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

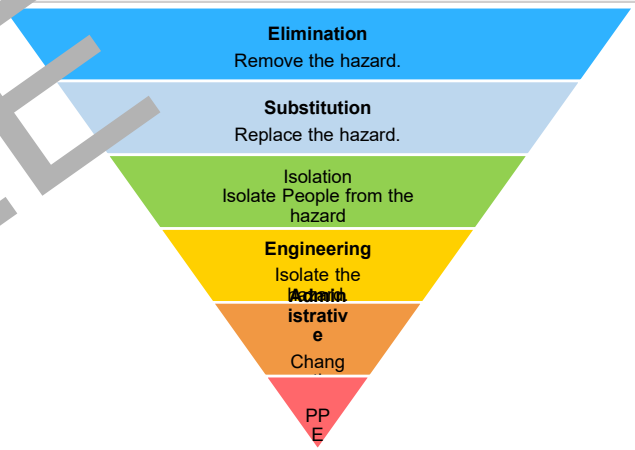
THIS RISK ASSESSMENT IS APPROVED BY THE PCBU OF THE PROJECT		
Under the Work Health and Safety Regulation (WHS Regulation), a person conducting a business or undertaking (PCBU) is required to ensure that a RISK ASSESSMENT is prepared before the proposed work starts.		
Full Name:		
Signature:	Title:	Date:

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, WHS Duties and Regulatory Compliance	• Failure to identify boilers as plant requiring higher-level WHS management under WHS Act 2011 and WHS Regulations • Lack of clear allocation of PCBUs' and officers' due diligence responsibilities for boiler safety • Absence of documented boiler safety management plan aligned with relevant Australian Standards (e.g. AS 2593, AS 1210, AS 4041) and state/territory codes of practice • Inadequate process to monitor changes in legislation, Australian Standards or regulator guidance relating to pressure equipment • Poor integration of boiler risks into the organisation's overall WHS management system and risk register • Insufficient resourcing (budget, peop time) allocated by senior management manage boiler-related risks • No formal process f consulting workers and Healt and Safety Representatives (I Rs) on bo fety matters	High	• Establish and maintain a documented Bo Safety Man ement Plan that sets out responsibilities, risk controls, inspection regimes, training and em ency a angements consistent with the WHS Act 2011 and WHS Regulations • Define and document WHS ties for officers, P Us, man ers, supervisors and workers in relation to boilers, including due diligence bligations and sig ff re ements for key decisions • Maintain a legal re ptur applicable WHS legislation, Australian Standards and regulator guidance for bo s and pr sure e oment, w assigned responsibility for monitoring updates and implementing anges • Inte te boile elated ks into the co porate WHS risk register with defined risk owners, review dates and p mance tors • Includ b r safe WHS objectives and KPIs for relevant executives and managers to drive accoun bilit nd res ce allocation Implem t for l consultation processes (toolbox talks, WHS committee meetings, pre-change bri s) pecifi ly covering boiler design, operation, maintenance and modification activities Conduc eriodic external or independent audits of boiler safety governance and compliance with WHS l islative requirements and applicable standards • Ensure procurement, engineering, maintenance and operations procedures reference and embed the legislative and standard requirements for pressure equipment	Medium
2. Design, Engineering and Boiler Selection	• Selection of boilers that are not fit f purpose or incompatible with site conditions, load profiles o ess requirements • Inadequate design verification and registration of design for higher-risk pressure equipment as required under WHS Regulations • Failure to incorporate inherent safety principles (e.g. appropriate safety margins, redundancy, and protection against over-pressure, over-temperature and dry firing) • Use of non-compliant materials, valves, fittings or controls that do not meet relevant Australian Standards	High	• Specify compliance with relevant Australian Standards and WHS Regulations for all boilers and associated pressure equipment in design and procurement documentation • Require independent design verification, design registration (where required) and certification by a competent engineer experienced in boiler and pressure equipment design • Adopt inherently safer design principles, including adequate safety factors, appropriate pressure ratings, over-pressure protection, temperature limits and interlocks to prevent dry firing and fuel accumulation • Standardise on reputable boiler and component manufacturers with proven compliance history, technical support and spare parts availability • Ensure engineering design reviews consider site-specific conditions such as ambient temperatures, water quality, fuel supply stability, emission requirements and load cycling • Integrate boiler control systems with site SCADA / DCS systems for centralised monitoring, alarm management and interlocking with upstream and downstream equipment	Medium

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
	• Insufficient consideration of water quality, fuel type, blowdown requirements and condensate handling in the design phase • Lack of engineered safeguards to prevent catastrophic failure (e.g. dual safety valves, pressure relief lines routed to safe locations, flame failure protection) • Poor integration of boiler control systems with site-wide process control, alarm and emergency shutdown systems		• Include in the design the provision for safe access, isolation points, blowdown and venting points, and monitoring devices (pressure, temperature, level, flow) for inspection and maintenance • Maintain all design documentation, calculations, drawings, certificates and registration details in an accessible engineering records system	
3. Procurement, Installation and Commissioning Management	• Procurement decisions driven solely by price without systematic evaluation of safety, reliability and lifecycle costs • Engagement of installation contractors or commissioning personnel without demonstrated competency in boiler and pressure equipment work • Inadequate review of vendor documentation, manuals and certificate prior to acceptance and commissioning • Failure to verify co[illegible]t installation of safety-critical devic[illegible]s (safety valves, level controls, inte[illegible]cks, eme[illegible] stops) • Lack of formal commissioning plan including functional testing of saf[illegible] systems and emergency [illegible]owns • No documented acceptance criteria or handover process for new or modified boilers	H[illegible]	• Imple[illegible]ent procur[illegible]ent procedure for boilers that includes mandatory WHS and technical evaluation criteria ([illegible]omp[illegible]nce, ce[illegible]fications, history of performance, support arrangements) [illegible]e-qua[illegible]fy boil[illegible] installers, service providers and commissioning engineers based on licences, qual[illegible]fi[illegible]s, references and safety performance Require detailed vendor documentation packages (manuals, certificates of compliance, material test c[illegible]ficates, wiring diagrams, control logic descriptions) as a condition of purchase • Develop and implement a commissioning plan that includes verification of all safety devices, alarms, trips and interlocks under simulated fault conditions before routine operation • Establish formal inspection and test records for installation and commissioning, reviewed and signed off by a competent person and site management • Use structured pre-startup safety review (PSSR) or management of change (MOC) checklists prior to first firing or re-commissioning after major modifications • Implement a documented handover process including training, asset registration, maintenance schedules, operating envelopes and emergency procedures	Medium
4. Plant Layout, Access and Safe Design of Work Environment	• Inadequate separation distances between boilers and other plant, combustible materials or occupied areas • Poor ventilation within boiler rooms leading to accumulation of combustion products or flammable gases • Restricted access and egress, including blocked or insufficient emergency exits from boiler houses	High	[redacted]	Medium

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
	• Lack of safe access platforms, ladders, handrails and walkways for inspection, testing and maintenance activities • Inadequate lighting, signage and labelling around boilers, valves, isolation points and emergency controls • Insufficient provision for noise control leading to hearing damage or communication difficulties in boiler areas • Poor housekeeping design, such as limited storage for chemicals and tools, increasing trip and fire risks		[redacted]	
5. Operational Management, Procedures and Supervision	• Absence of clear operating envelopes (pressure, temperature, loading, fuel type) for boilers • Inadequate or outdated standard operating procedures (SOPs) for norma operation, start-up, shutd and upset conditions at a syste evel • Inconsistent sup ision and oversight of boiler operations articu s shifts or remote sites • Poor control of changes to contro setpoints, alarm limits an ks by unauthorised personnel • Lack of systematic monitoring and review of boiler performance trends (pressure fluctuations, cycling, efficiency, trip frequency) that could indicate developing hazards • Reliance on single individuals with key operational knowledge rather than robust, documented systems	High	[redacted]	Medium
6. Competency, Licensing, Training and Information	• Use of personnel who do not hold the required HRW licence or competency for boiler operation where mandated	High	[redacted]	Medium

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
	• Inadequate initial and refresher training on boiler principles, hazards, controls and emergency procedures • Lack of site-specific inductions addressing local boiler configurations, interlocks and hazards • Insufficient training for supervisors, maintenance staff and contractors on boiler risk controls and safe systems of work • Poor communication of lessons learned from incidents, near misses and audits related to boiler operations • Inadequate record-keeping of licences, training and competency assessments		[redacted]	
7. Inspection, Testing, Maintenance and Reliability Management	• Inadequate preventive maintenance and inspection regimes for pressure parts, safety valves, controls and fuel systems • Failure to comply with statutory inspection and test intervals for boilers and pressure vessels • Deferred or reactive maintenance leading to deterioration, leaks or unsafe operation • Poor calibration and testing of safety devices, alarms and gauges • Use of unqualified contractors or in-house staff to perform critical inspection and maintenance tasks • Incomplete maintenance records and lack of traceability for defect history and repairs	High	[redacted]	Low

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
8. Hazardous Energy Isolation and Lockout Systems	• Uncontrolled release of steam, hot water, fuel gas, electricity or stored pressure during maintenance or inspection • Lack of standardised isolation and lockout procedures for the boiler and associated systems • Inadequate identification and labelling of isolation points for steam, feedwater, fuel, electricity and instrumentation • Bypassing or defeating interlocks and safety systems during testing or fault-finding without appropriate controls • Failure to verify zero energy state before commencing intrusive work	High	[redacted]	Medium
9. Process Safety, Monitoring, Alarms and Change Management	• Inadequate configuration, prioritisation and management of boiler alarms and trips leading to alarm flood or desensitisation • Changes to boiler hardware, software, fuel type or operating conditions implemented without formal risk assessment • Poor monitoring of critical process parameters that affect boiler integrity and efficiency • Lack of documented response expectations for operators when alarms or trips occur • Insufficient analysis of boiler trips, upsets and abnormal events to identify systemic issues	High	[redacted]	Medium
10. Water Treatment, Corrosion and Deposits Management	• Inadequate water treatment leading to scale formation, corrosion, foaming and carryover	High		Medium

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
	• Poor control of boiler blowdown practices at a system level, resulting in concentration of dissolved solids or wastage of energy • Failure to monitor and manage key water chemistry parameters (pH, hardness, dissolved solids, oxygen, alkalinity) • Use of inappropriate or incompatible water treatment chemicals • Lack of clarity around responsibilities between site personnel and external water treatment service providers		[redacted]	
11. Fuel Supply, Combustion and Explosion Risk Management	• Uncontrolled release of fuel gas or oil due to system failure, p intenance or incorrect isolation • Inadequate comb stion contr ding to incomplete com tion bon monoxide generation or explosion ris • Poor design or management of f storage and distribution s associated with boilers • Failure of flame detection, ignition systems or purge sequences without adequate safeguards • Lack of routine system-level checks on gas leak detection and ventilation effectiveness	High	[redacted]	Medium
12. Third-Party Interfaces, Contractors and Supplier Management	• Contractors performing installation, inspection or maintenance on boilers without adequate induction or understanding of site-specific risks	Medium	[redacted]	Low

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
	• Poor coordination between in-house staff and external providers leading to conflicting activities, duplicated isolations or missed hazards • Inadequate verification of contractor competence, licences and insurances for boiler-related work • Lack of clarity regarding responsibilities for statutory inspections, certification and record-keeping when using external providers		[redacted]	
13. Documentation, Records and Asset Information Management	• Loss, fragmentation or inaccessibility of critical boiler documentation (design, registration, inspections, maintenance, modifications) • Inaccurate or incomplete asset registers for boilers and associated pressure equipment • Poor configuration control of drawings, manuals and control system documentation • Inability to demonstrate compliance with WHS and statutory requirements due to inadequate record	Medium	[redacted]	Low
14. Emergency Preparedness, Response and Incident Management	• Inadequate planning and preparedness for boiler-related emergencies such as ruptures, fuel leaks, fires or explosions • Lack of clear roles, responsibilities and communication channels during boiler emergencies • Insufficient training and drills for workers and emergency responders specific to boiler incidents	High	[redacted]	Medium

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
	• Poor post-incident investigation and follow-up, leading to recurrence of boiler-related events		[redacted]	
15. Health, Hygiene and Environmental Management	• Exposure of workers to heat stress, noise, combustion products or boiler treatment chemicals • Inadequate management of emissions, blowdown water and chemical discharges impacting the environment • Insufficient monitoring of air quality and noise levels in and around boiler plant • Lack of integration of boiler health and environmental risks into broader organisational programs	Medium	[redacted]	Low

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