Well Integrity

Doug Forbes
Manager – Well Integrity
NOPSEMA’s jurisdiction

NOPSEMA replaced the state regulator as the regulator for wells in Commonwealth waters (April 2011)

The states and NT regulate onshore and coastal water (3NM)

Victoria has conferred its powers to NOPSEMA

A duty holder’s management plan, accepted by NOPSEMA is a legally binding permissioning document:

- Well Operations Management Plan (WI)
- Safety case (OHS)
- Environment plan
Regulatory activities

Assessment

Inspection

Investigation

Enforcement
A performance-based regime requires the titleholder to control well integrity risks to ALARP
• **WOMP is a permissioning document**
  – Owned by titleholder
  – Legally binding commitment by titleholder
  – Regulator role is assessment (acceptance/refuse to accept decision) and subsequent compliance monitoring through inspection.

• **WOMP must:**
  – Be appropriate to the wells and well activities contemplated
  – Be a stand-alone document that is sufficient to meet the contents & level of detail requirements of the regulations without need to refer to other documents external to the WOMP.
• **WOMP to provide for:**
  
  – Identification of hazards and assessment of risks
  – Implementation of measures to eliminate the hazards or otherwise control the risks to ALARP
  – A comprehensive and integrated system for management of the hazards and risks
  – A description of measures to ensure that contractors and service providers are competent and are aware of their responsibilities
  – A description of measures and arrangements to regain control of the well
  – Monitor, audit and review.
• Adopted control measures for any particular identified risk must be shown to collectively eliminate, or reduce that risk to a level that is ALARP.
  – by reasoned and supported arguments, that there are no other practical measures that could reasonably be taken to reduce risks further.

• The ALARP argument will be underpinned by the adoption of appropriate performance standards, sound engineering principles, specifications, good oilfield practice and the implementation of a management system which supports and maintains them.
Standards and guidelines

Technical guidance and standards include, for example:

• Oil & Gas UK – *Well Life Cycle Integrity Guidelines* and *Guidelines for the suspension and abandonment of wells*
• International Association of Oil & Gas Producers – *Capping and Containing recommendations*,
• NORSOK standard D-010 – *Well integrity in drilling and well operations*,
• ISO/DIS 16530 Part 1 - *Well integrity life cycle governance* and Part 2 - *Well integrity for the operational phase*.

These standards have been developed using the expertise of industry, responding to previous accident and incident experience and, in general, prescribe specific design and operational solutions.

The aim of technical standards is to ensure that wells are designed, constructed and operated using good industry practices and sound engineering principles, ensuring the risks will be reduced to ALARP.
Well barriers are the cornerstone of managing well integrity

The primary purpose is to maintain full control of fluids at all times to prevent the loss of containment to the exterior of the wellbore. This is achieved by employing and maintaining one or more well barrier envelopes.

Well barrier element

For a well barrier element to be considered operational, it should be verified and maintained through regular testing and maintenance. The location and integrity status of each well barrier element should be known at all times.
Hazards:

Reservoir fluids & characteristics – pressure & temperature, \( H_2S, CO_2, H_2O \)......

Geological formations – faults, fractured carbonates / thief zones / depleted sands, squeezing salts, moveable shales, pore pressure & fracture gradients: overpressure / under-pressure zones, pressure ramps

Environment – Weather, tides, corrosion, fatigue, cyclic and thermal loadings, collisions
Thank You