Hazard & Operability Study

Couple of takeaways

- Hazard studies are a living, lifecycle process, not one-off workshops.
- HAZID and HAZOP (Technical and Construction) are applied at different project phases to progressively sharpen risk and opportunity focus.
- Findings are captured in Hazard Study Records, with only selected high-risk or residual items escalated to the Project Risk Register.
- Effective studies rely on structured prompts, skilled facilitation, and active multidisciplinary participation.

What Is The Purpose Of This Procedure?

This procedure establishes a Hydro Tasmania Group (Hydro) unified, multi-disciplinary framework for identifying, assessing, and managing project risks and opportunities across the project lifecycle. It integrates Hazard Identification (HAZID) & Hazard and Operability study (HAZOP) processes.

What Is The Scope Of This Procedure?

This procedure applies where activities may introduce, change, or interact with safety, operational, or environmental risk, including but not limited to:

- Process, energy system, control / automation changes or modifications.
- Construction Projects, in accordance with WHS Reg 292.
- Contractor appointed to manage a Hydro workplace.
- Interfaces with live plant or safety critical systems.
- Software / firmware changes to Programmable Logic Controller / Supervisory Control and Data Acquisition / automation.
- Alarm philosophy changes, or network segmentation that may alter interlocks, alarms, or SIS behaviour.

How Does This Procedure Fit Into the Overall Risk Management Framework?

This procedure is a core component of the Integrated Risk Management Framework (IBRM), which ensures risks and opportunities are systematically identified, assessed, and controlled across the project lifecycle and collectively address risks across the full asset lifecycle, including design, construction, operation, maintenance, decommissioning, demolition, and disposal.
Incorporating several complementary processes:

- Safety in Design: Eliminates or minimises hazards during the design phase.
- Environmental Impact Assessment: Evaluates environmental risks and ensures compliance with regulatory obligations.
- WHS Risk Management: Identifies and controls workplace hazards to protect personnel.
- Management of Change: Assesses risks associated with changes before implementation.

These processes work in conjunction with HAZID and HAZOP Studies. Outputs are captured through Hazard Study Record, with selected high-risk or residual items escalated to the Project Risk Register.

Progressive and Iterative Approach

This progressive and iterative approach applies to HAZID and HAZOP, representing a progressive sharpening of focus, moving from broad considerations (HAZID) to technical systems (Technical HAZOP) and finally to physical human interaction (Construction HAZOP).

Hazard studies are adaptive and iterative, not one time events. They begin early in the project and remain active throughout, being revisited whenever conditions change or the project risk profile evolves.

Hazard Study Lenses

Hazard studies may be undertaken as HAZID, Technical HAZOP, or Construction HAZOP, with the study type selected to suit the nature of the risk being considered and the project phase.

HAZID: Focuses on macro level hazards and high level project opportunities (e.g., site optimisation).

HAZOP: Applied through two complementary lenses depending on the focus of the review: Technical and Construction.

- Technical HAZOP: Examines technical integrity and potential process deviations and improvement opportunities including:
  - Process or system deviations affecting safety, reliability, or operability
  - Design simplification opportunities
  - Maintenance access and lifecycle supportability considerations
  - Control system logic or automation behaviour affecting safe operation
  - Alarm rationalisation impacts and alarm management effectiveness
  - Cybersecurity posture adjustments influencing operability and safety
- Construction HAZOP: Addresses constructability, physical execution, and human interaction during installation and commissioning. Identifies hazards and improvement opportunities including:
  - Construction sequencing or access constraints affecting safe installation
  - Temporary conditions or interfaces with live plant
  - Lifting, installation, or spatial conflicts
  - Installation efficiency improvements
  - Opportunities to reduce commissioning complexity or downtime.

How Are Study Tiers Defined?

There are two tiers of study, based on project risk and complexity:

Tier 1 – Trained HAZOP Facilitator Led Study (High Risk):

- Required for projects with complex systems, safety instrumented system changes, or multi-contractor simultaneous operations.
- Must be led by a trained facilitator to ensure structured hazard identification and operability analysis.

Tier 2 – Project Team Facilitator Led Study (Lower Risk):

- Available for projects with minor design changes, isolated energy sources, or single-trade activities.
- Can be completed by the project team using guide words and prompts provided in this procedure and supporting documents.
- The project team facilitator does not require formal training, but must still follow the systematic process, complete, and align with the intent of this procedure.

Tier 1 studies (HAZID, Technical HAZOP, or Construction HAZOP) are triggered when any of the following apply:

High-energy or hazardous systems:

- Hydraulic or process fluids: >200 psi.
- Hydraulic tools or equipment: > 2000 psi
- High-voltage electrical systems: >1000 V AC or >1500 V DC or lower-voltage systems capable of high fault energy.

Mechanical, electrical, or process changes:

- New or revised P&IDs, electrical single-line diagram, modifications to switchboards or electrical components.
- Major process logic changes, or changes affecting process safety equipment.

Control and instrumentation changes:

- Safety instrumented system modifications, protection or interlocking changes, emergency stop or shutdown logic updates.
- Major PLC / SCADA revisions.

Construction complexity or multi-contractor operations:

- Construction Projects in accordance with WHS Reg 292.
- Contractor appointed to manage a Hydro workplace.
- SIMOPS or High-risk work requiring SWMS under Reg 299 where site works are expected to exceed 5 working days, or significant interface issues across trades.

Civil or structural impacts:

- Modifications affecting access, lifting, load-bearing structures, excavations greater than 1.5 meters, or structural integrity, including water-retaining structures (e.g., dams, spillways, penstocks, embankments, or other major civil infrastructure).

Safety, environmental, or operational procedures:

- Changes impacting isolation philosophy, energisation or shutdown arrangements, emergency response, or environmental controls.

For detailed examples and criteria, see "When Are Studies Triggered?" later in this procedure. When in doubt, escalate to Tier 1 or seek advice from a trained Facilitator.

How Are Study Sessions Prepared?

Study preparation and integration follow a structured approach for HAZIDs and HAZOPs to ensure both targeted reviews and overall project risk coverage.

Preparation Steps

Job Manager:

- Determines if the study is Tier 1 or Tier 2 using the trigger criteria.
- Reviews the Integrated Hazard and Operability Study Preparation Guide.
- Engages Facilitator and Scribe.

Job Manager and Facilitator, collaboratively:

- Populates the Integrated Hazard and Operability Study Presentation Template
- Confirms relevant design drawings and technical documentation are sufficiently developed to support the hazard study.
- Confirms required roles (such as Subject Matter Experts, Contractors).
- Develops the Presentation Template slides with details such as:
  - Nodes, guide / prompt words to promote & support structured discussions, while allowing facilitator judgement to maintain engagement.
  - Where beneficial, including high level "Causes of Failure" prompts to support deviation credibility testing and safeguard selection during HAZID and HAZOP (e.g. equipment failure, control system failure, human error, external events, construction / temporary works related failures).
- Share the study pre-read package at least 2 working days before the session, allowing participants time to familiarise themselves and come prepared to contribute.

Holistic Integration

Holistic integration ensures that hazards and opportunities identified through HAZID and HAZOP are considered collectively rather than in isolation. While studies may initially focus on discrete portions of the project or specific equipment, a holistic review across HAZID and HAZOP must be completed at critical milestones to ensure:

- All process, system, and interface risks are considered collectively.
- Opportunities for design improvement and construction efficiency are captured.

No study is considered closed until the asset is formally handed over to Operations and any residual risks are communicated to Operations and as required Portfolio Managers, supported by documenting in the Site and / or Operational Risk Registers.

Minimum cadence: Revisit at each phase gate and after any hard trigger; monthly review recommended for high activity projects.

How Are Study Findings Recorded?

All findings from HAZID and HAZOP are captured in the Hazard Study Record by the Scribe, documenting hazards, opportunities, deviations, potential consequences, existing controls, and recommended actions, ensuring a complete and traceable record of the workshop, serving as the primary record of the study.

Escalation to Project Risk Register:

- Hazards or issues requiring cross-project visibility, higher-level review, formal approval, or retaining residual risk are escalated to the Project Risk Register.
- All other findings remain fully documented in the Hazard Study Record.

Key Benefits of This Approach:

- Provides a single centralised record of HAZID and HAZOP discussions and outcomes.
- Supports structured follow-up, accountability, and evidence for audits or phase-gate reviews.
- Keeps escalation to the Project Risk Register focused and deliberate, avoiding unnecessary duplication or population.
- Preserves full detail of hazards, opportunities, and reasoning in the Hazard Study Record while maintaining a lean project-level view.

How Are Actions Managed And Closed?

- The Job Manager supported by the Hazard Study team converts findings and recommendations into defined, SMART actions.
- The Job Manager discusses and assigns actions to actioners with agreed target (due) dates.
- The Actioners complete the assigned action/s and provide closure evidence (e.g., photos, updated drawings) to the Job Manager.
  - Specific: Define exactly what you want to achieve, focusing on who, what, where, and why.
  - Measurable: Use metrics (numbers, data) to track progress and know when the action is met.
  - Achievable: Ensure the action is realistic given the project resources, time, and skills.
  - Relevant: Ensure the action aligns with broader business objectives and the project, and that the level of risk is appropriate for the project's complexity.
  - Time-bound: Set a specific target (due) date for completion.
- The Job Manager verifies closure evidence, saves it to the project SharePoint and documents the action closure in the Hazard Study Record and updates the Project Risk Register as required for any escalated items.

What Are The Phase Gate Requirements?

Phase gate requirements apply to HAZID and HAZOP, as appropriate to the project phase and risk profile.

Before advancing phases, the Job Manager must ensure that the appropriate hazard studies have been conducted as per the triggers, findings recorded, and relevant actions either closed or progressed sufficiently to control hazards moving into the next project phase, including:

Concept and Feasibility: strategic hazards and opportunities logged; Safety in Design principles considered and where appropriate applied.

Preliminary Design (approximately 30% complete): major interface risks addressed; early safety instrumented system considerations documented.

Detailed Design (approximately 90% complete): safety instrumented system logic validated; all design-related actions closed.

Procurement and Fabrication: vendor risks assessed; documentation verified; Project Risk Register updated for package changes.

Construction: Safe Work Method Statements in place; simultaneous operations risks mitigated.

Pre-commissioning: temporary energisation risks closed; isolation and test procedures verified.

Commissioning: safety instrumented system validation completed; interlock recommendations closed; operational readiness confirmed.

Handover: all Project Risk Register items closed, or residual risks transferred to the Site Risk Register; evidence verified.

Operations (Ongoing): residual risks monitored; Management of Change triggers Project Risk Register updates; lessons learned captured.

Checklists

Two mandatory checklists are provided to support assurance at key project lifecycle phases where a HAZID or HAZOP study is triggered. These checklists do not replace hazard studies; rather, they provide a structured and collaborative means of confirming that hazard study outcomes have been appropriately reviewed, understood, and addressed prior to progressing to the next lifecycle phase. The checklists are typically completed at the conclusion of the relevant hazard study.

Commissioning Readiness: Where commissioning activities are undertaken, the Hazard Study Commissioning Readiness Checklist shall be completed to verify that commissioning-related hazards, safeguards, and actions identified through hazard studies have been implemented and communicated.

Handover Readiness: Prior to the transfer of responsibility to Operations or the next lifecycle owner, the Hazard Study Handover Readiness Checklist shall be completed to confirm readiness for handover.

Where a formal hazard study is not required based on the project or change risk profile, completion of these checklists is not mandatory and may be applied at the discretion of the responsible Job Manager, Commissioning Manager, Project Director or Asset Owner.

When Are Studies Triggered?

To support effective and consistent hazard management, the following Lifecycle Trigger Matrix serves as the definitive reference for hazard study (HAZID and HAZOP) trigger requirements in each project phase.

Lifecycle Trigger Matrix

Project Phase	HAZID		Technical and Construction HAZOP	
	Hard Triggers *Study Required*	Soft Triggers *HSR Review Required*	Hard Triggers *Study Required*	Soft Triggers *HSR Review Required*
Concept & Feasibility Phase	• Initial definition of scope or site selection • Introduction of new processes, technologies, or hazardous materials • New site, remote location, or major site layout change -layout change • Regulatory drivers requiring early safety and environmental consideration	• Neighbouring infrastructure discoveries • Scope or concept still shifting • Incomplete site or geotechnical information • Early signs of environmental, community, or infrastructure constraints	• Concept includes new control/automation strategy • Planned tie ins to live or legacy systems	• Operating philosophy still unclear • Draft flow logic or mass-balance still evolving • Uncertainty around legacy system interfaces
Preliminary Design (relevant design drawings and technical documentation are sufficiently developed to support the hazard study generally 30% complete)	• Layout, equipment selection, or system changes that affect hazards • Modification of safety-critical systems • New confined spaces / hazardous atmospheres / fall risks	• Key design parameters still moving • Emerging congestion or access issues • Known but unresolved inter-disciplinary risks	• Changes to flow paths, process logic, interlocks, or shutdowns • Significant human-machine interface impacts • Known cross discipline interface risks	• Control narratives incomplete or inconsistent • Early modelling shows unstable behaviour • Cross-discipline coordination still forming
Detailed Design (relevant design drawings and technical documentation are	• Cumulative design changes revising earlier risk assumptions • Deviations from the preliminary design that alter safety basis	• Late vendor information impacting requirements • Physical fit, access, or maintenance concerns emerging	• Final design drawings and technical documentation available for structured review • SIS, shutdown logic, or E-stop design changes	• Discrepancies between drawings, logic, or specifications • New information influencing original process assumption

sufficiently developed to support the hazard study generally 90% complete)			• PLC / SCADA architecture updated	
Procurement & Fabrication	• Vendor packages introduce new hazards / conditions • Change of vendor / specification • Off-site prefabrication	• Manufacturing tolerances affecting performance • FAT/SAT details unclear • Documentation mismatches with the design intent	• Vendor packages alter control / automation / interlocks • Affect control architecture / safety functions • Risk of documentation / config mismatch	• Late supplier clarifications • Late clarifications, substitutions, or alternative equipment • Questions about integration of vendor logic/controls
Construction	• High-risk methods (confined space, HV, excavation) • SIMOPS, temporary systems / sequencing introducing hazards • Temporary energisation or high risk sequencing (e.g., partial commissioning during construction) • Any temporary energisation or pressure testing during construction	• Permit scope changes • Method or sequence changes affecting risk • Emerging congestion or access issues onsite • Weather, environmental, or site constraints elevating risk	• Control overrides or bypasses • Any modification impacting permanent safety systems • Construction Project in accordance with WHS Reg 292 • Contractor appointed to manage a Hydro workplace • Multiple workgroups in same footprint, lifts >75% capacity or over live equipment, physical tie-in to live systems	• Access changes; methodology changes; transition to live-asset status, emerging SIMOPS conflicts or unexpected sequencing changes • New SIMOPS interactions • Forced sequencing or access changes during construction
Pre-commissioning	• First fills, energisation, pressure testing, or temporary logic • Temporary commissioning configurations • Pressure testing	• Provisional or incomplete control logic • Vendor test requirements raising new risk conditions • Documentation gaps affecting readiness	• Test results deviating from design intent • Pre-op testing / simulation introduces new deviations • Risks with incomplete / provisional logic	• Upstream / downstream systems not fully ready • Unexpected alarms, responses, or early test anomalies
Commissioning	• Introduction of live energy/materials • Non standard or staged start up procedures • Untested interfaces or system handovers	• Operator or maintainer concerns raised during runs • Temporary or improvised workarounds • Unexpected operational behaviour during ramp-up	• First automatic / interlocked operation • Full integration with live or legacy systems • Risk of unexpected behaviour due to incomplete commissioning data	• Alarm bursts, instability, or tuning issues • Differences between expected and actual plant response

Handover	• New procedures, responsibilities, or emergency response arrangements • Changes to access, isolation, or operational controls	• Late documentation changes • Training gaps or operator unfamiliarity	• Commissioning modifications affecting logic or safety functions	• Ergonomic / accessibility issues raised by operators • Maintenance access limitations identified during walkthroughs
Operations (Ongoing)	• Modifications (MOC triggers) • Aging, obsolescence, or declining equipment reliability • Adjusted throughput or operating envelope changes	• Early trends showing drift from normal operation • Recurring minor issues or near-misses • Frequent manual overrides or bypasses	• Operational changes affecting control / SIS integrity • Software / firmware updates impacting safety logic • Recurring incidents / near misses / deviations	• Alarm rationalisation findings or nuisance trends • Unusual operating patterns • Informal operator workarounds becoming routine

How Is The Methodology Applied To Each Study?

To maintain the effectiveness of the hazard study process, each study utilises structured prompt or guide words to stimulate the identification of both hazards and opportunities.

This approach ensures that high risk activities, operational interfaces, and lifecycle considerations are systematically considered, including:

Hazardous materials and exposures: e.g., asbestos, noise, silica, polycyclic aromatic hydrocarbons, welding fumes.

Electrical and energy hazards: including live equipment and stored energy.

Safe access and interfaces: covering workers, the public, and underground or concealed services.

Traffic, transport, and heavy vehicle movements: within and adjacent to the worksite.

Confined spaces and work at height: with elimination or minimisation measures applied where practicable.

Lifting, rigging, and crane operations: including planning and coordination.

Isolation points and energy control: for mechanical, electrical, hydraulic, and pneumatic systems.

Chemical storage, handling, and bunding: ensuring compliance and safe practices.

Asset lifecycle considerations, including maintenance, monitoring, decommissioning, and operability impacts.

Note: Prompt and guide words provide the required structure for the study and are to be applied throughout. **Facilitators** are encouraged to exercise professional judgement in adapting the approach to sustain engagement and effective collaboration, while maintaining alignment with the intent of the process.

HAZID

Uses high-level prompts to identify strategic, location-based, and external risks that could influence feasibility, safety, cost, schedule, or approvals. Promoting early identification of hazards and opportunities for inherently safer and more efficient design.

Examples:

Category	Guide Words (Prompts)	Potential Opportunity
Site / Environment	Geotechnical, Flooding, Seismic, Protected Species	Can we reposition assets to reduce excavation costs?
Logistics / Access	Transport routes, Weight limits, Neighbouring land	Can we use local resources to reduce the carbon footprint?
Strategic / Legal	Permit requirements, Land rights, Heritage, Approvals	Can we combine permits to accelerate the schedule?
Inherently Safer Design	Hazard Elimination, Energy Reduction	Can we eliminate high pressure systems through design?

Refer to the Hazard and Operability Study – Preparation Guide for the full list of guide words. Additional prompts may be introduced to address project-specific considerations.

Technical HAZOP

Systematically examines deviations from design intent using structured guide words to identify potential failure modes, operability issues, and safeguards. The level of detail increases as the design matures.

Examples:

Category	Guide Words	Potential Opportunity
Flow / Pressure	Water hammer, overpressure, burst pipes	Can we optimize pipe diameters to reduce pumping energy?

Control Logic	Spurious trips, fail to close valves	Can we simplify the logic to reduce instrument count?
Materials	Corrosion, erosion, incompatibility	Can we use low maintenance materials for hard to reach areas?
Human Interface	Ergonomics, valve height, labelling	Can we move high maintenance items to grade (ground level), handrails, stairs and technology, design to enable remote maintenance, maintenance and decommissioning?

Refer to the Hazard and Operability Study – Preparation Guide for the complete list of guide words. Project-specific prompts may be added as required.

Construction HAZOP

Evaluates how the work will actually be performed, focusing on interfaces between activities, people, equipment, and live systems.

Examples:

Category	Guide Words	Potential Opportunity
SIMOPS	Congestion, Multiple trades, Shared craneage	Can we reschedule work to reduce site density?
Energy Interface	Live Tie ins, Residual pressure, Back feed	Can we use "Plug and Play" connectors to reduce hot work?
Environment	Dust, Spill risk, Weather window, Noise	Can we modularize components off site to reduce site impact?
Movement	Heavy lifts, Restricted access, Access way	Can we use permanent structures for early construction access?
Commissioning	Flushing, Testing, Dry vs. Wet runs	Can we use temporary test loops to compress the schedule?

Refer to the Hazard and Operability Study – Preparation Guide for the full list of guide words. Additional prompts may be included to reflect construction methodology or site-specific risks.

How Are Study Findings Finalised?

Every finding from the methodology follows the Action Lifecycle to ensure it is not lost:

- Every Hazard or Opportunity is recorded in the Hazard Study Record during the workshop or review session.
- Where an action is identified, an actioner and a target (due) date are assigned by the Job Manager.
- An action can only be marked as "Closed" when the Actioner provides documented evidence demonstrating completion (e.g., photos of installation, updated design drawings or technical documentation, or signed-off procedures). The Job Manager must verify the evidence and formally close the action in the Hazard Study Record.
- High-risk or residual hazards requiring escalation have been recorded in the Project Risk Register by the Job Manager.
- Before Pre-commissioning, Commissioning, and Handover, the Hazard Study Records are reviewed by the Job Manager.
  - This ensures every relevant "Living Study" actions have been verified in the "As Built" environment prior to proceeding to the next phase.
- Any Residual Risks identified during the 'Living Study' that require ongoing operational management must be formally briefed to the Operations Team and documented in the Site and/or Operational Risk Registers prior to and reviewed as part of the Handover.

Note: The Integrated Hazard & Operability Study 'Preparation Guide and Presentation Template' includes Study Finalisation Review Prompts to assist on the day studies.

How Is The Procedure Maintained As A "Living" Framework?

To ensure this process does not become a static historical record, the following "Living" protocols apply:

- If the "As Built" site conditions differ significantly from the "As Risked" design (e.g., a pipe is rerouted around an obstruction), the Job Manager must retrigger a targeted Study review.
- At the end of each project phase, the Job Manager shall review the "Opportunities" captured in the Hazard Study Record to determine if they can be applied as "Lessons Learned" for future projects.
- A project is not considered "Complete" until the Job Manager audits the and verifies all actions from each Hazard Study is marked as closed.

What Is Your Role in the Hazard Study?

The success of a hazard study depends on clearly defined roles, appropriate training, and active participation. The below outlines the key roles, accountabilities, and training expectations for each participant in the hazard study process.

Job Manager

The Job Manager is responsible for ensuring the hazard study is properly planned, resourced, and aligned with project objectives.

Key responsibilities and characteristics include:

- Engage the appropriate Facilitator and Scribe to lead and record the study effectively.
- Ensure the appropriate personnel, documentation, and facilities are available for the study.
- Confirm that the study level (Tier 1 or Tier 2) is appropriate for project risk and complexity.
- Actively participate as required to provide project context, clarify technical or operational assumptions, and support timely decision-making.
- Ensure all relevant disciplines are represented (mechanical, electrical, civil, safety, environmental, operations, controls, etc.) and that their input is considered.
- Ensure that agreed actions, recommendations, and follow-up items from the hazard study is addressed and verified in a timely manner.
- Reinforce the importance of hazard studies as a critical part of project safety , environmental and operational integrity.

*The **Job Manager** provides project leadership, resources, and coordination to ensure hazard studies are conducted effectively and that outcomes are implemented.*

Facilitator

The Facilitator is responsible for guiding the hazard study to ensure it is complete, structured, and effective.

Key Responsibilities and Characteristics

Training and Competence

- Formally trained in HAZOP Facilitation or Leadership.
- Competent in hazard study methodology, including the use of guide words and prompts.

Independence (Tier 1 Studies)

- Where possible, should be independent from the design or construction being studied to maintain objectivity.

Leading the Hazard Study

- Directing the session:
  - Ensures all hazards, operability issues, and opportunities are identified.
  - Ensures critical areas are not overlooked.
- Team dynamics and engagement:
- Encourages participation from all team members, actively drawing out quieter participants.

- Manages dominant or overly passionate contributors to maintain productive discussion.
- Keeps the study focused on objectives while allowing structured exploration of ideas.
- Applies strong judgment and adaptability to balance discussion depth with project timelines and study scope.

Communication and Documentation

- Clearly communicates with the study team and project stakeholders.
- Documents decisions, rationale, and outcomes in the hazard study report.

*The **Facilitator** is central to the success of the hazard study, ensuring the process is thorough, balanced, and actionable.*

Scribe

The Scribe is responsible for accurately capturing the discussions, decisions, and outputs of the hazard study.

Key responsibilities and characteristics include:

- Recording of hazards, operability issues, deviations, opportunities, and agreed actions in the hazard study record.
- Support the Facilitator ensuring the study remains structured and that all discussion points are captured without influencing the technical content.
- Capture guide words, prompts, and any additional observations raised during the study.
- Maintain a neutral perspective, recording discussions objectively without bias.

*The **Scribe** plays a critical supporting role, enabling the **Facilitator** and study team to focus on hazard identification and analysis while ensuring a complete and accurate record of the study.*

Participants

Participants provide the technical and operational expertise required to identify hazards, operability issues, and improvement opportunities during the study.

Key responsibilities and characteristics include:

- Contribute knowledge from their area of responsibility (mechanical, electrical, civil, instrumentation, safety, environmental, operations, etc.).
- Participate fully in discussions, raising potential hazards, deviations, and opportunities for improvement.
- Share insights constructively, respect differing perspectives, and work as part of a multi-disciplinary team.
- Respond to guide words, prompts, and queries to ensure all potential issues are considered.
- Provide recommendations, clarifications, and technical validation where required.
- Help ensure the study covers all relevant systems, processes, and interfaces without unnecessary tangents.

***Participants** are critical to the success of a hazard study, as their expertise and input ensure comprehensive identification and analysis of hazards and opportunities.*

Additional Key Hazard Study Roles

WHS Representative

Responsible for providing work health and safety expertise to ensure hazards are identified and mitigated.

- Advises on compliance with WHS legislation and organisational safety standards.
- Highlights potential human factors, ergonomics, and operational safety risks.
- Contributes to control selection and verification of mitigation measures.
- Supports the facilitator and study team in assessing risks from an operational safety perspective.

Environmental Representative

Provides environmental management expertise to identify potential environmental hazards and compliance requirements.

- Advises on regulatory and environmental controls, permits, and monitoring obligations.
- Identifies hazards relating to emissions, discharges, waste, and sensitive receptors.
- Ensures environmental considerations are integrated into study outputs.
- Supports follow-up actions related to environmental management.

Technical / Engineering Experts

Provides discipline-specific technical knowledge for hazard identification.

- Mechanical, electrical, civil / structural, instrumentation, control, process, and software / automation experts.
- Validate design assumptions, operational logic, and constructability issues.
- Contribute to identifying deviations, hazards, and operability challenges during HAZID, Technical HAZOP, and Construction HAZOP.
- Assist in developing mitigation options and verifying technical feasibility.

Project / Site / Construction Manager

Ensures construction, implementation, and project execution perspectives are considered.

- Provides insight into scheduling, sequencing, and interfaces between trades or contractors.
- Advises on constructability, temporary works, and access constraints.
- Ensures relevant SWMS and high-risk activities are addressed.
- Coordinates resources and ensures hazard study outcomes are incorporated into project planning.

Asset Owner / Operations Representative

Provides asset knowledge and operational experience to support hazard identification.

- Advises on operational procedures, maintenance requirements, and equipment limitations.
- Identifies potential operational risks and opportunities for efficiency improvements.
- Ensures recommendations are practical and aligned with ongoing asset management.

Contractors / Third-Party Representatives

Provides practical insight from contractor perspectives where work is outsourced.

- Contribute knowledge of execution methods, risks, and constraints.
- Advise on interface hazards between multiple contractors and project teams.
- Support integration of contractor activities into the hazard study.

MES (Manufacturing / Maintenance / Engineering Systems) Representative

Provides systems knowledge related to production maintenance, control, or production systems.

- Advises on automation, SCADA, PLC, or software logic risks.
- Supports identification of operational or interface hazards affecting system performance.
- Ensures system-level considerations are captured in study outcomes.
- Contributes to recommendations or mitigation measures for system-related hazards.

Heritage / Cultural Representative

Provides expertise on heritage, archaeological, or culturally sensitive areas impacted by project activities.

- Advises on regulatory and preservation requirements.
- Identifies potential hazards or risks related to cultural or heritage protection.

Ensures mitigation measures are considered and documented.

Who Should Participate?

Project Phase	Study Types	Required	Strongly Recommended	Optional (Context Dependent)
Concept & Feasibility	HAZID / Technical HAZOP	• Area Ops & Maintenance Reps • Asset Owner • Engineering Reps • Portfolio Owner • Job / Business Case Manager • Environment + Heritage Rep • WHS Rep	• Project Director	• Contractor / Subcontractor Reps. • OEM / Vendor Reps.
Preliminary Design (~30%)		• Area Ops & Maintenance Reps • Asset Owner • Engineering Reps. • Portfolio Owner • Facilitator & Scribe • Job Manager	• Enviro Rep • WHS Rep	• Contractor / Subcontractor Reps. • OEM / Vendor Reps. • Project Director
Detailed Design (~90%)		• Area Ops & Maintenance Reps • Engineering Reps. • Project Director • Facilitator & Scribe • Job Manager	• WHS Rep. • Enviro Rep. • Asset Owner	• Contractor / Subcontractor Reps. • OEM / Vendor Reps.
Procurement & Fabrication		• Engineering Reps. • Facilitator & Scribe • Job Manager	• Area Ops & Maintenance Reps • Project Director • WHS Rep. • Enviro Rep. • Asset Owner	• Contractor/Subcontractor Reps • OEM / Vendor Reps.
Construction	Construction HAZOP	• Area Ops & Maintenance Reps • Asset Owner • Engineering Reps. • Portfolio Owner/s • Job Manager • Site / Outage / Construction Manager	• Commissioning Manager	• OEM / Vendor Reps. • Commercial

		• WHS Rep. • Environment + Heritage Rep. • Facilitator & Scribe • Work Supervisors • Key Contractor / Subcontractor Reps		
Pre-commissioning & Commissioning	Construction HAZOP	• Area Ops & Maintenance Reps. • Asset Owner • Engineering Reps. • Portfolio Owner/s • Job Manager • Site / Outage / Commissioning/ Construction Manager • WHS Rep. • Facilitator & Scribe • Work Supervisors • Key Contractor / Subcontractor Reps.	• Enviro Rep . • Commissioning Manager	• OEM/Vendor Reps. • Commercial
Handover	HAZID / Construction HAZOP	• Area Ops & Maintenance Reps • Asset Owner • Engineering Reps. • Site / Outage / Construction Manager • Job Manager • Facilitator & Scribe	• Portfolio Owner/s • WHS Rep. • Work Supervisors	• Key Contractor / Subcontractor Reps.
Operations (Ongoing)	HAZID / Technical HAZOP / Construction HAZOP	• Area Ops & Maintenance Reps • Asset Owner • Job Manager • Facilitator & Scribe	• WHS Rep. • Engineering Reps.	• Contractor / Subcontractor Reps. • OEM / Vendor Reps.

Participation Exceptions & Special Requirements

Scenario	Requirement / Action
Missing "Required" Participants*	The **Job Manager & Facilitator** must assess if the study's integrity is at risk.
Exclusion of Roles**	If a standard "Required" role is deemed non applicable (e.g., EPC or Greenfield), a WHS Variance Request is mandatory.
Contractor Managed Workplaces***	Interfaces, reliance assumptions, and the transfer of WHS responsibilities must be documented in both the PRR and contractual documentation.

Detailed Guidance

1. (Unplanned) **Non Attendance of Required Participants**

If a required participant is absent, the **Job Manager, Facilitator**, (and **WHS Partner** for Construction Studies) must decide:

- If the knowledge is critical: Defer the session or carve out that specific scope for a later date.
- If the session proceeds, endorsement: Obtain approval from the Senior Accountable Manager (typically **Project Director / Team Leader**) before starting.
  - Record the absence, endorsement, rationale, and assumptions in the Hazard Study Record.

2. **Formal Exclusion of Required Participants**

In cases where a standard participant role is not applicable to the scope:

- Seek approval from the Senior Accountable Manager (typically **Project Director / Team Leader**).
- The **Job Manager** must lodge a WHS Variance Request, add the endorsing Manager to the "watch list" section of the WHS Variance Request to ensure oversight.

3. **Contractor Managed Workplace**

Where a contractor is appointed to manage a Hydro workplace (e.g. under their own WHS system), the arrangement, interfaces, reliance assumptions, and any phase-based allocation or transfer of WHS responsibilities between Hydro and the contractor shall be documented in the PRR and relevant contractual documentation.

How Do You Organise Training?

Persons seeking HAZOP Facilitation or Leadership training should have experience as study participants or Job Managers and possess a solid understanding of the relevant process.

- Discuss your training needs with your **People Leader / Manager.**
- Training booking details for Hydro Tasmania Group employees are provided on the Hazard Study Intranet page.

Note: It is preferred to conduct training in groups of three or more, where possible.

Not Trained or Not Confident to Facilitate?

If you have not completed the required training or have but don't feel confident to lead a hazard study, it's important to act early and responsibly.

What Should You Do?

- Discuss with your **Manager.**
- Be open about your status whether you are untrained or unsure. This helps your **Manager** plan the right support.

Reflect and Plan Your Development

- Identify what feels unclear or challenging.
- Consider whether a checklist, guide, or mock session would help.
- Request Coaching or Support

You can ask for:

- Refresher training.
- Shadowing or coaching from an experienced **Facilitator.**
- Ongoing coaching is encouraged for all trained **Facilitators** to build confidence and maintain consistent study quality. This is particularly recommended following initial Facilitator training.

Standard/Regulation Mapping

The references listed are the primary standards and regulations commonly applied to these studies. Additional standards or regulatory requirements may apply depending on project scope, location, or activities.

Jurisdictional Application

These requirement applies to hazard studies conducted under this procedure:

Tasmania:

- References reflect the standards and regulations typically used for Hydro Tasmania projects.

Interstate (Australia):

- The **Job Manager** must identify the equivalent state WHS / OHS Act and Regulations.

International:

- The **Job Manager** must ensure compliance with the host nation's regulatory framework and any applicable international agreements.
  - Studies must meet, at minimum, the Tasmanian WHS Act 2012 baseline unless local laws impose stricter requirements.

Precedence:

- The more stringent requirement, either this procedure or local law shall always apply.