Blowouts show **Human and Organisational** factors as primary causes

- **Industry Standards**, both corporate and International give good guidance to prevent MAE’s.
- **Regulation** sets out expectations to protect people and the environment

**Loss of control events** still happen:

- Incorrect Prognosis
- Barrier Failures
- Exceeding design constraints
- Human error
- Failure to learn
- Poor sharing

**Design is not the issue** with some exceptions.. failures are in **execution**.

*Operators are not short of data, but are short of access, timely, quality, transparent analysis of the data, particularly of trends* – **This is a resourcing and organisational choice**
WEPA Process

Key Elements

1. WEPA DCR Introduction
2. Identify candidate well(s)
3. DNRM data request

Review Regulatory Compliance:
4. Operator Standards
5. Well Design & Planning
6. Rig Selection
7. Specialised equipment selection (e.g. MPD)

Monitor:
8. DDRs
9. MOCs in drilling
10. Well barrier validation
11. Well Incident (if any)
12. Well suspension/abandonment

Drilling outcomes:
- Technical challenges, lessons learnt, innovation

Present Findings to Industry late 2018

Operator Engagement/Data Request

Well Design

Well Construction

WEPA DCR 2017-18

Confidential – Draft, Not for Distribution
**Well Construction**

**PGI Daily Barrier Assessment**  
– based on Operator DDR and other reports

**Activity:** Drill 8-1/2" hole section to TD in conventional mode or using Aerated drilling (contingency)

<table>
<thead>
<tr>
<th>Primary Barrier(s)</th>
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<tbody>
<tr>
<td><strong>Barrier Element Type</strong></td>
<td><strong>Display Name</strong></td>
</tr>
<tr>
<td>Fluid Column</td>
<td>8-1/2&quot; Drilling Fluid</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Barrier(s)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Barrier Element Type</strong></td>
<td><strong>Display Name</strong></td>
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<tr>
<td>Drilling Adapter</td>
<td>9&quot; STS Drilling Adapter</td>
</tr>
<tr>
<td>Casing</td>
<td>9-5/8&quot; Surface Casing</td>
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<tr>
<td>Casing Cement</td>
<td>9-5/8&quot; Surface Casing Cement</td>
</tr>
<tr>
<td>Drill String &amp; BHA</td>
<td>Drill String</td>
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<tr>
<td>Drilling BOP</td>
<td>Drilling BOP</td>
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<tr>
<td>Stab-in safety valve</td>
<td>Stab in Safety Valve</td>
</tr>
<tr>
<td>Wellhead Spool</td>
<td>9-5/8&quot; STS Casing Head Housing &amp; SOVs</td>
</tr>
<tr>
<td>MPD System</td>
<td>MPD System</td>
</tr>
</tbody>
</table>

**Additional Barrier Verification Comments:**

4. **Unknown** whether the STS drilling adapter was locked to the casing head housing by tightening the lock screws to 250ft-lb torque.

5. **Unknown** whether P tests were “stable” as required by the Drilling Program (4.11):
   - Offline 9-5/8” seal connection P test
   - 9-5/8” casing head & 3-1/8” SOV P test
   - 9-5/8” casing P test (on plug bump)

6. **Unknown** whether the 9-5/8” casing centralisers were run according to plan
Well Construction

PGI Daily Barrier Assessment

Daily Integrity Report (DIR) **sent to operator** as part of compliance check
Standards
- General compliance but Individual exceptions

  - Notable **failure to comply by smaller independent operators** – use of consultant drillers struggling to build standards from scratch.

Well Design
- Common risks taken in design choices, particularly casing

  - Finalised **very late – impact on risk**

Well Construction
- Close monitoring and feedback beneficial to regulator and operator

- The **Daily Drilling Report (DDR)** focused is **performance and OHS not MAE**

  - **DIR** did give regulator and operator insight into **escalating** non compliance risks

  - Supporting data/evidence often lacking to demonstrate compliance with operator own standards

  - One example of **major failure of kick detection** systems/human error – typically unreported outside of the WEPA
PRELIMINARY KEY FINDINGS of Well Control Incident (WCI):

1. **PP prognosis failure** – drilled underbalance into overpressure hydrocarbons, causing large influx initially undetected and consequent risk of catastrophic loss.

2. **Failure of kick detection systems/Signal negligence** Kick was not detected and BOP closed > 100 bbls influx.

3. **DDR report** – DDR contains insufficient information in a well control incident to interpret well integrity condition and risk development during recovery operations.

4. **Decision-making process** – Decision making and impact/risk assessment to prevent escalation to an MAE is not clear.

5. **Heightened Risks to personnel and environment inevitable in a serious WCI**– risk of underground blowout, gas broach to surface, and uncontrolled flow through drill string or via annulus due to human error and/or loss of barrier integrity.

6. **Daily Integrity Reporting by regulator (DIR)** – facilitating deeper learnings around the incident through transparency, which will benefit industry.
Preliminary Conclusions of the WEPA

1. Some evidence of **failure to follow approved plans** during execution, particularly when problems develop. **MOC’s do not tell** the complete picture

2. Daily Integrity system approach created **transparency** when deviations occur, and forced better management response.

3. WEPA programme showing potential to **reduce MAE risk** through transparency by encouraging operators to consider recovery operations more **evidence and analysis based**.

4. The WEPA process has important implications for **Oil and Gas wells** but also emerging **Geothermal well** projects where, due to current absence of global standards, compliance challenges exist

5. Blowout **underwriters supporting WEPA/DIR** programme as useful contribution to reducing MAE
VISION…..

❑ Use a harmonize WEPA approach across Australia States and Territories’ regulators

➢ Use a similar WEPA approach across several International regulators, Asia Pacific Region & ANZAC.

➢ This would create a limited but global barrier validation best practice and potential failure data base for well construction

➢ Include all critical component failures affecting well integrity

➢ Aligns the safety of ‘Wells’ industry with aviation by sharing failure events globally cutting across national and corporate boundaries

➢ Regulators could show the lead as in Queensland in a limited scheme Operators may follow and create a truly global “Deep Learning’ System!

❑ Set up an equivalent of the NTSB/AAIB specific to wells industry to investigate Loss of well control MAE’s.
Thankyou
Queensland has an intensive wells programme particularly for CSG in the last several years, which will continue and grow again due to domestic gas demand, but does not have permissioning or wells examination regulations.

A ‘Code of Practice’ for Wells design and construction is in force, co-written by operators and the regulator, as enshrined in the regulation.

[Graph showing CSG and Petroleum Wells Drilled in Queensland]