Well Operations in South Australia

International Association of Drilling Contractors, May 2018
South Australian Context

• Historical Regulatory Perspective
• Australian and International Standards initiative
• Past and Present South Australian well operations
• Some regulatory matters of interest
• Some interesting projects in South Australia
Regulatory Historical Perspective

Pre-2000:

- Petroleum Act 1940
- Covered licensing, environment and OH&S
- Prescriptive regulations – tick box regulation
- 1989 OH&S provisions transferred to OH&S Regulations
  - Occupational Health, Safety and Welfare Act 1986
  - Petroleum Work Regulations (old Petroleum Regulations)
  - Now: WHS Act 2012
Prior to 2000: Prescriptive Regulatory Regime

284—Regulation of certain practices
A person must not—
(a) snap-up a tool joint with an automatic cathead or pipe joint breaker—jaw clutch type that automatically disengages its clutch at the completion of a fixed cycle or travel; or
(b) use the rotary table for the final making-up or initial breaking-out of a pipe connection; or
(c) handle the spinning chain over the rotary table while it is in motion.
Prior to 2000: Prescriptive Regulatory Regime

286—Blowout preventer closing units

(1) Blowout preventer activating accumulator units, must be located at least 15 metres from the wellhead and, without accumulator pump assistance, must have sufficient capacity to—

(a) open or close the hydraulically operated choke line valve; and

(b) close or open the annular type blowout preventer; and

(c) close or open 2 blowout preventer pipe rams.
Depended on Regulator Inspection and Verification

Richard (Dick) Hancock
Regulatory Paradigm Shift
Regulatory Paradigm Shift

- *Petroleum and Geothermal Energy (PGE) Act 2000*
  - Duty of care
  - Safety Case Philosophy
  - Objective risk based
  - Fitness for Purpose Demonstration Provisions
    - Equipment
    - Facilities
    - Management Systems
  - Licensee responsible to demonstrate can meet objectives
Regulatory Paradigm Shift

- Model Work Health and Safety (WHS) Legislation
  - 1st January 2013
  - Replace prescriptive Petroleum Work Regulations with:
    - Duty of Care
    - Objective risk based/Safety Case Philosophy for MHF
Small Gas Release
Gulf of Mexico
Longford, 1998
Moomba Plant, 2004
Varanus Island, 2008

Security of Gas Supply
Environment

Small leak

![Diagram showing the relationship between severity and frequency for different types of gas releases and leaks.](image)
Montara Blow Out

**Threat:**
Loss of well control

- Cement Plug
- BOP
- Drilling Mud
- Cement Shoe Integrity

**Critical Preventative Controls**

**Mitigative Controls**

**Well Tie In**

**Incident Blow Out**

**Escalating Factors (Source of Root Causes)**

- Well Design
- QA Construction
- PTW
- MOC
- SOPs/COPs
- Maintenance
- Training/Competency

**Consequences:**

- Fire
- Marine Spill
- Reputation
- Financial losses
- Offshore industry trust

- Relief Well
- Spill Response
- Ignition Control
- Evacuation

**Government of South Australia**
Department of the Premier and Cabinet
Commonwealth Government: Standards Initiative
COAG opportunities for jurisdictional collaborations:

1. Improving information on gas resource, reserves and production potential for onshore and offshore gas, and potential underground gas storage, regardless of unconventional or conventional reservoir-type.

2. Improving public availability and accessibility of rigorous science and factual information on all types of gas sources and extraction methods.

3. Consideration of leading practice regulatory frameworks that effectively manage the risks and address issues for onshore and offshore gas, and underground gas storage.

4. Supporting leading practices in industry for responsible development of onshore and offshore gas and underground gas storage.
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4. Supporting leading practices in industry for responsible development of onshore and offshore gas and underground gas storage.
Council acknowledges that:

Development of gas from onshore conventional/unconventional and offshore reservoirs…needs to remain internationally competitive…and that it is the primary responsibility of industry to:

• invest in exploration and development to supply gas, and
• protect the environment and maximise benefits by eliminating or minimising adverse impacts on landholders and communities.

Council also recognises that the commercial interests of industry will strive to:

• develop and use cost-effective technological solutions, and
• increase productivity and reliability in production profiles.
Gas Supply Strategy: Action

• **Action 9 Objective:**
  Pursue consistent, efficient and good practice regulation across all onshore gas jurisdictions to facilitate ecologically and economically sustainable upstream gas industry.

• **Strategy:**
  Ensure consistent good industry practice onshore gas standards are deployed across all Australian jurisdictions that will underpin productivity.
WHY IS THIS IMPORTANT

- Objective/risk based regulatory regimes;
- Focus on duty of care;
- Reliant on good industry standards;
- What are such standards and are they fit for purpose?
- Are they consistent across jurisdictions?
- Are they enforced consistently?
- Equipment (e.g. rigs) and licensees operating across borders;
- Are regulatory expectations clear to industry and suppliers?
Council is working with industry led growth centre, NERA, in its:

- Australian oil and gas standardisation initiative
- Mirror committee to ISO/TC 67 (ME092)
Wells Spudded in South Australia
Drilling Applications

![Drilling Applications Chart]

- Drilling
- Production
- Geophysical
Cumulative Well Status in South Australia
Wells Fracture Stimulated: Over 900 without incident!
Rig Status in South Australia

- Ensign Rigs 950, 965, 970 & 971
- Easternwell Rigs 27 (workover), 101 & 106
- Wild Desert Rigs 6, 16 and 22 (workovers)
- Silver City Drilling Rigs 16 and 20 (Leigh Creek Energy)
- Nitschke Rig 2 (Workover)
- Wild Desert Rigs (workover)
- SLR Rig 183 and 185
- Watsons Rig 6
- TDC Drilling Rig 8 (workover)
Well Integrity

To ensure well construction activities satisfy acceptable and fit-for-purpose industry practice relating to safety and environmental protection objectives, ERD routinely reviews and challenges:

• Licensee well design, construction and barrier verification practices;
• General well integrity, ensuring containment of well fluids and isolation of hydrocarbon zones and aquifers through all stages; and
• Ultimately decommissioning of all well assets
Well Integrity

Well integrity lifecycle phases. Source PetroWiki (http://petrowiki.org/Well_integrity_lifecycle)
Cement Integrity Project- Cooper and Eromanga Basin

• Review and assess zonal isolation (of aquifers) by cement behind casing of all wells in the Cooper and Eromanga basins in South Australia.
• Identify potential non-compliances with the PGE Act and any insufficient data.
• Build database to enable us to provide assurance that, when cased production wells are decommissioned, decommissioning program will be compliant with legislative requirements.
  • 2,435 wells entered into database.
• 582 wells identified to have no observable annular cement between two or more aquifers that are required to be isolated under the PGE Act.
  • Over 90% of these 582 wells were drilled prior to the year 2000 under the previous Petroleum Act 1940.
Drilling Rig Fitness for Purpose Assessments

Reviews focus on a variety of operational and technical aspects including:

• rig specifications and certifications;
• hazardous area and electrical compliance;
• operational procedures and risk mitigation measures;
• alignment of health, safety and environment objectives and policies;
• personnel competency;
• third party and internal audits; and
• systems ensuring ongoing validation of FFP.
Haselgrove 3: Ensign 965
Strike Energy Jaws 1: Ensign 965
Leigh Creek Energy UCG Trial: Silver City Rig 20
Leigh Creek Energy UCG Trial: Silver City Rig 20

- Well Design – designed for extreme operating conditions *(operating conditions up to approx. 340°C surface temperature, up to 1200°C bottom-hole temperature)*

- Ultra High Temperature Blend cement required extreme conditions expected during gasification operations:
  - *lab tests performed to 360°C wet conditions, 450°C dry conditions, other labs performed dry tests up to 800°C*

- Premium thread production casing selected for wells anticipated to be exposed to extreme heat conditions *(Casing grade is L-80)*
## HSE Self-Assessment

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<thead>
<tr>
<th>Level</th>
<th>Assessment Criteria</th>
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<tbody>
<tr>
<td><strong>4</strong></td>
<td>HSE in the heart</td>
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<tr>
<td><strong>3</strong></td>
<td>HSE in the head</td>
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<tr>
<td><strong>2</strong></td>
<td>HSE on paper</td>
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<tr>
<td><strong>1</strong></td>
<td>Overall, performance is poor. Awareness may be there, but the implementation of this particular aspect of the management system is haphazard or not in evidence.</td>
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HSE Self-Assessment: Results
Conclusions

• Risk based regulatory regime
• Onus on licensees to demonstrate compliance with good practice
• Australian legislation needs to facilitate good recognised practice
• All this needs to deliver community confidence
• Industry survival depends on community support & trusted regulation
• Keep up the innovative projects
Thank you