

Atmospheric Monitoring and Gas Detection

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:	

SAMPLE

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. WHS Governance, Legal Compliance and Duty of Care	<ul style="list-style-type: none"> Lack of documented WHS policies specific to atmospheric monitoring and gas detection Failure to identify and apply relevant WHS legislation, regulations, Codes of Practice and Australian Standards (e.g. confined spaces, hazardous chemicals, plant, ventilation) Unclear roles, responsibilities and accountabilities for atmospheric monitoring and gas detection Inadequate consultation with workers and Health and Safety Representatives (HSRs) on gas-related risks No formal process to review and update the atmospheric monitoring system in line with regulatory or industry changes Inadequate due diligence by Officers under WHS Act 2011 regarding atmospheric risks (toxic gases, oxygen deficiency, asphyxiation) 	4A	<ul style="list-style-type: none"> Develop and implement a WHS governance framework that explicitly covers atmospheric monitoring, gas detection and work in oxygen-deficient or potentially asphyxiating atmospheres Ensure a documented legal register capturing relevant WHS legislation, regulations, codes and standards for atmospheric monitoring, hydrogen sulphide (H₂S), methane, pressurised gas systems, hazardous chemicals and ventilation requirements Define and document clear WHS roles and responsibilities for PCBUs, Officers, managers, supervisors, safety personnel and workers with respect to gas detection and air quality monitoring Establish formal worker consultation mechanisms (HSR forums, toolbox talks, safety committees) to review atmospheric risks and controls on a scheduled basis Implement a WHS due diligence program for Officers, including periodic briefings on atmospheric monitoring systems, control controls and incident trends Schedule regular management system reviews and internal audits to verify compliance with WHS Act 2011 and associated regulations for atmospheric and confined space hazards 	3H
2. Risk Management Framework for Atmospheric Hazards	<ul style="list-style-type: none"> Inadequate formal risk assessment process for atmospheric environments Failure to identify potential sources of hazardous atmospheres (H₂S, methane, oxygen deficiency, VOCs combustion products) Inconsistent use of risk assessment tools between departments or sites Failure to consider reasonably foreseeable abnormal conditions (loss of ventilation, plant failure, unexpected gas release) No systematic re-assessment after incidents, near misses or significant process changes Risk assessments focusing on tasks only, not on system and organisational failures 	4A	<ul style="list-style-type: none"> Implement a structured risk management procedure for atmospheric hazards in line with WHS Regulation and ISO 31000 principles, including identification, analysis, evaluation and treatment Develop standardised atmospheric risk assessment templates that require consideration of air quality monitoring, oxygen levels, flammable gases (e.g. methane) and toxic gases (e.g. H₂S) Require multi-disciplinary participation (operations, maintenance, safety, engineering) in all high-risk atmospheric environment risk assessments Mandate review and update of risk assessments whenever there is a change in process, ventilation, plant layout, chemical usage or control systems that may affect air quality Integrate atmospheric risk assessments into broader hazard registers and critical risk control programs, rather than standalone one-off assessments Apply a formal change management and risk review process following any atmospheric incident, gas alarm, near miss or ventilation failure event 	2M

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3. Atmospheric Monitoring Strategy and Design	<ul style="list-style-type: none"> Atmospheric monitoring regime not aligned with actual risk profile (frequency, locations and scope inappropriate) Failure to adequately monitor for oxygen deficiency or enrichment in confined or enclosed spaces Insufficient monitoring for hydrogen sulphide in high-risk process areas or where decomposition may occur Inadequate methane gas monitoring in areas with potential for flammable or explosive atmospheres Over-reliance on single-point or portable monitoring where fixed systems are required Monitoring locations not representative of worker breathing zones or worst-case build-up areas No formal strategy for short-term exposure peaks versus time-weighted average exposures 	4A	<ul style="list-style-type: none"> Develop a documented atmospheric monitoring strategy based on risk assessments, specifying monitoring locations, parameters (O₂, H₂S, methane, CO, VOCs etc.), durations and trigger levels Conduct engineering and ventilation reviews to determine appropriate placement of fixed gas detectors, sampling points and air quality sensors within all relevant work areas Classify areas by atmospheric risk (e.g. normal, confined, high-risk/confined) and specify mandatory monitoring types and frequencies for each classification Incorporate both fixed and portable gas detection systems where appropriate, ensuring redundancies in high-risk hydrogen sulphide, methane and oxygen-deficient environments Set alarm setpoints and response levels based on applicable exposure standards (e.g. Workplace Exposure Standards) and flammable limits, with documented rationale Establish periodic review of the monitoring strategy using incident data, alarm logs and process changes to validate adequacy of monitoring coverage and sensitivity 	2M
4. Selection, Specification and Procurement of Gas Detection Equipment	<ul style="list-style-type: none"> Selection of gas detectors that are not fit for purpose or not rated for the specific gases and environmental conditions Procurement decisions based primarily on cost rather than technical suitability and reliability Incompatibility between different brands or models leading to data collection and maintenance complexity Failure to specify intrinsically safe equipment where required in hazardous areas Inadequate consideration of battery life, durability, ingress protection and usability in actual field conditions Lack of documented performance specifications, approvals and certifications for devices 	3H	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	1L

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5. Maintenance, Calibration and Reliability Management of Gas Detection Systems	<ul style="list-style-type: none"> Inadequate maintenance system leading to undetected failures of sensors, alarms or data logging functions Failure to calibrate gas detection devices at required intervals or according to manufacturer specifications Use of out-of-date calibration gases or improper calibration procedures Lack of functional bump testing prior to use of portable gas detectors Poor tracking of device status, repair history and recall notices Unreported or unresolved faults, bypassed alarms or disabled detectors in critical areas 	4A	[REDACTED]	2M
6. Atmospheric Risk Identification, Hazard Registers and Mapping	<ul style="list-style-type: none"> Incomplete identification of locations where oxygen deficiency, H₂S or methane accumulation may occur Lack of formal atmospheric hazard register or mapping of high-risk zones Failure to differentiate between routine, non-routine and emergency atmospheric risks Unrecognised hazards from process by-products, decomposition, fusion or cleaning chemicals Outdated hazard information not reflecting modifications to plant, ventilation or work processes 	3H	[REDACTED]	1L
7. Ventilation and Engineering Controls for Air Quality	<ul style="list-style-type: none"> Inadequate general or local ventilation resulting in accumulation of toxic, flammable or asphyxiating gases Poor design or positioning of exhaust and supply vents leading to dead zones or recirculation of contaminants 	4A	[REDACTED]	2M

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	<ul style="list-style-type: none"> Reliance on temporary or ad hoc ventilation solutions for ongoing work activities Failure of mechanical ventilation systems without adequate monitoring or alarms Inadequate consideration of worst-case scenarios such as simultaneous equipment operation or process upset Lack of engineering controls for pressurised gas environments, leading to uncontrolled releases 		[REDACTED]	
8. Training, Competency and Behavioural Controls	<ul style="list-style-type: none"> Workers and supervisors lacking competency in atmospheric monitoring principles and gas detector use Misinterpretation of gas detector readings, alarm levels and trends Complacency or normalisation of deviance regarding low-level gas alarms or minor ventilation issues Inadequate training in recognition of symptoms of H₂S exposure, oxygen deficiency or asphyxiation risks No formal competency assessment or refresher training for gas detection and atmospheric risk management Failure to train contractors to the same standard as employees 	4A	[REDACTED]	2M
9. Procedures, Permits and Work Authorisation for Hazardous Atmospheres	<ul style="list-style-type: none"> Lack of formal procedures for work in oxygen-deficient, potentially asphyxiating or pressurised gas environments Inconsistent or inadequate permit-to-work processes for confined spaces and other high-risk atmospheric locations Work commencing without verification of current atmospheric test results or validity of monitoring equipment Failure to define clear access controls, isolation requirements and monitoring 	4A	[REDACTED]	2M

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	frequency for hazardous atmosphere work • Procedures that are overly complex, ambiguous or not aligned with actual work practices		[REDACTED]	
10. Emergency Planning, Alarm Response and Rescue Capability	• Lack of clear organisational response plan to gas alarms, ventilation failures or suspected atmospheric contamination • Delayed or inappropriate evacuation due to confusion or alarm fatigue • Insufficient rescue capability for workers incapacitated in oxygen-deficient or H ₂ S-rich environments • Inadequate communication systems for alerting workers in remote or noisy areas of atmospheric emergencies • Failure to coordinate emergency response with external services who may be unfamiliar with site-specific gas hazards	4A	[REDACTED]	2M
11. Health Surveillance, Exposure Monitoring and Medical Management	• Chronic or repeated low-level exposure to toxic gases not being identified or managed • Lack of systematic recording and analysis of personal exposure data for gases such as H ₂ S • No health surveillance program for workers with significant atmospheric exposure risks • Inadequate medical response capability for acute exposures, asphyxiation events or inhalation injuries • Failure to provide medical practitioners with information about specific atmospheric hazards and exposure scenarios	3H	[REDACTED]	1L

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			[REDACTED]	
12. Contractor, Visitor and Third-Party Management	<ul style="list-style-type: none"> Contractors undertaking work in hazardous atmospheres without equivalent controls or training Incomplete transfer of information about site-specific atmospheric hazards and gas monitoring requirements to third parties Visitors entering or transiting near high-risk atmospheric areas without appropriate awareness Subcontractor use of unapproved or incompatible gas detection equipment 	3H	[REDACTED]	1L
13. Data Management, Trend Analysis and Continuous Improvement	<ul style="list-style-type: none"> Gas detection data, alarm records and exposure results not systematically collected or analysed Missed trends indicating deteriorating ventilation performance or increasing gas emissions Inability to demonstrate compliance with WHS Act 2011 due to poor recordkeeping Lack of feedback loop from incident investigations into system improvements 	3H	[REDACTED]	1L
14. Change Management, Design Review and Project Integration	<ul style="list-style-type: none"> New projects or plant modifications introducing atmospheric risks that are not properly assessed Decommissioning or relocation of ventilation or monitoring equipment without adequate risk review 	3H	[REDACTED]	1L

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	<ul style="list-style-type: none"> Changes to chemical use, process parameters or pressurised systems affecting gas generation or dispersion patterns Installation of new enclosures, barriers or buildings reducing natural ventilation and increasing risk of oxygen deficiency or gas accumulation 		[REDACTED]	
15. Remote, Isolated and After-Hours Work in Hazardous Atmospheres	<ul style="list-style-type: none"> Workers undertaking atmospheric monitoring or work in hazardous atmospheres without immediate assistance or supervision Delayed emergency response for lone or remote workers exposed to H₂S, methane or oxygen-deficient atmospheres Inadequate communication and location tracking systems for workers in remote or complex facilities Lack of clear escalation pathways when abnormal readings occur outside of normal business hours 	4A	[REDACTED]	2M

SAMPLE

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.