STANDARD OPERATING PROCEDURES

SAFETY Everyone. Everywhere. Every day.

PRESSURE SAFETY

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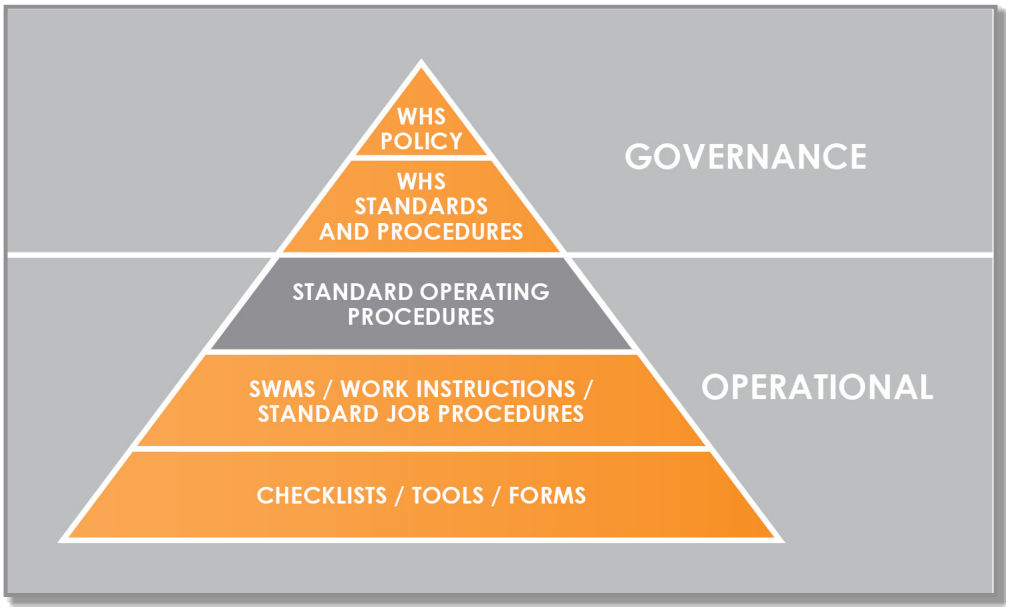
1. WHSMS DOCUMENT HIERARCHY



2. PURPOSE

This Standard Operating Procedure (SOP) documents Queensland Urban Utilities' (QUU) approach to pressure safety at QUU controlled workplaces.

The overall purpose of this procedure is to ensure that risks associated with pressure applications are adequately managed in order to minimise the risk of injury or harm to workers.

3. SCOPE

This SOP provides practical guidance on how to manage health and safety risks associated with pressure applications. This procedure applies to all QUU staff, including contractors and other persons on QUU-controlled worksites.

4. DEFINITIONS AND ACRONYMS

ASPHYXIA: a condition that occurs when there is a lack of oxygen. All gases are an asphyxiation hazard in high concentrations. Too little oxygen in the air can cause fatigue and, in extreme cases, death. Using compressed and liquefied gases can result in dangerously low levels of oxygen.

EXPLOSIVE ATMOSPHERE: areas where flammable or combustible materials are handled. These areas pose a danger of an explosion or fire occurring.

HEALTH AND SAFETY REPRESENTATIVE (HSR): a worker who has been elected by their workgroup to represent them in all health and safety matters.

HIGH PRESSURE WATER JETTING: a process that uses a stream of pressurised water to remove material, coatings, contamination or debris from the surface of a work piece or material.

KPI: acronym used for Key Performance Indicator.

MANAGER: the person/s directly responsibility for the workplace activity being performed or the work site where the activity is occurring.

MAWP: acronym used for Maximum Allowable Working Pressure.

OFFICER: a term used to refer to directors, partners, or anyone else who makes decisions which affect the whole or a substantial part of a business or undertaking.

Under the WHS Act 2011, Officers are required to exercise due diligence when ensuring that their business or undertaking fulfils its health and safety obligations. This means that Officers are expected to:

- have up-to-date knowledge of all work health and safety matters,
- understand the operations of the business and the hazards and risks involved,
- ensure appropriate resources and processes are in place to enable hazards to be identified and risks to be eliminated or minimised,
- ensure information regarding incidents, hazards and risks is reviewed and responded to in a timely manner,
- ensure that the business has, and implements, processes for complying with any legal duty or obligation,
- ensure that these processes are verified, monitored and reviewed.

PERSON CONDUCTING A BUSINESS OR UNDERTAKING (PCBU): a term which is primarily used to refer to employers, but which is equally applicable to sole traders, contractors, the self-employed, or anyone else who is responsible for workers.

Under the WHS Act 2011, PCBUs are, as far as is possible, responsible for ensuring the health and safety of:

- workers they directly engage or whose activities they influence,
- anyone else who could be put at risk by the activities the PCBU is undertaking, for example visitors, customers, or members of the public.

PERSONAL PROTECTIVE EQUIPMENT: anything used or worn by a person to minimise risk to the person's health and safety, including air supplied respiratory equipment.

PICOW (PERSON IN CONTROL OF WORKSITE): QUU staff employed as a Supervisor/PICOW, or in a role that requires them to oversee, supervise, direct or control a workplace or work activity, including persons involved in the activity.

PPE: acronym used for Personal Protective Equipment.

PRESSURE VESSEL: a vessel subject to internal or external pressure. It includes interconnected parts and components, values, gauges and other fittings up to the first point of connect to connecting piping. Examples include boilers, chillers and gas cylinders.

QUU WORKPLACE: Any structure or location where work is undertaken by QUU workers, including fixed, temporary and mobile locations such as vehicles, plant, and buildings.

STEAM CLEANING: a cleaning process that involves the use of stored water vapour at high pressure and at extremely high heat.

SUPERVISOR: a term used to refer to any QUU employee who acts or is appointed as a Supervisor, Coordinator or Team Leader within QUU.

WHS: Work Health and Safety.

WHS MANAGEMENT SYSTEM (WHSMS): the comprehensive and integrated system of WHS Standards, Procedures, SOPs, Quick Guides and Work Instructions that allows QUU to effectively manage and control our workplace hazards and risks.

WORKER: a person who carries out work in any capacity for a person conducting a business or undertaking. This includes employees, contractors, sub-contractors, apprentices, trainees, volunteers and work experience students.

Under the WHS Act 2011, Workers are responsible for:

- their own health and safety,
- ensuring their actions do not adversely affect the safety of others,
- complying with all reasonable instructions given by the PCBU,
- co-operating with any policy or procedure which has been communicated to them.

5. ROLES AND RESPONSIBILITIES

Officers, Managers and Workers have clear responsibilities and accountabilities for WHS outlined in QUU's **WHS Resources, Responsibility and Accountability Standard (STD132)** and **Procedure (PRO359)**. These responsibilities and accountabilities are non-transferrable and critical to achieving QUU's WHSMS goals, objectives and targets.

Outlined below are the role specific responsibilities relating to pressure safety activities on QUU-controlled worksites:

5.1 QUU EXECUTIVE

QUU Executive and Senior Management (CEO, ELT, General Managers – Officer and Non-Officer Appointed) are responsible for overseeing and ensuring the implementation of the requirements of this SOP and related procedures within their respective functional areas. This includes ensuring all sites are suitably risk assessed and have appropriate facilities, services and resources to ensure that risks associated with pressure applications are adequately managed to minimise the risk of injury or harm to workers.

5.2 MANAGER

Managers in all operational areas and QUU worksites are responsible for ensuring the review and management of risks associated with pressure applications. This includes:

- Provision of appropriate resources so that the design and operation requirements for pressure vessels are appropriate.
- Provision of appropriate resources to deliver training to workers who are involved in pressure related tasks, including:
    - The risks associated with pressure applications;
    - Related chemical hazards;
    - Emergency procedures; and
    - Personal Protective Equipment (PPE) requirements.
- Reviewing and managing risks when purchasing pressure vessels.

5.3 SUPERVISORS

Supervisors and Team Leaders in all operational areas and QUU worksites are responsible for ensuring that risks associated with pressure applications are managed, including ensuring:

- The completion and currency of pressure vessel risk assessments;
- Plant is in safe and in good working order and is maintained as required by the manufacturer;
- Plant alterations are conducted by competent persons;
- Plant is only used for those purposes it was designed for;
- Keeping the pressure vessel register (provided by the R.A.M.P team) on-site;
- Pressure vessel storage areas are kept free of ignition sources;
- All pressure vessel equipment is appropriately labelled;
- Pre-Start Checks are completed by operators where required;
- Workers who undertake pressure applications are appropriately trained and use required PPE; and
- Informing all workers and contractors of requirements of this SOP and ensuring their compliance with this SOP.

5.4 REGISTERED ASSET MANAGEMENT PLANNING (R.A.M.P) TEAM

The R.A.M.P team are responsible for the following:

- Registering pressure vessels (where required) with relevant statutory authority such as WHS Queensland (including design), as legislated with records maintained on TRIM.
- Ensuring the design and operation requirements for pressure vessels are appropriate;
- Maintaining pressure vessel maintenance plans and inspection, testing and maintenance records;
- Completing and storing records and registers of pressure vessel licences; and
- Maintaining a hard copy register of pressure vessels (which is provided to the site).

5.5 WORKER

All workers must ensure that they:

- Follow the guidelines of this **Pressure Safety SOP (PRO445)** and related procedures and comply with manufacturers' recommended procedures for use and storage of pressure equipment;
- Only use plant/pressure vessels for which they have attained competency;
- Only use plant for the purposes for which it was designed;
- Comply with all reasonable instruction regarding the use of plant;
- Do not interfere with or misuse plant and do not render any safety devices ineffective (e.g. remove safety mechanisms);
- Report all faults to their Supervisor/Manager;
- Wear appropriate PPE; and
- Report any incidents to their supervisor and:
    - Follow the injury management procedure; and
    - Complete a QUU WHS Incident Report Form in accordance with QUU WHS Incident Reporting Procedures.

5.6 CONTRACTORS

At all times when performing work on a QUU site or for/on behalf of QUU, contractors must comply with QUU's Pressure Safety Management requirements detailed in this and related procedures and report any pressure safety-related incidents to the relevant QUU Manager and to their employing / contracting agency in accordance with QUU **WHS Incident Reporting, Investigation and Escalation Procedure (PRO364)**.

5.7 WHS TEAM

QUU WHS Team will work with the business to ensure:

- The establishment, review and continual improvement of systems, arrangements and related procedures relating to the management and undertaking of pressure applications; and
- The provision of advice to assist in the active management and resolution of identified pressure safety hazards and risks in accordance with QUU SMS and relevant legislative requirements.

6. RELATED DOCUMENTS

- Confined Spaces Standard Operating Procedure (PRO444)
- Energy Lock Out Tag Out Procedure (PRO379)
- Fire Management Standard Operating Procedure (PRO376)
- Hazardous Chemicals Standard Operating Procedure (PRO377)
- Hot Work Standard Operating Procedure (PRO439)
- Personal Protective Equipment (PPE) Standard Operating Procedure (PRO424)
- Plant Standard Operating Procedure (PRO386)
- WHS Consultation and Communication Procedure (PRO361)
- WHS Hazard and Risk Management Procedure (PRO363)
- WHS Incident Reporting, Investigation and Escalation Procedure (PRO364)
- WHS Training and Competence Procedure (PRO360)

7. PRESSURE SAFETY

7.1 OVERVIEW

QUU will take action to manage their facilities, plant, work environment and tasks as to eliminate the risks associated with pressure applications at their worksites, and if that is not possible, QUU will minimise the risks so far as is reasonably practicable.

Examples of pressure applications that occur at QUU controlled worksites include:

- Water jetting/blasting;
- Steam cleaning;
- Working with pressurised vessels;
- Working with compressed gas cylinders;
- Working with pressurised water mains; and
- Working with hydraulic pressure (e.g. hand jacks, standing nearby to excavators, earth moving plant).

7.2 RISK ASSESSMENT

To manage the risks associated with pressure applications at QUU worksites, QUU will:

- Identify and assess the risk for all pressure applications that could cause injury or damage;

- Supply and maintain suitable plant and equipment for workers to reduce the likelihood of an incident occurring as a result of a pressure application;
- Provide instruction in safe pressure applications to workers;
- Educate workers in the risks of pressure applications and the controls required for managing pressure activities; and
- Develop and test emergency response, rescue and first aid plans.

Pressure applications will vary at each QUU workplace or controlled site. QUU will determine requirements related to pressure applications (such as equipment, facilities and personnel) through a risk management approach. This may include one or more of the following:

- Identifying hazards that could result in work-related injury, illness or damage;
- Assessing the type, severity and likelihood of injuries and illnesses;
- Providing appropriate equipment, facilities, first aid and training; and
- Reviewing requirements of pressure applications on a regular basis or as circumstances change.

Refer to the **WHS Hazard and Risk Management Procedure (PRO363)** for further guidance on QUU's risk management process that must be applied.

8. PRESSURE WASHING/STEAM CLEANING/USE OF HYDRAULIC HOSES

Common hazards and risks associated with high pressure washing and steam cleaning includes:

- Being struck by flying debris;

Exposure to noise;

- Exposure to hazardous materials (e.g. chemicals or biological waste); and
- The water jet of a pressure washer piercing the skin.

Adequate control measures must be put in place to protect the worker. Example controls include:

- Operator isolation;
- Multiple operators;
- Short working periods;
- The use of minimum pressure;
- Manual removal of heavy/biological matter prior to the carrying out the task; and
- The use of suitable PPE (as determined by risk assessment).

8.1 SAFETY REQUIREMENTS

- Before water jetting or steam cleaning activity can commence, a WRAP must be completed.
- 'Medical Alert cards' must be issued to all workers required to operate high pressure equipment as per AS/NZS 4233 :2013 High pressure water jetting systems - Safe operation and maintenance

8.2 GENERAL PRECAUTIONS

- All plant, equipment and attachments must only be used in accordance with the manufacturer's recommendations.
- All jetting and steam cleaning equipment and attachments must not be modified in any way.
- Equipment must not be used unless it:

- Has a logbook/ maintenance service history which defines past and future maintenance requirements;
- Has an Original Equipment Manufacturers manual and is available to personnel operating the equipment;
- Has been inspected/serviced in accordance with the manufacturer's recommendations; and
- Is free from any fault that may adversely affect its performance and safe operation.

- All equipment near jetting/steam cleaning operations must be shielded/protected from debris and water.
- All electrical components must meet the required protection levels against water vapour and overspray.
- No persons other than the operating team are permitted within the barricaded work areas.
- Safe access to the equipment and item/surface being cleaned must be provided at all times.
- Overhead work must be avoided where possible.
- Before starting jetting/steam cleaning activities, operators must be in a safe and well-balanced position.
- Jetting/steam cleaning activities must not be performed:
  - From ladders or other surfaces not intended for use by workers; or
  - On asbestos-containing material.
- Before starting jetting/steam activities, the operator must check that there is no interruption or interference to the release mechanism of any hand/foot controls that are used to safely stop the equipment operating.
- Jetting/steam cleaning operations must stop when:
  - Conditions change or new hazards are introduced;
  - Unauthorised people enter the barricaded area;
  - Recommended safe work practices are not being followed; or
  - A malfunction occurs.
- Jetting/steam cleaning machines should be depressurised and secured when:
  - Not in use or left unattended; or
  - Components are being replaced or repairs are being made to the system.
- Operators must never direct the water/steam flow toward any other person.
- Pressurised equipment must never be left unattended.
- After jetting/steam cleaning activities have been completed, operators must undertake full hygiene practices (e.g. change clothes, have shower etc.) as necessary for the task. Refer to the **Hygiene Maintenance SOP (PRO448)** for more information

8.3 PUMP UNIT PRECAUTIONS

- The pump unit must be maintained in accordance with the manufacturer's instructions.
- The entire pump unit must be checked as part of the daily Pre-Start Check, including:
  - The engine and drive unit (lubricating oil, water, hydraulic fluid and fuel levels);
  - The pump unit (lubricating oil, water filters, drive belts, gauges and gearbox oil levels);
  - The hydraulic hose reel (lubricating oil and fluid levels); and

- The condition of guards, shields and safety interlocks; and
- Electrical leads and connectors.

8.4 FILTER PRECAUTIONS

- Water filters must be checked regularly in accordance with the manufacturer's recommendations.
- Water must be cleaned through filters that meet the manufacturer's recommendations.

8.5 HOSE PRECAUTIONS

- Hoses, couplings, connections and end fittings that are suitable for the activity must only be used.
- Before each use, hose assemblies must be visually inspected by a competent person to ensure:
  - The correct pressure rating and size is selected;
  - There is no apparent damage (e.g. corroded/broken wires, bulging, kinking or cuts);
  - End fittings are in good condition and are the correct pressure rating for the unit; and
  - Hose connections to equipment/other hoses are restrained (e.g. with braided stockings) to stop their movement if the hose end fails.
- When water supply and jetting hoses are laid across thoroughfares, walkways or roads vehicle cable protectors must be used.
- Where hoses need to be hung vertically, they must be supported by a wire stocking. Where multiple lengths of hose are used this way, they must be supported at points below each coupling.
- To ensure that hose assemblies are kept in a safe condition, they:
  - Must not be unnecessarily subjected to frequent and prolonged periods of high pressure;
  - Must not be used in temperatures higher than the stated rating;
  - Must not be unnecessarily exposed to chemicals/corrosive substances;
  - Must not be used in functions that require repetitive/prolonged use (e.g. long-line drain cleaning);
  - Must not be exposed to sharp, protruding or abrasive surface; and
  - Must be stored lying flat in a cool, dry area.
- If the following faults are identified, the equipment must not be used and must be immediately taken out of service in accordance with the **Energy Lock Out Tag Out Procedure (PRO379)**:
  - Hoses with broken wires, deep abrasions, kinking, blisters or bubbles in the outer covering; or
  - End fittings/crimping with cracks, corrosion, damaged threads or other evidence that they may not be safe.
- Hoses must be tested when they:
  - Are new;
  - Have been damaged;
  - Have been re-ended or repaired; and
  - Have been exposed to adverse conditions which may have affected their integrity.

- Hose assemblies systems must be tested in accordance with the requirements of the relevant Australian Standard:
    - Class A Jetting Systems: AS3791-1991: Hydraulic Hose.
    - Class B Jetting Systems: ASNZS4233 Part1:1999: High Pressure Water Jetting Systems – Safe Operation and Maintenance.

8.6 OTHER SAFETY CONSIDERATIONS FOR HOSES

- Where hoses are exposed to external mechanical damage, such as the hose being kinked or crushed, all attempts should be made to protect the hose by manufacturer approved means i.e. sheaves or sleaves situated over friction/ exposure points; and
- Where known activities are likely to expose hoses to frequent wear such as jet rodding and pressure washing activities, consideration should be made for preventative maintenance and additional inspections completed by competent personnel.

8.7 NOZZLE PRECAUTIONS

- As part of the Pre-Start Check, nozzles must be inspected before each use for:
    - Blocked/damaged holes;
    - Damage to threads;
    - Cracks; and
    - Other structural damage that could affect their safe operation.
- Nozzles that have been identified as defective must not be used. They must be removed from service immediately and repaired or destroyed in accordance with the **Energy Lock Out Tag Out Procedure (PRO379)**.
- Nozzles must be kept clean and stored safely when not in use.

8.8 ELECTRICAL EQUIPMENT PRECAUTIONS

- Cables, plugs, connections and control devices must be checked before any works commence.
- Where water jetting/steam cleaning activities are to be carried out within a potentially explosive atmosphere, the pump equipment must meet the requirements of AS 2380.1-1989: Electrical Equipment for Explosive Atmospheres – Explosion-Protection Techniques – General Requirements.

8.9 HAZARDOUS MATERIAL PRECAUTIONS

- Product safety data sheets (SDSs) must be obtained before starting jetting/steam cleaning activities if hazardous materials are present or suspected to be present in the material/coating being jetted.
- Appropriate controls must be put in place to eliminate or minimise exposure to any hazardous materials identified in the risk assessment process. This may include that is suitable for the hazardous materials identified/suspected.

8.10 PERSONAL PROTECTIVE EQUIPMENT

- Appropriate PPE must always be worn, regardless of the other control measures that are in place. Selection of PPE must be based on risk assessment, which may include:
    - Waterproof suit/overalls;
    - Face shield, goggles or blast mask;
    - Waterproof boots;
    - PVC gauntlet gloves;
    - Heat-resistant clothing (for steam cleaning only);

- Hearing protection; and
- Breathing equipment or respirators.

- Additional PPE may be required for certain jetting activities, as determined by risk assessment. This may include liquid/chemical-resistant suits, leg guards or head protection. Refer to the **Personal Protective Equipment SOP (PRO424)** for further information.
- PPE selected for high pressure activities must be suitable for the activity and comply with the following standards wherever deemed necessary:
  - AS/NZS 4233 :2013 High pressure water jetting systems - Safe operation and maintenance
  - AS 3765: 1990 Australian Standard Clothing for protection against hazardous chemicals
  - AS/NZS 2210.:1994 Occupational protective footwear
  - AS/NZS 1337:1992 Eye protectors for industrial applications
  - AS/NZS 2161.1:1998 Occupational protective gloves – Part 1: Selection, use and maintenance.

8.11 MAINTENANCE AND REPAIRS

- Operators of jetting/steam cleaning systems must not carry out repairs, other than simple adjustments to or replacements of parts which are listed in the manufacturer's instructions for use/periodic service.
- Other repairs, maintenance and servicing operations must be carried out by the manufacturer or other suitably qualified people.
- Maintenance records must be kept for each major piece of the jetting/steam cleaning equipment.
- Jetting/steam cleaning parts or assemblies that need to be identified for service, maintenance or application must be permanently marked with enough information to identify the part, its use and performance in a way which is easy to read.
- Whenever plant is placed out of service or defects and noticeable hazards/ risks are identified with high pressure equipment, a hazard report must be logged into QUU's safety Reporting System
- Refer to the **Plant SOP (PRO386)** for further information.

9. PRESSURE VESSELS

- There are a wide range of pressure vessels found across QUU sites. Pressure vessels represent a risk for explosion and physical injury if they are not properly maintained.
- Pressure vessels are classified under AS4343 Pressure Equipment – Hazard Levels according to their maximum volume, operating pressure, type of fluid gas and type of door closure. The regulatory requirements for each pressure vessel depend on the hazard level classification.

9.1 SAFETY REQUIREMENTS

- Hazard identification and risk assessment must be undertaken for all pressure vessels on-site.

9.2 GENERAL PRECAUTIONS

- Pressure vessels must be installed and stored in compliance with the appropriate Australian Standards, Codes and Legislation.
- Pressure vessels must be maintained in accordance with the manufacturer's instructions.
- Pressure vessels must be maintained and repaired by qualified persons.

- All workers required to work with pressurised vessels must be trained in its safe use/operation. Where necessary, workers must have appropriate certificates of competency (e.g. boiler certificate). Training records must be retained.
- All pressure equipment, including piping, must be appropriately labelled.
- Pressure vessels must not be operated without an appropriate and properly functioning pressure gauge and safety relief valve.
- Safety relief values must not be removed or obstructed/restricted by any means (e.g. tie downs, paint, caps, blocks etc.).
- Only pipes, tubing, fittings and valves appropriate to the pressure vessel's fluid and maximum allowable working pressure (MAWP) must be used.
- Pressure vessels must be kept level at all times. If the pressure vessel is mounted, appropriate vibration protection must be in place.
- Pressure vessels must be protected from damage caused by vehicle traffic or general work operations.
- Materials, supplies or stock must not be piled up against any pressure vessel.
- Before operating a pressure vessel, it must be inspected by the operator for corrosion, fatigue or build-up of deposits. If any faults are identified, the equipment must be immediately removed from service and promptly reported to a Supervisor in accordance with the **Energy Lock Out Tag Out Procedure (PRO379)**.
- Workers must not operate a pressure vessel at a pressure higher than its MAWP.
- If a worker is required to enter a pressure vessel for maintenance or repairs, they must have received and comply with Confined Space Training. Refer to **Confined Space SOP (PRO444)** for further information.
- Refer to the **Plant SOP (PRO386)** for further information.

9.3 INSPECTIONS AND MAINTENANCE

- Pressure vessels must be inspected by a competent person:
    - After installation;
    - At prescribed frequencies; and
    - After any welding, alterations, repair or relocation. For further information on welding, refer to the **Hot Work SOP (PRO439)**.
- All pressure vessels must be maintained in accordance with the relevant standards, including AS3873.
- All records of maintenance/repair must be retained and kept with the pressured vessel.

9.4 REGISTRATION

- All pressure vessels categorised as a hazard level of A, B or C (according to the criteria defined in AS4343) must have current registration with Workplace Health and Safety Queensland. The R.A.M.P Team are responsible for registering pressure vessels.
- All registration certificates must be kept with the pressure vessel.
- Refer to the **Plant SOP (PRO386)** for further information on registration of pressure vessels (including design).

10. COMPRESSED/LIQUIFIED GAS CYLINDERS

One type of pressure vessel stored and used on QUU sites is compressed/liquefied gas cylinders. These cylinders contain large volumes of gas under high pressure and precautions need to be taken when storing, handling and using cylinders.

The hazards associated with compressed and liquefied gases include fire, explosion, toxicity, asphyxiation, oxidisation and uncontrolled release of pressure. Gas leakage is a particular hazard, especially with oxygen leaks, as they cannot be recognised by odour (unlike fuel gas leaks) and are harder to detect.

For further information on hazardous chemicals, refer to the **Hazardous Chemicals SOP (PRO377)**.

10.1 GENERAL PRECAUTIONS

- Gas cylinders must be stored and handled appropriately at all times. Cylinders:
    - Must be restrained and secured against movement with chain or strap (i.e. not rope) at all times during storage, transport and use.
    - Must be stored and transported in an upright position.
    - Must be stored in a clean area free from oil and grease.
    - Must be sheltered from weather conditions, such as sunlight.
    - Must be clearly labelled with their content.
    - Must be stored away from doorways, stairs and aisles, and must not be positioned in an access way or traffic area.
    - Must be stored at least 6 meters away from flammable materials such as fuel, paint and solvents.
    - Must be maintained free from leaks and dents.
    - Must not be dropped.
- Cylinder storage areas must be designated and signed appropriately.
- All sources of heat and ignition must be kept away from cylinders, even if the cylinders do not contain flammable material.
- To ensure the controlled release in an emergency situation:
    - Oxygen, hydrogen, carbon dioxide and inert gas cylinders must be fitted with a bursting disc safety device;
    - LPG cylinders must have an operation spring-loaded pressure release value; and
    - Acetylene cylinders must be fitted with a fusible plug in the neck of the cylinder and must always be stored and used in an upright position.
- Flashback arrestors must be fitted at the blow pipe and to the oxygen and fuel gas regulators.
- Before commencing any activity, workers must check all cylinder fittings to ensure they are not damaged or in poor condition, and that they are ready for safe use.
- If a cylinder has a valve tool, this must not be tampered with in any way. The cylinder valve must be kept closed at all times apart from during welding operation.
- When opening cylinder values, workers must stand to the side of the regulator, and never stand in front of it.
- If a small leak occurs, the cylinder valve must be closed (if possible). The area must be well-ventilated and any air conditioning systems must be turned off to avoid the spread gas. In the event of a large amount of gas escaping, emergency procedures must be implemented immediately.
- Oxygen cylinders and fittings must not be lubricated with grease or oils or stored with grease or oils.
- When transporting gas cylinders, whenever practicable they must be contained within an approved caged safety device. If this is not practicable, all attachments must be removed from the gas cylinders.

- Gas cylinders (excluding Breathing apparatus) must not be taken into any confined spaces. Refer to the **Confined Spaces SOP (PRO444)** for further information.
- For further information regarding the use of cylinders for welding, refer to **Hot Work SOP (PRO439)**.

11. MAINS UNDER PRESSURE

There are some activities at QUU that may require mains to be pressurised for decontamination purposes.

Where mains need to be pressurised, the pressure must be released before any work on the mains commences.

For further information, refer to the **Energy Lock Out Tag Out Procedure (PRO379)**.

12. HYDRAULIC PRESSURE

There are some activities at QUU that involve hydraulic pressure:

- Hydraulic hand tools (e.g. jacks);
- Earth moving plant;
- Cutting devices;
- Fixed hydraulic assets (e.g. floor sludge doors).

A plant risk assessment must be undertaken in relation to hydraulic pressure activities. Refer to the **Plant SOP (PRO386)** and **WHS Hazard and Risk Management Procedure (PRO363)** for further information.

Before any hydraulic pressure activities are carried out, the equipment must be visually expected to ensure that it is in good working condition and there is no apparent damage. If a fault is identified, the equipment must be immediately tagged out for repair.

For further information on safety precautions for hydraulic hose use, refer to the relevant section above.

13. TRAINING, COMPETENCY AND SUPERVISION

- All workers involved in any pressure applications must be trained and have the appropriate skills to carry out the task safely.
- If a pressure related task requires competency certification (e.g. working in boilers), all workers carrying out that task must have appropriate certificates of competency.

QUU will provide instruction to workers on:

- Hazards associated with pressure applications;
- The safe use of QUU pressure equipment;
- Manufacturer's requirements for pressure equipment.
- Safety Data Sheets (SDSs); and
- Emergency procedures related to pressure applications.

14. AUDIT AND INSPECTION

Review of the implementation of this SOP will be undertaken through periodic inspections carried out in accordance with the QUU **WHS Audit and Inspection Procedure (PRO366)**.

The Safety Team will undertake period inspection of selected projects to validate, where design is required by the project, that the Principles 1-5 are applied and complied with.

15. REFERENCES

- Queensland Work Health and Safety Act 2011.
- Queensland Work Health and Safety Regulations 2011.
- Petroleum and Gas Act
- AS3791-1991: Hydraulic Hose.
- ASNZS4233 Part1:1999: High Pressure Water Jetting Systems – Safe Operation and Maintenance.
- AS 2380.1-1989: Electrical Equipment for Explosive Atmospheres – Explosion-Protection Techniques – General Requirements.
- AS4343 Pressure Equipment – Hazard Levels.
- AS3873 AS 3873-2001: Pressure Equipment - Operation and Maintenance.
- AS4332 The Storage and Handling of Gases in Cylinders.
- AS2030.1 Gas Cylinders – General Requirements.
- Guide for Managing Risks from High Pressure Water Jetting, Safe Work Australia, 2013.
- AS/NZS 4233 :2013 High pressure water jetting systems - Safe operation and maintenance
- AS 3765: 1990 Australian Standard Clothing for protection against hazardous chemicals
- AS/NZS 2210.:1994 Occupational protective footwear
- AS/NZS 1337:1992 Eye protectors for industrial applications AS/NZS 2161.1:1998 Occupational protective gloves – Part 1: Selection, use and maintenance.

16. REVIEW

This Standard Operating Procedure (SOP) is to be reviewed every 2 years or earlier if:

- There is an identified risk to the business;
- A significant WHS or unplanned event occurs;
- There is evidence safety is not effectively being considered in design at QUU workplace;
- Incident investigation or audit results demonstrate that the procedure is failing to deliver the required outcomes;
- There are changes in associated legislation; or
- There is evidence that the SOP is not having a positive impact on WHS-related KPIs.

17. FURTHER INFORMATION

For further information, contact your Health and Safety Representative (HSR) or a member of the QUU WHS Team.