Hydrogen Safety Code of Practice
Consultation Draft – An introduction

Chaired by:

Nancy Norton, Senior Inspector, Petroleum and Gas
Paul Beaumont, Principal Inspector, Gas Work and Devices

WEBINAR WILL START AT 10:00AM
WEBINAR WILL BE RECORDED
Acknowledgement of Traditional Owners

- We acknowledge the Traditional Owners of the land on which we live, learn and work, and pay our respects to Elders – past, present and emerging

- Specifically I would like to acknowledge the Wulgurukaba and Bindal people of the Townsville region where I am presenting from today
Safety Moment

H₂ fuel gas – similar but not the same

Disperses rapidly
Rises @ ~ 60km/hr

Wide flammability range
4-75% in air

H₂ buoyancy, diffusivity, and small molecule make it difficult to contain and create a combustible situation

Significantly less radiant heat than a hydrocarbon flame

Climate friendly

Petroleum & Gas Inspectorate
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4. Gas safety regulation in Queensland
5. Scope and Application of P&G Legislation
6. Why a Code of Practice?
7. Operating Plant – challenges & proposals
8. Gas Work & fuel cells – challenges & proposals
9. Summary of Policy Proposals
10. Next steps
Introductions

• RSHQ Hydrogen Team
  • Nancy Norton – Hydrogen Lead
  • Paul Beaumont – Gas Devices, Gas Work and Licensing
  • Marshall Holmes – Pipelines and Distribution Networks
  • Radika Lucas – Deputy Chief Inspector
  • Cecily Coleman – Policy Officer
  • Tony O’Connor – Fuel Gas Delivery Networks and Refuellers

• Supporting Consultant – GPA Engineering
Objective

• Introduce the draft Code of Practice

• Explain the Policy Proposals for which we are seeking feedback
Hydrogen in Queensland

The Queensland Government is committed to developing a sustainable and safe Queensland hydrogen industry

Queensland Hydrogen Industry Strategy 2019-2024
1. Supporting innovation
2. Facilitating private sector investment
3. **Ensure effective legislative, regulatory and policy framework**
4. Building community awareness and confidence
5. Facilitating skills development for new technologies

Queensland Hydrogen Industry Development Fund
Project funding to drive investment & accelerate project development

Queensland Hydrogen Investor Toolkit
Overview of planning and regulatory approvals in Queensland

Queensland Hydrogen taskforce
$60M+ multiple initiatives
H₂ hubs – Gladstone Townsville
Gas safety regulation in Queensland

Resources Safety and Health Queensland

• Independent regulator of workplace safety and health in Queensland’s mining, quarrying, petroleum, gas and explosives industries

• Includes the Petroleum and Gas Inspectorate who regulate petroleum and gas safety & administers safety provisions of the Petroleum and Gas (Production and Safety) Act 2004 (P&G Act)

• P&G Act defines ‘hydrogen’ as a fuel gas and establishes safety frameworks for Operating Plant, Gas Devices and Gas Work

Workplace Health and Safety Queensland

• Queensland’s general work health and safety regulator who administer provisions of the Work Health and Safety Act 2011

• Leads regulation of Major Hazard Facilities

• Leads regulation of hazardous chemicals (includes hydrogen)

• Regulates general workplace safety obligations and duty of care
Scope of P&G Legislation

**Hydrogen Production from petroleum products**
- Natural gas
- Hydrogen production
- Carbon Capture

**Hydrogen as a transport fuel**
- Cars, buses, trucks, trains, boats

**Hydrogen for Industry**
- Existing users such as chemical manufacture, agriculture etc

**Hydrogen for export (MHF)**

**Hydrogen for energy storage & Power generation**

**Transport via pipelines and distribution networks**

**Transport via road for fuel use**

**Hydrogen for heat and use in gas appliances**

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**KEY**

- **Within scope of P&G legislation**
- **Out of scope of P&G legislation**
Gas safety regulation – Current

**Application of Petroleum and Gas (Production & Safety) Act 2004**

**OPERATING PLANT**

- Hydrogen Suppliers
- Hydrogen Refuellers
- Hydrogen Pipelines & Distribution networks

The operator is responsible for managing risk

- Safety management system required
- Supply to consumer must be odorised
- Commissioning notification requirement

**GAS WORK AND DEVICES**

- Fuel cells are Type B gas devices
- Type A devices - pre-approved appliances

Risk is managed through authorisations and working to prescriptive standards

- Gas devices must be approved
- Installers must hold a licence or authorisation
- Gas systems must be installed to specified standards
Gas safety regulation – application of Petroleum and Gas (Production & Safety) Act 2004
A Code of Practice:

- provides **certainty & guidance** for industry about approval processes, safe operations and technical requirements **specifically** for hydrogen fuel gas applications
- is a **flexible** tool, responding quickly to support emerging operations and able to be adjusted as the industry develops and consolidates

The draft Code of Practice responds to:

- *Industry questions to RSHQ over the last 2 years about hydrogen projects*
- *Projects in Queensland - some operational, others developing rapidly*
- *How existing P&G Act provisions for regulating gas apply to hydrogen used as a fuel gas*
Developing a code of practice

The Petroleum and Gas Inspectorate is working with government and industry stakeholders to develop a Hydrogen Safety Code of Practice

The draft Code of Practice includes some policy proposals for legislative changes to cater for emerging hydrogen applications

<table>
<thead>
<tr>
<th>Date</th>
<th>Key Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 2021</td>
<td>Registration of interest announced</td>
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<tr>
<td>Oct–Nov 2021</td>
<td>Discussion paper (PDF, 1.7MB) released &amp; industry feedback received</td>
</tr>
<tr>
<td>October 2021</td>
<td>Hydrogen in the mobility sector webinar</td>
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<tr>
<td>May 2022</td>
<td>The draft hydrogen safety code of practice (PDF, 812KB) released for feedback</td>
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<tr>
<td>25 May 2022</td>
<td>Draft code of practice webinar - <a href="#">register your interest</a> to attend</td>
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<tr>
<td>24 June 2022</td>
<td>Last date for submission of feedback about the draft code of practice</td>
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<tr>
<td>Post June 2022</td>
<td>Feedback is considered and the policy approach is finalised. The final hydrogen safety code of practice is published following government approval</td>
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## Operating Plant

<table>
<thead>
<tr>
<th>Challenge with P&amp;G Act framework</th>
<th>Draft Code response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How do proponents know about gas safety regulation?</strong></td>
<td>• The draft Code of Practice sets out specific and accessible guidance for proponents of hydrogen applications about safe operations, regulatory compliance, approval processes and proposals where current provisions of the legislation are not appropriate for emerging applications</td>
</tr>
<tr>
<td>• Many new proponents to hydrogen fuel industry are not aware of requirements under the P&amp;G Act</td>
<td></td>
</tr>
<tr>
<td><strong>Gas blends in distribution systems</strong></td>
<td><strong>Policy proposal A7.2</strong></td>
</tr>
<tr>
<td>• AS/NZS 4645 is a mandatory requirement for distribution systems</td>
<td>• the Chief Inspector receives notification of the formal safety assessment having been completed prior to the commencement of supply</td>
</tr>
<tr>
<td>• AS / NZS 4645 limits the introduction of $H_2$ to 15%, restricting opportunity for networks with 100% hydrogen or with blends over 15%</td>
<td>• proponent must manage risk as low as reasonably practicable</td>
</tr>
<tr>
<td><strong>Gas odour requirements</strong></td>
<td><strong>Policy proposal A7.3</strong></td>
</tr>
<tr>
<td>• The P&amp;G Act prescribes an odour for fuel gas supplied to consumers. Odourants damage fuel cells.</td>
<td>• the operator must only supply systems designed and approved for unodourised fuel gas</td>
</tr>
<tr>
<td></td>
<td>• the safety obligation shifts from the supplier to the owner of the gas system to ensure the system is SAFE for unodourised fuel gas</td>
</tr>
<tr>
<td></td>
<td>• the supplier is required to have evidence of the gas system safety prior to supplying (e.g. compliance certificate)</td>
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</tbody>
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## Gas Work and Devices

<table>
<thead>
<tr>
<th>Challenge with P&amp;G framework</th>
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<tbody>
<tr>
<td><strong>Fuel Cell Gas Device Approval</strong></td>
<td><strong>Policy proposal A7.5</strong></td>
</tr>
<tr>
<td>• There are no preferred standards for fuel cells</td>
<td>• Reference standards to apply – Australian Standards for fuel cells</td>
</tr>
<tr>
<td>• There are limited Gas Device Approval Authorities (GDAA) holders that can approve fuel cells</td>
<td>• a new process for <em>fuel cell gas system</em> approval</td>
</tr>
<tr>
<td><strong>Gas System Design and Installation Requirements</strong></td>
<td><strong>Policy proposal A7.6</strong></td>
</tr>
<tr>
<td>• There is no preferred standard for hydrogen gas system installation</td>
<td>• the GDAA holder approves the “<em>fuel cell gas system</em>”</td>
</tr>
<tr>
<td>• Unodourised gas risk is not addressed in current design and installation requirements</td>
<td>• the <em>fuel cell gas system</em> design must be by an RPEQ engineer, include leak detection and automated shut-off, and installation instructions</td>
</tr>
<tr>
<td><strong>Gas Work Licences and Authorisations</strong></td>
<td></td>
</tr>
<tr>
<td>• Gas work requirements document has no requirements for hydrogen licenses and authorisations</td>
<td>• The P&amp;G Act allows a GWA to be issued by the Chef Inspector based on knowledge and skills – this pathway can be applied with applicants providing information about their relevant knowledge and skills. Gas Work Authorisations to be issued on an as needed basis until national competencies are developed.</td>
</tr>
<tr>
<td>• There are no national competencies for fuel cell installations</td>
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Resources Safety & Health Queensland

![Resources Safety & Health Queensland Logo](logo.png)
### Type B Devices – including Fuel Cells & Hydrogen FCEV

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<thead>
<tr>
<th>Challenge with P&amp;G Act framework</th>
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<tr>
<td><strong>Fuel cells in vehicles</strong></td>
<td><strong>Policy proposal A7.6</strong></td>
</tr>
<tr>
<td>• Fuel Cell Electric Vehicles have gas systems on board</td>
<td>• UN R134 is listed as a <em>reference standard</em></td>
</tr>
<tr>
<td>• The fuel cell must be approved for installation and use</td>
<td>• Australia are a contracting party to the Global Technical Regulations including GTR 13 from which UN R134 is derived</td>
</tr>
<tr>
<td>• Australian Design Rules do not yet provide safety requirements for H₂ fuel systems</td>
<td>• Australian Vehicle Standards body have indicated a future intention to adopt GTR13 as a requirement for Australian vehicles</td>
</tr>
<tr>
<td>• Installers and maintenance personnel must operate under an appropriate gas work authorisation</td>
<td>• The draft Code includes information for applying for a gas work authorisation that includes authority to install and maintain fuel cell electric vehicles in Queensland.</td>
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</tbody>
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<thead>
<tr>
<th><strong>Individual approval of Type B devices</strong></th>
<th><strong>Policy proposal A7.6</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fuel cells are Type B gas devices</td>
<td>• A blanket approval via the Chief Inspector for imported vehicles certified to UN R 134</td>
</tr>
<tr>
<td>• All Type B devices must be individually approved</td>
<td>• A “multiple device” approval option via an appropriate GDAA for hydrogen systems locally designed by RPEQ (vehicles and stationary systems)</td>
</tr>
<tr>
<td>• For mass produced units and vehicles this approach is problematic</td>
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</table>
Summary of policy proposals


2. Formal Safety Assessment supplied to Chief Inspector for distribution networks supplying more than 15% H2 by volume.

3. Enabling supply of unodourised fuel gas when owner of gas system meets safety criteria.

4. An amendment to regulation to define all hydrogen delivery networks as operating plant.

5. Use of reference standards for gas device design and approval.

6. Use of reference standards for gas system design and approval.

7. Provision for a GDAA holder to approve multiple type B devices and on the same approval.

Next steps

➢ 25 May 2022 – draft Code of Practice Webinar
➢ 24 June 2022 – last day for feedback on draft Code of Practice
➢ August 2022 – publish final Draft Code of Practice (with consideration of public feedback)
➢ End of 2022 – legislative updates and final Code published (subject to Government approvals)

➢ Future Revisions of Code
  ➢ Updates to incorporate new standards and competencies
  ➢ Update with requirements for carbon capture and storage
  ➢ Consideration of other future fuels
Questions?

If you have any more questions you can contact us:

• Email - hydrogensafety@rshq.qld.gov.au
• Phone - 07 3199 8027