

Quarry Excavation and Screen Plant Operations

Business Name:		ABN:	
Business Address:			
Contact Person:	Phone:	Email:	

THIS RISK ASSESSMENT IS APPROVED BY THE PCBU ON THIS PROJECT

Under the Work Health and Safety Regulation (WHS Regulation), a person conducting a business or undertaking (PCBU) is required to ensure that a RISK ASSESSMENT is prepared before the proposed work starts.

Full Name:		
Signature:	Title:	Date:

CLIENT OR PRINCIPAL CONTRACTOR DETAILS

Client:	SCOPE OF WORKS
Project Name:	
Project Address:	
Project Manager:	
Contact Phone:	
Date Risk Assessment supplied to Project Manager:	



RISK MATRIX									
LIKELIHOOD	INSIGNIFICANT	MINOR	MODERATE	MAJOR	CATASTROPHIC	SCORE	ACTION	HIERARCHY OF CONTROLS	
ALMOST CERTAIN	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4 ACUTE			Elimination Remove the hazard.	
LIKELY	2 MODERATE	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4A ACUTE	DO NOT PROCEED	Substitution Replace the hazard.	
POSSIBLE	1 LOW	2 MODERATE	3 HIGH	4 ACUTE	4 ACUTE	3H HIGH	Review before work starts.	Isolation Isolate People from the hazard	
UNLIKELY	1 LOW	1 LOW	2 MODERATE	3 HIGH	4 ACUTE	2M MODERATE	Ensure control measures in place.	Engineering Isolate the hazard	
RARE	1 LOW	1 LOW	2 MODERATE	3 HIGH	3 HIGH	1L LOW	Monitor and keep records.	Administrative Change	
								PPE	

Risk Rating & Required Action:	
4A	Stop work. The risk is intolerable. Eliminate the hazard or redesign the activity before proceeding. A Safe Work Method Statement (SWMS) or higher-level authorisation is required.
3H	Review and approve additional controls before task starts. Senior supervisor sign-off needed.
2M	Ensure all nominated controls are in place and effective. Proceed with caution; monitor conditions.
1L	Proceed, following standard operating procedures. Monitor and keep records.

Consequence Scale:			
Consequence	People (injury/illness)	Project / Assets	Compliance / Reputation
Catastrophic	Fatality or permanent total disability	project shutdown	Significant regulator intervention; criminal prosecution
Major	Serious injury/illness (hospital > 5 days)	critical delay	Improvement notice; major media coverage
Moderate	Medical-treatment injury; lost-time > 1 day	moderate delay	Minor breach; adverse client comment
Minor	First-aid only, no lost time	negligible delay	Isolated non-conformance
Insignificant	No injury	no schedule impact	Deviation caught and corrected on site

Notes on Hierarchy of Controls:
Remember to apply controls in the preferred order shown by the coloured pyramid:

1. **Eliminate**
2. **Substitute**
3. **Isolate**
4. **Engineering**
5. **Administrative**
6. **PPE**

Always document **why** a lower-order control is accepted if elimination or substitution is not reasonably practicable.

aligned with Safe Work Australia's Managing the risk of fatigue at work (2023) and ISO 45001:2018 clauses 6–8.

JOB STEP	POTENTIAL HAZARDS	IR	CONTROL MEASURES	RR
SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
1. Governance, WHS Duties and Quarry SMS Integration	<ul style="list-style-type: none"> Lack of documented Safety Management System (SMS) specific to quarry excavation and processing operations Inadequate implementation of WHS Act 2011 duties by Officers, PCBUs and workers Poor integration of extraction, crushing, screen plant, froth flotation and tailings dam activities into one coordinated risk management framework Insufficient consultation with workers and Health and Safety Representatives (HSRs) regarding operational changes and process upsets Failure to monitor and review WHS performance indicators for quarry and process plant operations Inadequate change management for new or modified plant (e.g. Scorpion screen plant, additional flotation cells, new sand separation units) 	4A	<ul style="list-style-type: none"> Establish and maintain a site-specific Safety Management System (SMS) aligned with the WHS Act 2011, WHS Regulation, and relevant mining and quarrying Codes of Practice Define and document WHS roles, responsibilities and accountabilities for Officers, managers, supervisors, contractors and workers involved in quarry excavation, screen plant, froth flotation, sand separation, iron sulfide processing and tailings work Implement a formal risk management procedure (identify, assess, control, review) applied across all quarry and processing activities, including periodic formal risk assessments and bowtie analyses for critical risks Develop a documented change management (MoC) process requiring risk assessment, worker consultation and verification of controls before any modification to plant, process, layout or work methods Establish WHS objectives, KPIs and leading indicators (e.g. corrective actions closed, inspections completed, near-miss reports) and review them at senior management meetings Implement structured worker consultation mechanisms (toolbox talks, HSR forums, safety committees) with documented actions and feedback loops Undertake periodic independent audits of the quarry SMS and follow up with corrective action plans and management review 	3H
2. Organisational Structure, Competency and Training Systems	<ul style="list-style-type: none"> Inadequate supervision of quarry excavation, Scorpion screen plant and process plant operations Lack of formal competency requirements for operators, fitters, process technicians and tailings personnel Insufficient training in the specific hazards of froth flotation reagents, iron sulfide processing and sand separation systems Poor induction processes for contractors and short-term workers, leading to limited understanding of site rules and critical risks No ongoing verification of competency or refresher training for high-risk tasks and licence-required plant 	4A	<ul style="list-style-type: none"> Develop a formal organisational structure and responsibility matrix (RASCI) clearly defining supervision and escalation pathways for all operational areas Implement a competency framework mapping each role to required licences, tickets and site-specific competencies (e.g. quarry manager, shotfirer, process operator, tailings operator, mobile plant operator) Introduce a robust induction program covering site rules, critical controls, emergency procedures, hazardous chemicals and specific hazards of quarry excavation, screen plant and flotation circuits Implement a training and assessment system using nationally recognised units of competency where applicable and site-specific assessments (theory and practical) documented and retained Schedule periodic refresher training for high-risk activities (confined spaces, working at height, hazardous chemicals, isolation, mobile plant interaction) with competency reassessment Ensure training materials are developed in plain English with consideration for language, literacy and numeracy, and provide translation or coaching where required Introduce supervisor coaching and leadership training to enhance safety leadership, hazard recognition and enforcement of critical controls 	2M

JOB STEP	POTENTIAL HAZARDS	IR	CONTROL MEASURES	RR
SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
	<ul style="list-style-type: none"> Language, literacy and numeracy issues not adequately considered in training materials and communication 			
3. Mobile Plant, Traffic Management and Quarry Excavation Systems	<ul style="list-style-type: none"> Uncontrolled interaction between heavy mobile plant (excavators, loaders, dump trucks) and light vehicles or pedestrians in quarry pits and around screen plants Inadequate design, maintenance or signage of haul roads, tipping areas and stockpile faces leading to rollovers or engulfment Lack of formal systems for geotechnical assessment of pit faces, benches and batter slopes Poor visibility, blind spots and failure of proximity detection or communication systems Inadequate pre-start inspections and defect management for mobile plant Uncontrolled reversing, spotter use and parking practices near Scorpion screen plant and process area 	4A	<ul style="list-style-type: none"> Develop and implement a site Traffic Management Plan covering all quarry pits, haul roads, processing areas, workshops, offices and tailings facilities, including designated routes, speed limits and separation zones Design haul roads, ramps and tipping areas in accordance with recognised quarry design standards, including geotechnical input and periodic formal inspections Implement exclusion zones and controlled access systems around active excavation faces, stockpile areas and scorpion plant loading points with physical barriers and signage where practicable Standardise mobile plant fit-out with ROPS/FOPS, adequate lighting, reversing alarms, cameras and where possible proximity detection systems and two-way radio communication Introduce mandatory pre-start inspection checklist and defect reporting system (paper or digital) integrated with maintenance planning and lock-out for critical defects Establish procedures for safe tipping, bench development and stockpile management, including minimum term heights, stand-off distances and use of spotters under defined conditions Provide mobile plant operator training specific to the site, including traffic management rules, fatigue management and communication protocols 	3H
4. Fixed Plant Design, Guarding and Engineering Controls (Scorpion Screen, Crushers, Conveyors)	<ul style="list-style-type: none"> Inadequate guarding on conveyor at Scorpion screen plant, conveyors and transfer points resulting in entanglement, nip or crush injuries Failure of engineering controls such as emergency stop systems, pull-wire switches and interlocks Poor design or modification of fixed plant without engineering review and risk assessment Dust, noise and vibration levels not controlled at source leading to occupational illness and plant deterioration Access to moving parts for maintenance without effective isolation and verification systems 	4A	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	2M

JOB STEP	POTENTIAL HAZARDS	IR	CONTROL MEASURES	RR
SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
	<ul style="list-style-type: none"> Lack of standardisation of control interfaces and alarm systems across plant areas 		[REDACTED]	
5. Process Safety and Control of Froth Flotation, Sand Separation and Iron Sulfide Circuits	<ul style="list-style-type: none"> Uncontrolled process upsets in froth flotation leading to overflow, spillage or release of reagents Poor process control of sand separation leading to erosion, blockages or unexpected pressure surges Thermal, chemical or oxidation reactions associated with iron sulfides (e.g. spontaneous heating, acid generation) not adequately managed Inadequate instrumentation, alarms and interlocks on pumps, tanks, flotation cells and cyclones Lack of documented operating envelopes, setpoints and standard operating procedures (SOPs) for key process parameters Inadequate monitoring of critical process variables (flow, density, pH, DO reagent dosing) leading to instability and quality or environmental impacts 	4A	[REDACTED]	2M
6. Hazardous Chemicals, Reagents and Iron Sulfide Management	<ul style="list-style-type: none"> Inadequate identification and classification of flotation reagents, flocculants, pH modifiers and fuel oil Poor storage and segregation of incompatible chemicals leading to fire, explosion or toxic release Inaccurate or unavailable Safety Data Sheets (SDS) for chemicals and reagents used in flotation and sand separation Lack of formal hazardous chemical risk assessments and manifest management for quantities above threshold limits Inadequate controls for oxidation and acid generation from iron sulfides, leading to corrosive environments and potential environmental harm 	4A	[REDACTED]	2M

JOB STEP	POTENTIAL HAZARDS	IR	CONTROL MEASURES	RR
SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
	<ul style="list-style-type: none"> Insufficient training and emergency preparedness for chemical spills, leaks or exposure incidents 		[REDACTED]	
7. Tailings Dam Design, Operation and Stability Management	<ul style="list-style-type: none"> Inadequate geotechnical design, construction or monitoring of tailings dams leading to instability or failure Poor control of tailings deposition, water balance and freeboard levels Insufficient understanding of the geotechnical behaviour of tailings from froth flotation, sand separation and iron sulfide processing Inadequate inspection regimes for embankments, decant structures, spillways and seepage collection systems Lack of emergency preparedness for tailings dam incidents including overtopping, piping or structural failure Poor coordination between process water demand, tailings deposition rates and stormwater management 	4A	[REDACTED]	2M
8. Ground Control, Geotechnical and Pit Wall Stability	<ul style="list-style-type: none"> Unassessed geotechnical condition resulting in unexpected pit wall or bench failures Inadequate bench design, catch berms or pit slopes for prevailing geology and hydrogeology Poor drainage and water management leading to saturation and reduced stability of quarry faces Lack of systematic monitoring for cracks, slumps or movement in highwalls and batters Uncontrolled access under unstable faces or into exclusion zones Insufficient integration of blast design with geotechnical requirements 	4A	[REDACTED]	2M

JOB STEP	POTENTIAL HAZARDS	IR	CONTROL MEASURES	RR
SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
			[REDACTED]	
9. Maintenance Management, Isolation and Asset Integrity	<ul style="list-style-type: none"> Lack of a structured preventive maintenance program for mobile and fixed plant, flotation cells, pumps and tailings infrastructure Inadequate isolation and lock-out/tag-out systems during maintenance and fault-finding Use of unverified contractors or unlicensed personnel for high-risk maintenance tasks Poor management of plant defects leading to operation with bypassed or disabled safety systems Inadequate inspection of critical lifting equipment, pressure systems, tanks and structural components Insufficient planning of major shutdowns and maintenance campaigns, leading to time pressure and increased risk taking 	4A	[REDACTED]	2M
10. Health Hazards, Occupational Hygiene and Exposure Monitoring	<ul style="list-style-type: none"> Excessive exposure to respirable crystalline silica and other airborne contaminants from quarrying, crushing and sand separation Noise exposure from crushers, Scorpion screen plant, pumps and mobile plant exceeding exposure standards Dermal or inhalation exposure to flotation reagents, flocculants and sulfide-related by-products Heat stress in outdoor quarry pits and plant areas, particularly during summer and hot weather events Fatigue due to shift work patterns, extended hours and remote site access Inadequate health surveillance for workers exposed to high-risk agents (e.g. silica, noise, chemicals) 	4A	[REDACTED]	2M

JOB STEP	POTENTIAL HAZARDS	IR	CONTROL MEASURES	RR
SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
			[REDACTED]	
11. Emergency Preparedness, Incident Response and Rescue	<ul style="list-style-type: none"> Inadequate planning for emergencies specific to quarry excavation, processing plant and tailings facilities Poorly defined or untested response procedures for chemical spills, fires, plant entrapment and mobile plant incidents Insufficient capacity for first aid, on-site rescue and coordination with external emergency services Lack of effective communication systems in remote quarry areas and tailings dams Emergency equipment (fire systems, spill kits, rescue gear) not maintained or readily accessible Failure to learn from incidents, near misses and external industry events 	4A	[REDACTED]	2M
12. Contractor Management, Procurement and Supply Chain Controls	<ul style="list-style-type: none"> Contractors performing quarry processing or tailings work without adequate WHS systems or understanding of site critical controls Procurement decisions driven by cost, resulting in lower safety standards for plant, equipment or reagents Lack of integration of contractor activities into site traffic management, permit-to-work and emergency procedures Inadequate supervision and monitoring of contractor performance and compliance Poor control over delivery logistics, including heavy vehicle access, loading/unloading and interaction with operational areas 	3H	[REDACTED]	2M

JOB STEP	POTENTIAL HAZARDS	IR	CONTROL MEASURES	RR
SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
			[REDACTED]	
13. Documentation, Records, Inspections and Continuous Improvement	<ul style="list-style-type: none"> • Critical WHS procedures, plans and standards not documented or not kept up to date • Inadequate recordkeeping for training, inspections, maintenance and monitoring data • Irregular or ineffective safety inspections and behavioural observations • Failure to analyse WHS data (injuries, near misses, hazards, audits) to identify trends and opportunities for improvement • Loss of organisational knowledge during staff turnover or contractor changeover 	3H	[REDACTED]	1L
14. Remote and Isolated Work, Communication and Access Control	<ul style="list-style-type: none"> • Workers operating alone in remote quarry areas, tailings dams or process plants without reliable communication • Delayed emergency response due to lack of location awareness or ineffective check-in procedures • Unauthorised access to hazard areas such as highwalls, tailings embankments, reagent storage or plant rooms • Inadequate security and access control for after-hours or reduced-staff operations • Failure to manage visitor access and escort arrangements in high-risk operational zones 	3H	[REDACTED]	2M

EMERGENCY RESPONSE – CALL 000 FOR EMERGENCIES

Ensure to have an Emergency Management Plan in place as well as adequate numbers of trained first aid staff with easy access to fully stocked first aid kits, rescue equipment, material safety data sheets, adequate access to emergency communication equipment and fire-fighting equipment suitable for all classes of fire and ignition sources.

LEGISLATIVE REFERENCES

RELEVANT LEGISLATION AND CODES OF PRACTICE. DELETE THE LEGISLATIVE REFERENCES FOR ANY STATE THAT ARE NOT APPLICABLE

Queensland & Australian Capital Territory

Work Health and Safety Act 2011
 Work Health and Safety Regulations 2011
 Legislation QLD: <https://www.worksafe.qld.gov.au/laws-and-compliance/work-health-and-safety-laws>
 Codes of Practice QLD: <https://www.worksafe.qld.gov.au/laws-and-compliance/codes-of-practice>
 Legislation ACT: <https://www.worksafe.act.gov.au/laws-and-compliance/acts-and-regulations>
 Codes of Practice ACT: <https://www.worksafe.act.gov.au/laws-and-compliance/codes-of-practice>

Victoria

Occupational Health and Safety Act 2004
 Occupational Health and Safety Regulations 2017
 Legislation VIC: <https://www.worksafe.vic.gov.au/occupational-health-and-safety-act-and-regulations>
 Codes of Practice VIC: <https://www.worksafe.vic.gov.au/compliance-codes-and-codes-practice>

New South Wales

Work Health and Safety Act 2011
 Work Health and Safety Regulations 2025
 Legislation NSW: <https://www.safework.nsw.gov.au/legal-obligations/legislation>
 Codes of Practice NSW: <https://www.safework.nsw.gov.au/resource-library/list-codes-of-practice>

Western Australia

Work Health and Safety Act 2020
 Work Health and Safety Regulations 2022
 Legislation Western Australia: <https://www.commerce.wa.gov.au/worksafe/legislation>
 Codes of Practice WA: <https://www.commerce.wa.gov.au/worksafe/codes-practice>

Northern Territory

Work Health and Safety (National Uniform Legislation) Act 2011
 Work Health and Safety (National Uniform Legislation) Regulation 2011
 Legislation NT: <https://worksafe.nt.gov.au/laws-and-compliance/workplace-safety-laws>
 Codes of Practice NT: <https://worksafe.nt.gov.au/laws-and-compliance/codes-of-practice>

Safe Work Australia Links

Law and Regulation (All States): <https://www.safeworkaustralia.gov.au/law-and-regulation>
 Model Codes of Practice: <https://www.safeworkaustralia.gov.au/resources-publications/model-codes-of-practice>

South Australia

Work Health and Safety Act 2012 (SA)
 Work Health and Safety Regulations 2012 (SA)
 Legislation for SA: <https://www.safework.sa.gov.au/resources/legislation>
 Codes of Practice for SA: <https://www.safework.sa.gov.au/workplaces/codes-of-practice#COPs>

Model Codes of Practice

- Managing noise and preventing hearing loss at work
- Confined spaces
- Labelling of workplace hazardous chemicals
- Managing risks of hazardous chemicals in the workplace
- Welding processes
- First aid in the workplace
- Managing the risk of falls at workplaces
- Hazardous manual tasks
- Managing the risk of falls in housing construction
- Managing electrical risks in the workplace
- Demolition work
- Excavation work
- Work health and safety consultation, cooperation and coordination
- Managing the work environment and facilities
- How to manage work health and safety risks
- Managing risks of plant in the workplace
- Construction work

Tasmania

Work Health and Safety Act 2012
 Work Health and Safety (Transitional and Consequential Provisions) Act 2012
 Work Health and Safety Regulations 2012
 Work Health and Safety (Transitional) Regulations 2012
 Legislation for TAS: <https://worksafe.tas.gov.au/topics/laws-and-compliance/acts-and-regulations>
 Codes of Practice for TAS: <https://worksafe.tas.gov.au/topics/laws-and-compliance/codes-of-practice>

Details of permits, licenses or access required by regulatory bodies (add or delete as required):

- Permits from local council
- Authorisation to commence work
- Any required documents.