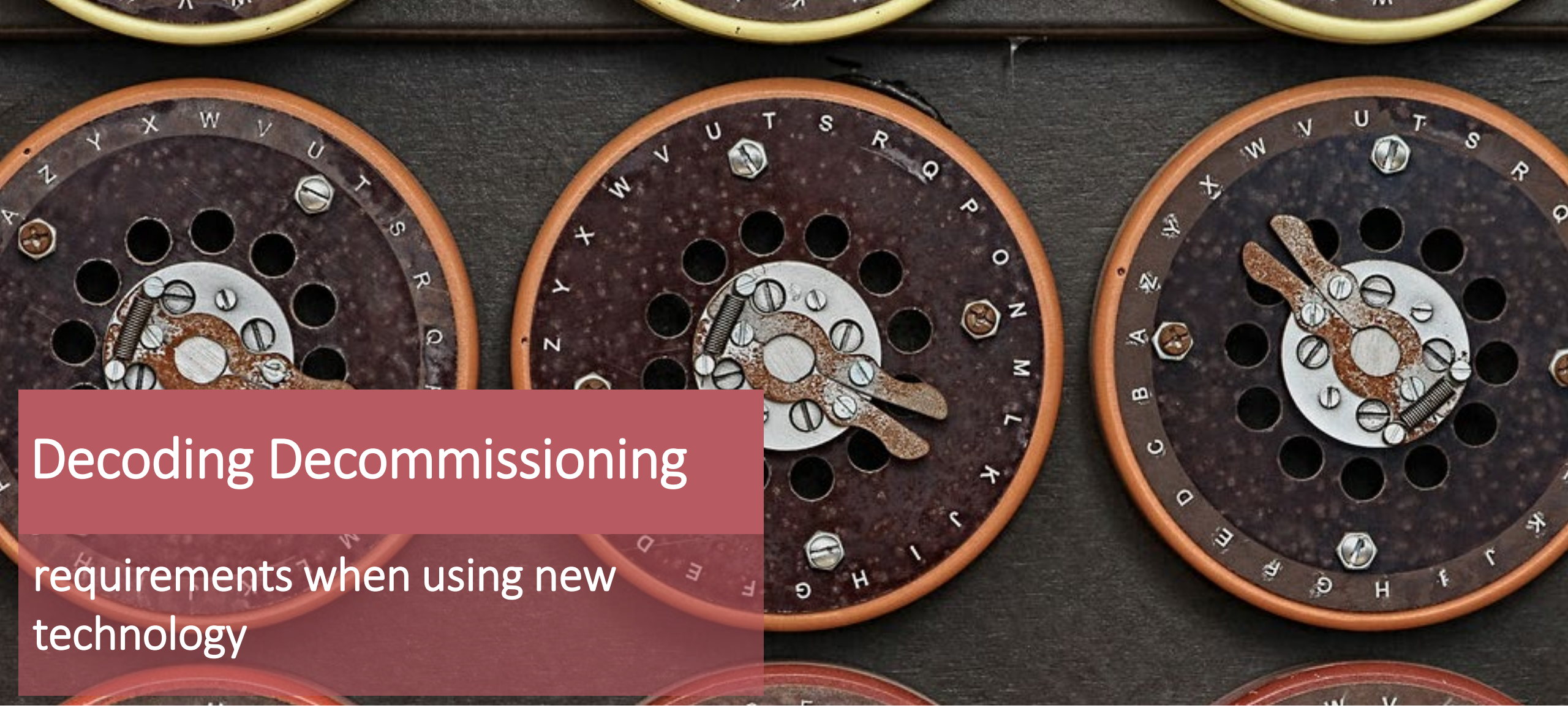


Decoding Decommissioning

requirements when using new technology

Queensland's petroleum wells code of practice

Petroleum & Gas Inspectorate 18-May-2023

Resources Safety & Health
Queensland

RSHQ

A data-driven risk based regulator.

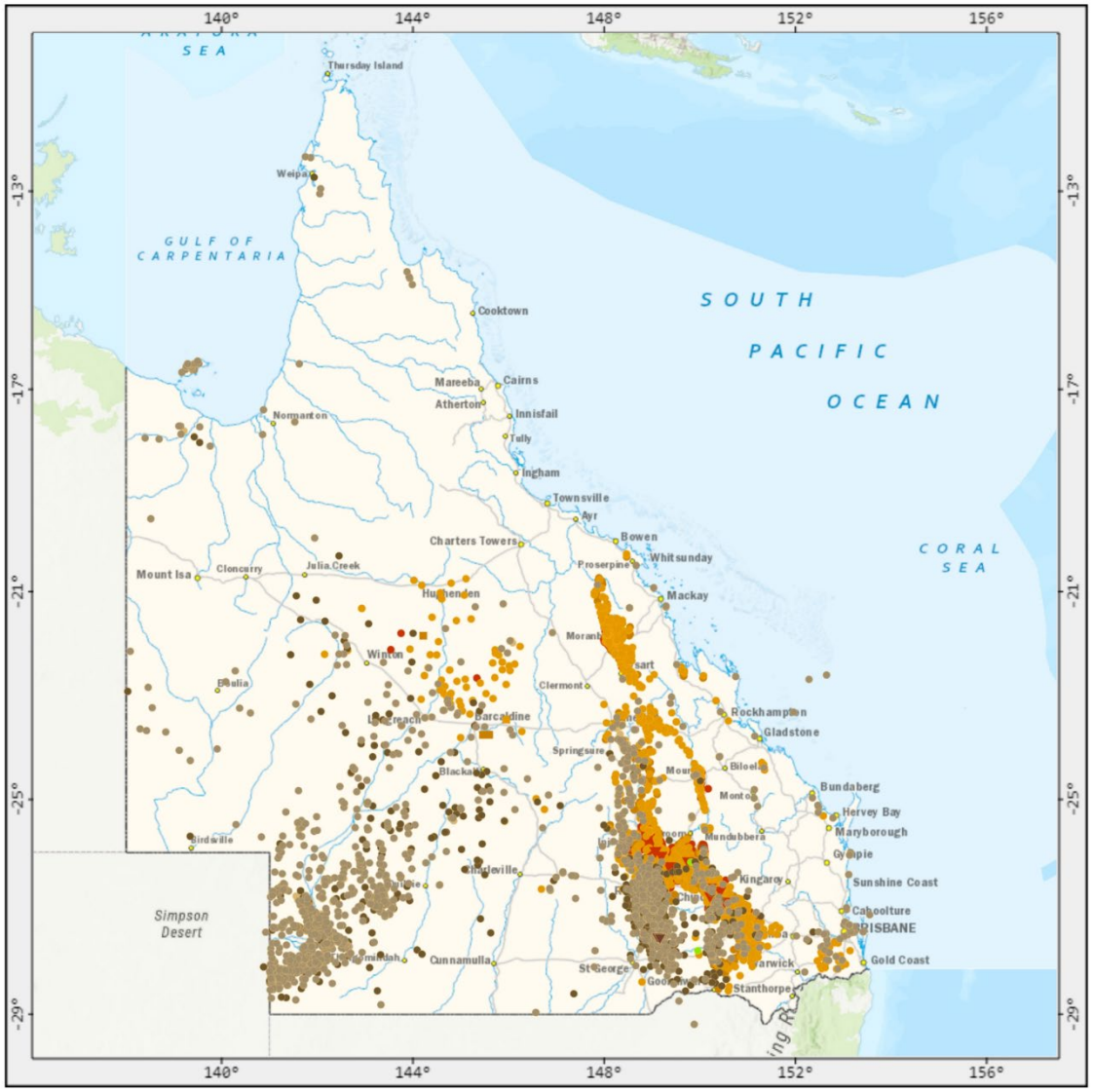
Our vision – *a Queensland resources sector free from fatality, serious injury and occupational disease.*

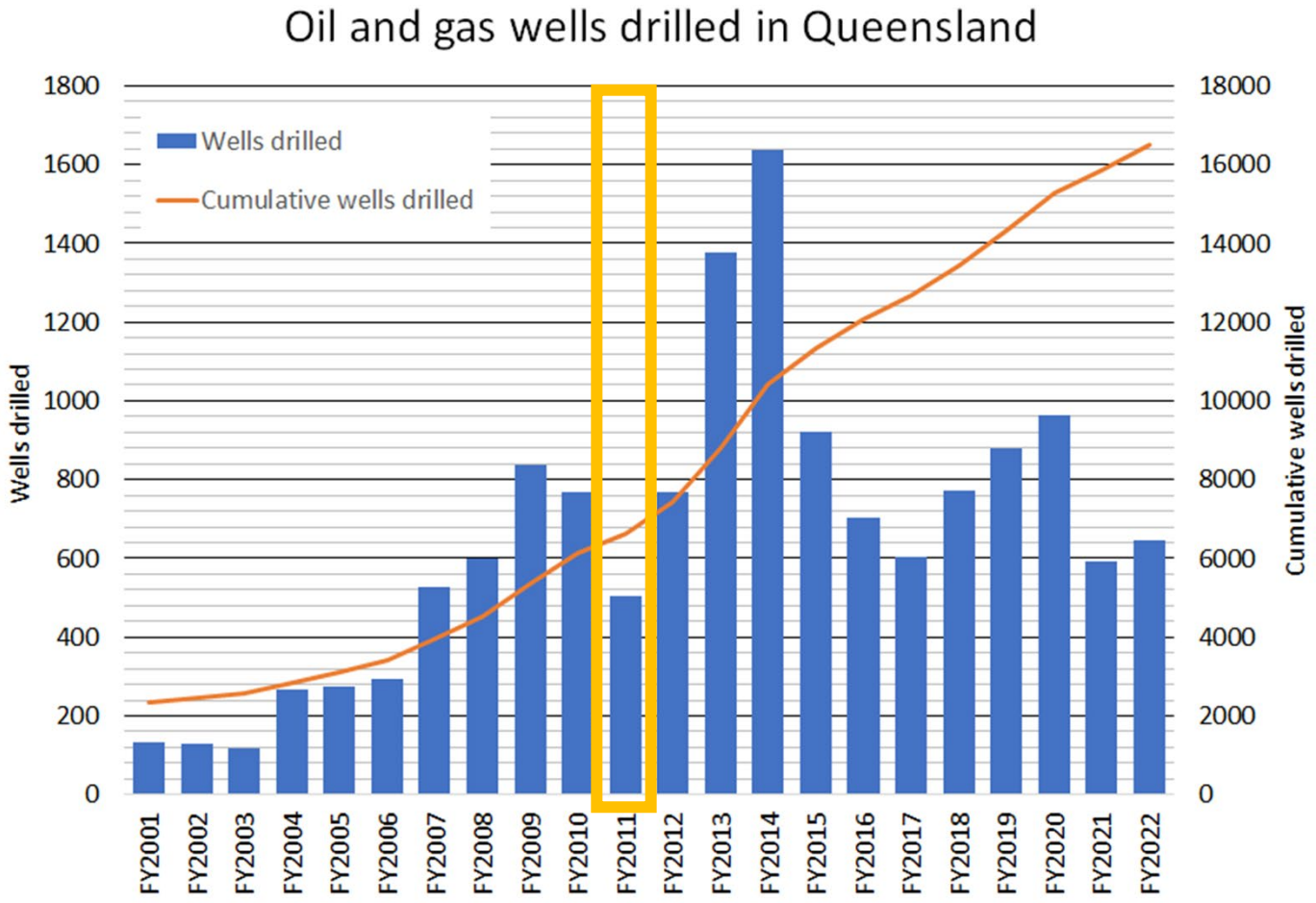
Zero Serious Harm

Petroleum & Gas Inspectorate

Resources Safety & Health
Queensland

Snap shot QLD oil and gas wells





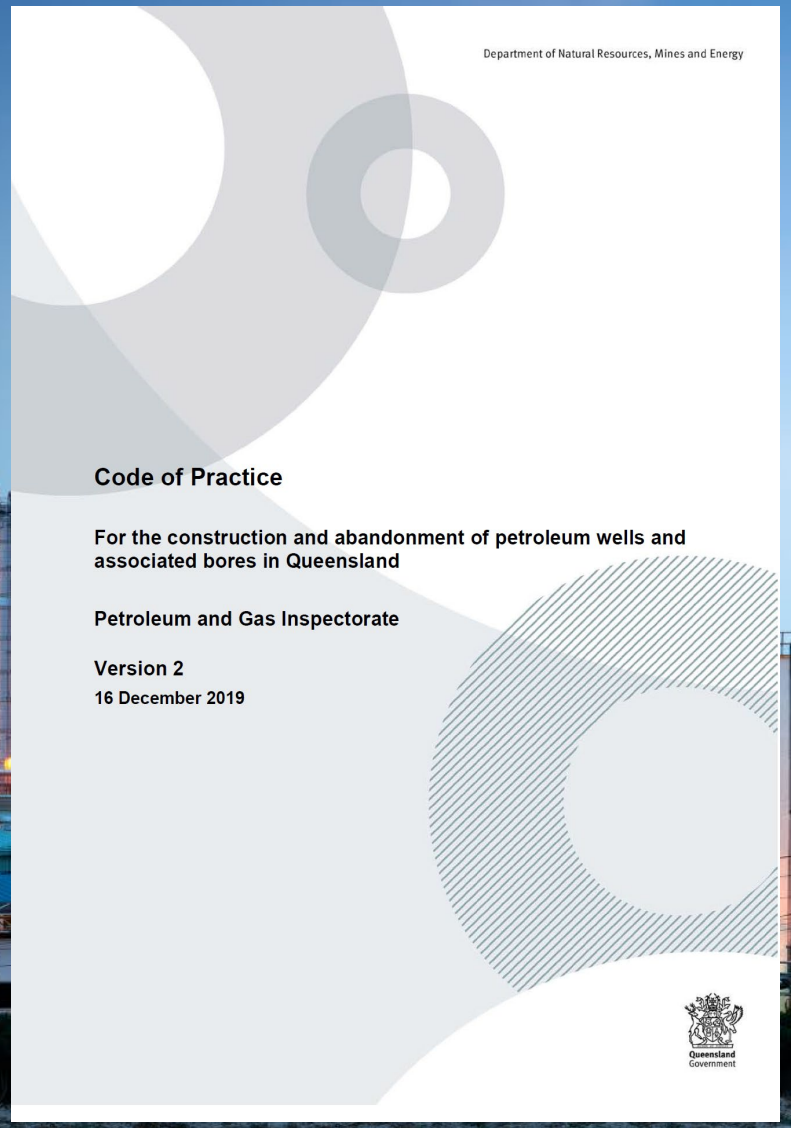
Well Population QLD

~ 16,500 Drilled

~ 10,500 Producing

~ 3000 Abandoned

QLD - Code of Practice



Evolution

- Commenced 2011 (CSG Only)
- 2013 Rev – Provision for alternative Technology approval
- 2015 Rev - Alternative Means of Compliance (AMoC) introduced
- 2018 Rev – Consolidation of CSG and petroleum wells CoP
- 2019 Rev – Current

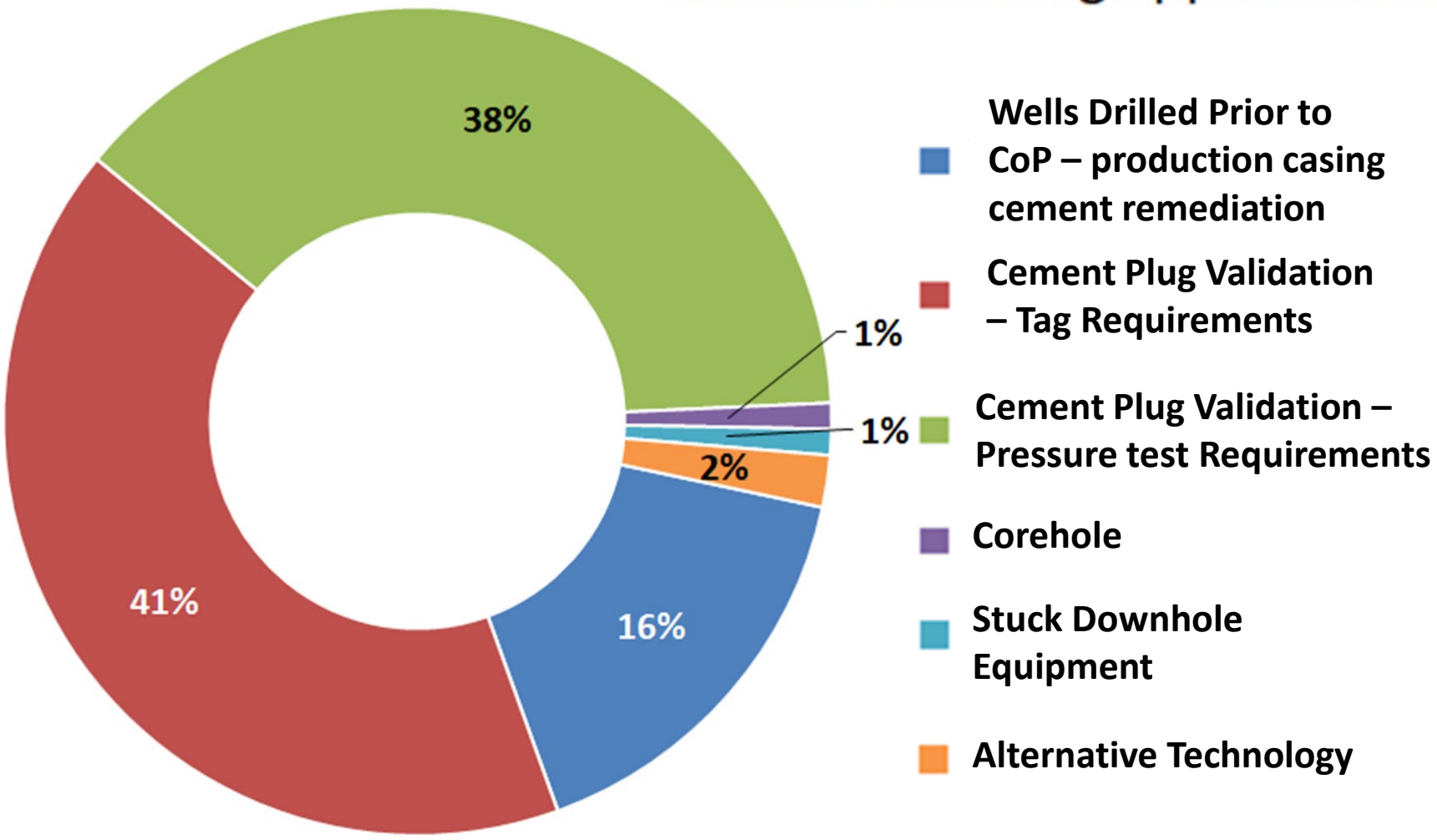
Influences

- OE UK - Guidelines
- OSHA- Guidelines
- API – Guidelines stds & RPs
- SA - Environmental Impact Reports
- NSW - Chief scientist & Engineer reports

Alternative Means of Compliance

AMoC population

- Commenced 2015
- ~ 120 Applications Received
- ~ 20 - Construction Applications
- ~ 100 - Decommissioning Applications



*What is **industry's perception** of the **alternative means of compliance**?*

*Is it seen as only a **mechanism** for **dispensations** rather than seeking **alternative methods** to achieving the **principles** of the code?*

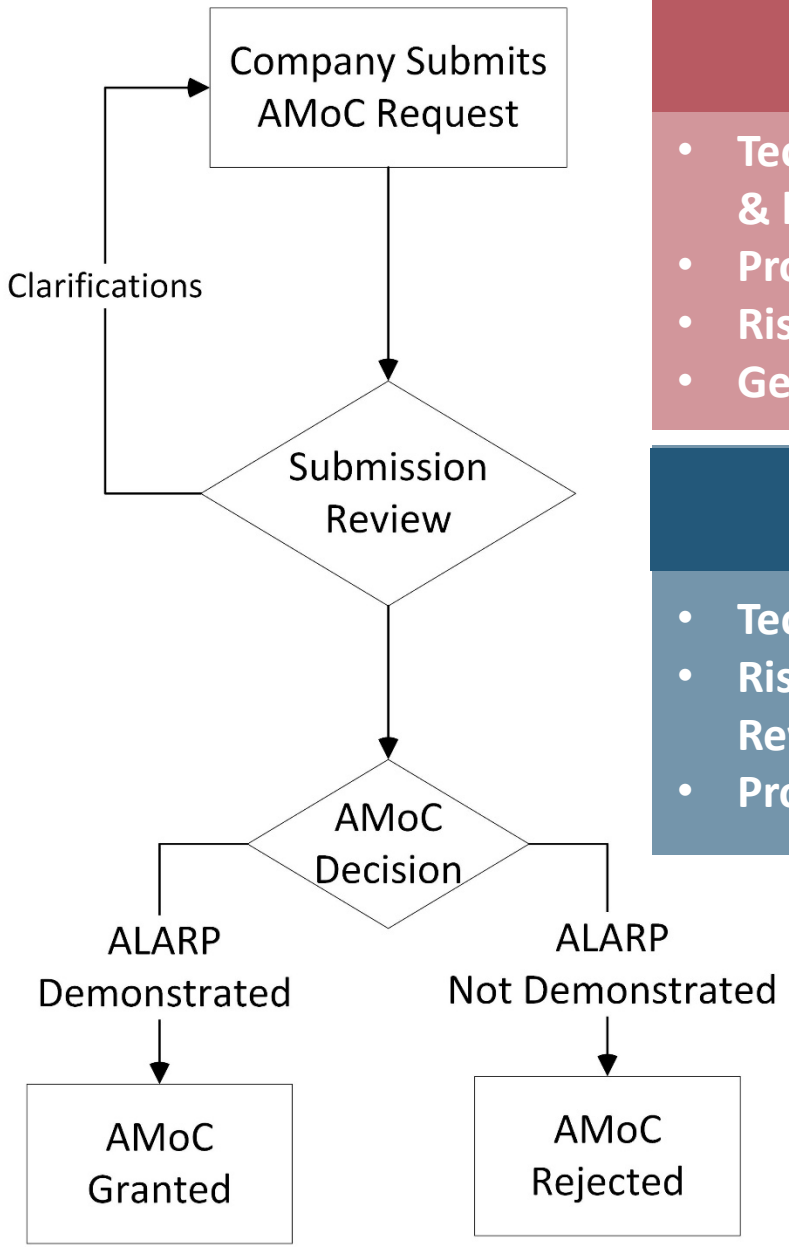
*Is the AMoC **approvals process impeding** the implementation of **alternative technology** in the oil and gas sector ?*

***OR** - **hindering** future improvement opportunities and efficiencies for the **decommissioning** of **petroleum wells**?*

Alternative Means of Compliance – Current Process

CoP Hierarchy

- Principles
- Means of Compliance
- Good Industry Practice

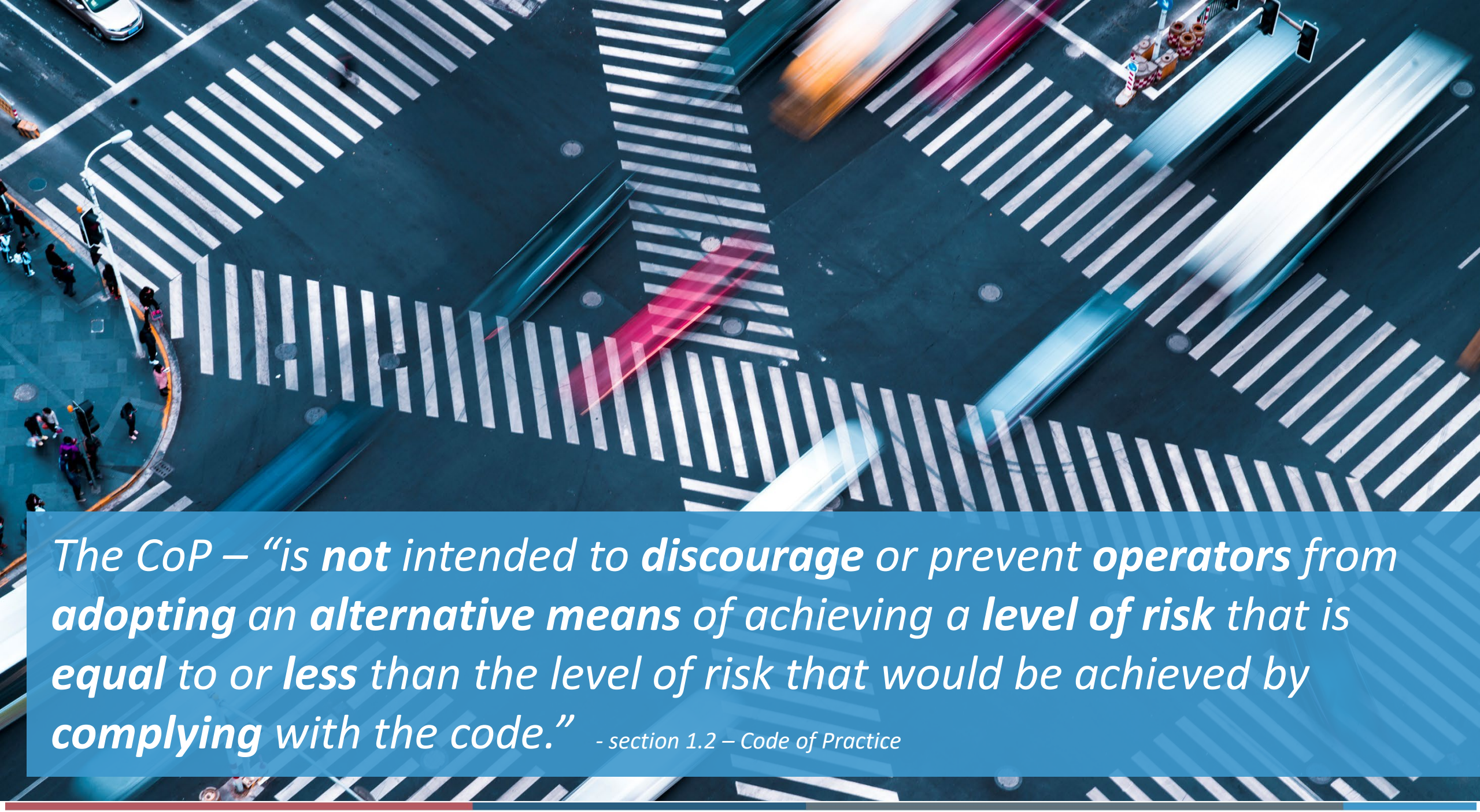


Application

- Technology Overview & history
- Program Details
- Risk Assessment
- Geological details

Review

- Technical Review
- Risk assessment Review
- Proposed Controls



*The CoP – "is **not** intended to **discourage** or prevent **operators** from **adopting** an **alternative means** of achieving a **level of risk** that is **equal** to or **less** than the level of risk that would be achieved by **complying** with the code."* *- section 1.2 – Code of Practice*

AMoC Case Study – Bentonite Plug trials

Bentonite Plugs

- Used in Water industry & O&G applications Internationally
- Potential Improved long term Sealing Capabilities
- Lower cost product than Cement
- Environmentally sustainable

Code of Practice

"Cement must be used as the primary sealing material. Cement testing must be carried out as per requirements set out in Section 3.6 of the Code."

*section **3.16.2 – (d)** – Code of Practice*

AMoC Application

- Technical Brief – Installation & Application
- Risk Assessment
- Quality Control and Assurance

AMoC Approval

- OEM QA/QC Process
- OEM installation Processes
- Plug validation
- Contingency Plan
- Monitoring Plan

Technology Maturity Cycle

Considerations

Assessing a new technology's risks requires additional considerations compared to proven technology

The maturity level of a technology is a driver for the controls required to manage risk

A shared system of categorising a technology's readiness level improves decision making and risk management processes

API Technology Readiness Level Scale

TRL 0 — Unproven Idea — Concept

TRL 1 — Concept Demonstrated

TRL 2 — Concept validated

Proof of Concept

TRL 3 — New Tech tested

TRL 4 — Technology Qualified

TRL 5 — Technology Integration tested

Prototyping

TRL 6 — Technology Installed

TRL 7 — Proven Technology

Field Qualified

The Future

Current Challenges

CoP – Lacks

- Guidance Material on the AMoC process
- Mapping of principles to associated means of compliance
- Acknowledgement of Technology Maturity cycle

AMoC process

- initial proposals do not include satisfactory risk assessments to support them
- Onerous clarification cycle

Areas for Improvement

Provide Guidance Material on application process requirements

Update of the Code of Practice (FY2024) demonstration of *controls* associated with *hazards or unwanted events*

Consideration of implementation or adoption of

- Technology readiness levels (TRLS)
- Technology readiness assessments (TRAs)