Isolation of Plant and Machinery

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

THIS RISK ASSESSMENT IS APPROVED BY THE PCBU OF THE 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:

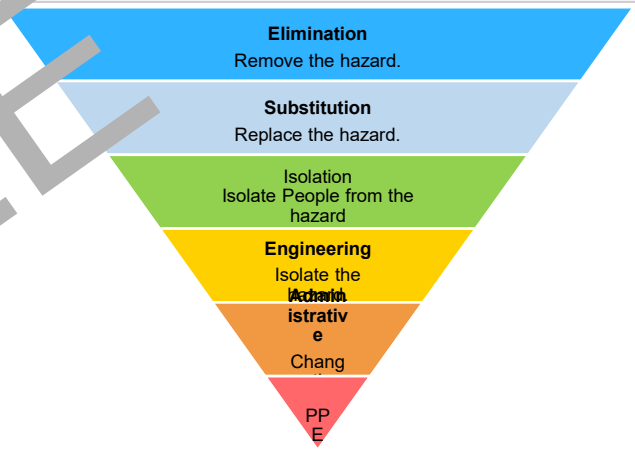
CLIENT OR PRINCIPAL CONTRACTOR DETAILS

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
ALMOST CERTAIN	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4 ACUTE		
LIKELY	2 MODERATE	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4A ACUTE	DO NOT PROCEED
POSSIBLE	1 LOW	2 MODERATE	3 HIGH	4 ACUTE	4 ACUTE	3H HIGH	Rev before work
UNLIKELY	1 LOW	1 LOW	2 MODERATE	3 HIGH	4 ACU	2M MO RATE	Ensure control measures in place.
RARE	1 LOW	1 LOW	2 MODERATE	3 HIGH	3 H	1L LOW	Monitor and keep records.

HIERARCHY OF CONTROLS



Risk Rating & Required Action:

4A	Stop work. The risk is intolerable. E inate the hazar redesign the activity before proceeding. A Safe Work Method Statement (SWMS) or hi er-level authorisati is required.
3H	Review and approve additional c rols b ask arts. Senior supervisor sign-off needed.
2M	Ensure all nominated controls are in ace and effe ive. 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, Legal Compliance and WHS Duties	• Lack of a documented isolation of plant and machinery procedure aligned with WHS Act 2011 and WHS Regulations • Officers not exercising due diligence to ensure isolation risks are identified, controlled and reviewed • Inadequate integration of isolation requirements into the organisation's WHS management system and other business systems (procurement, maintenance, projects, contractor management) • Failure to clearly allocate responsibilities for authorising, implementing, verifying and removing isolations • Inadequate consultation with workers, HSRs and contractors in developing isolation standards and procedures • No process to monitor legislative or standards changes relevant to energy isolation (e.g. AS/NZS and industry codes of practice) • Inconsistent appli tion of isolation requirements acro different business units lead lusion unsafe practices • Lack of documented criteria for en formal lock out–tag out (and permit-to-work are mandatory	High	• Develop, endorse and implement a corporate isolati of plant and machinery standard that clearly sets out legislative obligations under the WHS Act 201 nd WHS Regulations, including duties of PCBUs, officers, workers and contractors • Embed isolation requirements into the ove ching WH management system, ensuring alignment with AS/NZS 4801/ISO 45001 principles and any a lica industry codes of practice • Formally allocate and document roles, respons ities and au ities for isolation (e.g. isolation authority, authorised isolator, mit issuer, permi lder, ervisor, verifier) in policies, procedures and position descriptions • Establish a doc ented vernan e framework where WHS leadership committees regularly review isolation perfo ance, incid t trend audit fi ngs and improvement actions • Implement a al and st dards com nce register for isolation-related obligations and assign an owne review d u ate requirements at defined intervals or when legislation changes • Ensu sultati and participation of workers and Health and Safety Representatives in the develo ent review d testing of isolation procedures, including feedback loops from investigations and audits • ndat use o formal permit-to-work system for high-risk isolation activities (e.g. confined space entry on energised electrical systems where permitted, multiple energy sources, complex or shared olation • ndardise minimum isolation requirements across all operational sites while allowing for site-specific addenda to address unique plant and local conditions • Integrate isolation governance into change approval processes for new projects, new plant, major modifications and contractor engagements • Establish a requirement that officers receive periodic WHS briefings specifically covering isolation risks, legal duties and organisational performance data • Introduce key performance indicators (KPIs) and leading indicators for isolation management (e.g. number of isolations audited, percentage of non-conformances closed out on time, training completion rates) and link these to management performance reviews	Medium
2. Risk Management, Planning and Permit-to-Work Systems	• No formal risk assessment process for identifying isolation requirements for plant across its life cycle (commissioning, operation, maintenance, decommissioning) • Reliance on informal knowledge of isolations instead of documented, task-based risk assessments or job safety analyses • Inconsistent use, or complete absence, of a permit-to-work system for non-routine or high-risk isolation tasks	High	• Implement a formal risk management procedure requiring isolation hazards to be identified and assessed for all plant and machinery, referencing WHS Regulation requirements for plant risk management • Mandate task-based risk assessments (e.g. JSA, SWMS for high-risk construction work) for activities involving exposure to hazardous energies, ensuring isolation requirements are captured as specific controls • Establish a documented permit-to-work system for high-risk or non-routine work involving plant isolation, including clear criteria for when a permit is required and who can issue, receive and close permits • Develop risk assessment templates that specifically prompt for identification of all types of hazardous energy and verification methods (e.g. test for dead, zero pressure, locking and tagging, try step)	Medium

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	• Poor quality risk assessments that fail to identify all energy sources (electrical, pneumatic, hydraulic, kinetic, potential, thermal, chemical, process media) • Failure to plan for complex isolations involving multiple work groups, contractors or multiple energy sources • No systematic review of risk assessments after incidents, near misses or major plant changes • Over-reliance on generic procedures that do not reflect actual site conditions, resulting in gaps in isolation coverage • Permit systems that focus on paperwork completion rather than actual risk control and verification		• Require planning meetings (e.g. pre-start or isolation planning meetings) for complex isolations, with documented isolation plans and line diagrams where appropriate • Integrate plant isolation requirements into project planning, shutdown planning and maintenance planning processes, including scope definition and scheduling • Establish a process that triggers formal review and, if needed, re-validation of risk assessments and isolation procedures following incidents, significant near misses, design modifications or process changes • Provide training to supervisors and permit issuers on risk assessment quality, energy isolation principles and common failure modes, supported by examples from internal incidents and industry alerts • Periodically audit permits and associated risk assessments for quality, completeness and effectiveness of controls, feeding findings back into continuous improvement • Implement a centralised electronic permit and risk assessment system where practical, to improve visibility, tracking and cross-site consistency	
3. Design, Procurement and Engineering Controls for Isolation	• Procurement of plant that cannot be safely isolated or locked out in accordance with WHS legislative requirements and good practice • Lack of dedicated, clearly labelled isolation points such as lockable disconnects, isolation valves and emergency stops • Complex or concealed energy paths (e.g. stored hydraulic pressure, gravity loads, residual rotation) not accounted for in plant design • No requirement for suppliers to provide isolation instructions, energy schematics and residual risk information • Retrofit of plant without engineering review of isolation implications (e.g. guards, interlocks, automation, remote operation) • Dependence on administrative controls where engineering controls (e.g. positive isolation, lockable isolators, interlocks) are reasonably practicable • Incompatibility between isolation hardware supplied with plant and site-standard LOTO equipment	High	• Adopt and implement a procurement standard requiring that all new and modified plant include safe isolation capability (e.g. lockable isolators, isolation valves, bleed points, test points) consistent with relevant Australian Standards • Specify in purchase contracts that manufacturers and suppliers must provide clear isolation instructions, energy schematics and recommended LOTO arrangements for the plant, including information about residual risks • Require pre-purchase and pre-commissioning safety in design reviews that explicitly include hazardous energy identification and isolation capability assessments • Ensure engineering and project teams consult with end users, maintainers and WHS advisors when selecting plant and determining required isolation features • Standardise site LOTO hardware (locks, tags, hasps, lock boxes) and ensure compatibility of plant-mounted isolation devices (e.g. isolator handles, valve lockouts) with site standards • For existing plant, develop and implement engineering upgrade programs to retrofit lockable isolators, energy dissipation points, isolation valves and group lockout facilities where reasonably practicable • Require that control system interlocks and emergency stops are not relied upon as the primary means of isolation for maintenance; enforce positive isolation requirements in design documentation and procedures • Include verification of isolation features as a mandatory step in factory acceptance tests (FAT) and site acceptance tests (SAT) for new plant and major modifications • Establish a standard for labelling and signage of isolation points, including unique identifiers that align with P&IDs, single line diagrams and plant registers • Ensure that engineering change management processes capture and document any changes to isolation points, energy routes or system configurations, and that associated documentation is updated	Medium

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SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
	• Insufficient provision for group isolation and multiple lock points on shared systems			
4. Isolation Procedures, Standards and Documentation	• Absence of a formal, written isolation of plant and machinery procedure covering all energy types and modes of failure • Procedures that are overly generic, ambiguous or conflicting between departments or sites • Lack of documented isolation plans or standard isolation sheets for complex or critical plant • Procedures not reflecting actual plant configuration or current operating practices due to poor document control • No clear rules around personal locks, group locks, lock boxes, and contractor locks • Inadequate instruction/verification steps (e.g. testing for absence of energy, proving devices, try steps) leading to false assumption that plant is isolated • Isolation documentation not accessible at point of use or not understood by workers and contractors • Failure to define and document processes for removal of locks when a person is unavailable (e.g. left site, emergency removal protocol)	[redacted]	[redacted]	Medium
5. Training, Competency and Authorisation	• Workers, supervisors and contractors not adequately trained in principles of hazardous energy control and isolation requirements	High	[redacted]	Medium

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SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
	• Lack of a formal competency framework defining who may authorise, implement and verify isolations on different types of plant • Inadequate training for permit issuers and permit holders in isolation aspects of the permit-to-work system • Contractors assuming that their own company's isolation practices are acceptable without alignment to the PCBU's procedures • No refresher training or competency reassessment, leading to skill fade and outdated practices • Insufficient training in reading and understanding electrical single line diagrams, P&IDs and mechanical drawings relevant to isolation • Over-reliance on informal 'buddy' training without structured assessment and sign-off • Language, literacy or cultural barriers resulting in poor understanding of isolation rules and signage		[redacted]	
6. Lockout–Tagout Hardware, Tools and Asset Management	• Insufficient supply or poor quality of locks, tags, hasps, lock boxes and isolation devices, leading to workarounds and unsafe practices • Non-standard, duplicate or unlabelled locks that make it difficult to identify who is protected by an isolation • Use of shared keys or master keys that undermine personal control of isolation	Medium	[redacted]	Low

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SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
	• Lack of dedicated storage and control systems for LOTO hardware, resulting in loss, misuse or deterioration • Use of improvised isolation devices (e.g. cable ties, wire, tape) instead of purpose-designed hardware • No system to identify and manage defective isolation hardware or test instruments • Inadequate management of keys for fixed plant isolators, lock boxes and panel locks • Inconsistent use of tags to communicate isolation purpose, ownership and contact information		[redacted]	
7. Supervision, Behaviour and Safety Culture around Isolation	• Production and schedule pressures leading to bypassing or shortcutting of isolation procedures • Tolerance of informal practices such as 'live work' on plant that could reasonably be isolated • Supervisors not consistently enforcing isolation standards or failing to challenge non-compliance • Normalisation of deviance where minor breaches of isolation rules become accepted practice • Workers reluctant to stop work or question others when isolation is inadequate or unclear • Contractors operating under different cultural norms with less stringent isolation expectations • Failure to recognise and respond to early warning signs, near misses and low-level non-conformances	High	[redacted]	Medium

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	• Reward systems that prioritise output over safe isolation and compliance		[redacted]	
8. Contractor, Visitor and Third-Party Management	• Contractors implementing their own isolation processes without alignment to the PCBU's systems • Poor coordination of isolations on shared plant or services where multiple PCBUs are involved • Incomplete communication of isolation status to visiting specialists, OEM technicians or inspectors • Confusion about who has control of plant isolation during shutdowns or multi-employer worksites • Inadequate verification that contractor employees are trained and competent in isolation practices • Gaps in documentation when contractors perform isolations and de-isolations on behalf of the PCBU • Subcontractor activities not captured in permit-to-work or isolation planning processes • Language or cultural barriers between principal and contractors affecting understanding of isolation requirements	High	[redacted]	Medium

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			[redacted]	
9. Change Management, Projects and Modifications	• Plant modifications, upgrades or process changes implemented without assessing impacts on isolation methods and hazardous energy pathways • Temporary works, bypasses or jumpers installed during maintenance or projects and not adequately controlled or documented • Inadequate communication of changes in isolation points, labels or procedures to affected workers and contractors • Failure to update isolation documentation, drawings and risk assessments following changes • Project pressures leading to incomplete commissioning checks of isolation functions and interlocks • Use of commissioning or override modes that defeat isolation protections without appropriate authorisation and control • Management of change processes that do not capture isolation risks for software or control system changes	Mediu	[redacted]	Low
10. Inspection, Audit, Monitoring and Continuous Improvement	• Isolation systems degrading over time due to lack of monitoring and verification • Non-compliances with isolation procedures not detected or not acted upon • Reliance on lag indicators (e.g. injuries) rather than proactive checks of isolation effectiveness	Medium	[redacted]	Low

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	• Inconsistent audit methodologies between sites leading to variable standards • Failure to involve workers in reviewing isolation effectiveness and practicality • Poor data collection and analysis of isolation-related incidents, near misses and audit findings		[redacted]	
11. Emergency Preparedness, Incident Response and Recovery	• Lack of clear processes for safely managing plant in emergency situation where rapid isolation or controlled de-isolation may be required • Emergency respons[illegible] not addressing hazard[illegible] energy risks (e.g. unexpected restar[illegible] unstable pla[illegible] trapped energy) • Confusion about who can override remove isolations during an emer[illegible]cy and under what authority • Inadequate training of emergency response teams and first responders in site-specific isolation arrangements • Loss or damage of isolation devices during emergencies, leading to uncertainty about plant status during recovery • Poor communication of isolation status to external emergency services attending the site	Medium	[redacted]	Low

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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

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-of-codes-of-practice

Northern Territory
Work Health and Safety (National Uniform Legislation) Act 2011
Work Health and Safety (National Uniform Legislation) Regulations 2011
Legislation NT: https://worksafe.nt.gov.au/laws-and-compliance/workplace-safety-laws
Codes of Practice NT: https://worksafe.nt.gov.au/forms-and-resources/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

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.

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

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

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

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