impacted by a vehicle that loses control? E.g. Line of fire.

Scan the QR code below to access
Vehicle Impact on Person



	Blasting		Interaction w/ Aircraft
	Confined Space		Lifting Operations
	Contact with Molten Material		Personnel Hoisting
	Drowning		Rail Collision
	Entanglement and Crushing		Rail Impact on Person
	Exposure to Electrical Hazards		Uncontrolled Release of Energy
	Fall from Heights		Underground Hazardous Atmosphere
	Falling Objects		Underground Inrush
	Fire		Underground Rock Fall
	Ground Failure		Vehicle Collision or Rollover
	Hazardous Substances— Acute		Vehicle Impact on Person
	Hazardous Substances— Chronic		Underground Shaft Hoisting
	Maritime		