Better well integrity

US-Norway Technology Partnership Conference, Minimising Oil Spills and Discharges to Sea
Ken Feather – VP Marketing & Sales, Well services
Houston, 30 March 2011

Agenda

1. Industry challenge
2. Life-of-well integrity solutions
3. Overview of Archer
4. Questions
Industry challenge

A typical well...

> 2000 components

harsh conditions

wells fail
% of wells with integrity issues

<table>
<thead>
<tr>
<th>Region</th>
<th>Percentage</th>
<th>Wells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gulf of Mexico</td>
<td>45%</td>
<td>6,650</td>
</tr>
<tr>
<td>North Sea, UK</td>
<td>34%</td>
<td>1,600</td>
</tr>
<tr>
<td>North Sea, Norway</td>
<td>18%</td>
<td>482</td>
</tr>
</tbody>
</table>

1. US Minerals Management Service survey, 2004. Reported 6,650 out of 14,927 active wells had sustained annular pressure in deepwater and shelf GOM.
2. SPE North Sea Well Integrity Challenges, 2009. Approx. 100 participants indicated no. of wells with at least one anomaly. Average 1,600 out of 4,700 active wells.
3. Norwegian Petroleum Safety Authority, Well Integrity study, 2006. Study sampled 482 of 2,682 wells. 18% of wells had well integrity failures or issues. 7% completely shut in owing to integrity issues.

Failures affecting well integrity & performance

Integrity and performance failures

<table>
<thead>
<tr>
<th>Failure Type</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Tubulars</td>
<td>41%</td>
</tr>
<tr>
<td>Annular integrity</td>
<td>20%</td>
</tr>
<tr>
<td>Zonal isolation</td>
<td></td>
</tr>
<tr>
<td>Safety &amp; other control systems</td>
<td>20%</td>
</tr>
<tr>
<td>Corrosion</td>
<td>14%</td>
</tr>
<tr>
<td>Scale</td>
<td>5%</td>
</tr>
</tbody>
</table>

1. OTM Consulting & Archer market survey 2010. Data shows relative distribution failures affecting well performance encountered by survey participants. Based on global industry sample of 20 well performance experts.
The cost of well integrity failures

Global wells affected by integrity issues

- Shut in permanently
- Shut in temporarily
- Operating under dispensation
- Operating normally

38%
760,000 wells

19% shut-in, ~$1 billion/day lost

1. OTM Consulting 2006. Calculated percentages of global wells (oil & gas) operating under dispensation or shut-in permanently or temporarily. Global averages developed from OTM’s internal regional market models for all oil and gas wells, issue fractions weighted by number of wells per region.


Assume 19% of operating wells are shut-in due to integrity issues. Then production comes from 729,000 wells (average 110 bopd/well); 891,000 wells (average 56 boepd/well). Assume that shut-in wells would produce same average per day then potential production oil is 109,771,000 thousand bopd; gas is 35,325,000 thousand cubic feet. Therefore lost revenue oil is 10,977,100 * $61 = ~$681 million/day; gas is 35,325,000 * $4.4 = 158 million/day. Total lost potential revenue is ~$839 million/day.
Two main types of well integrity issue

Leak flow
tubing, casing, valves, packers...

Annular flow
cement integrity, packers, plugs...

Life-of-well integrity solutions

Cflex™
Annular seal integrity extends well life

VMB™ plug
Safe & secure “zero-bubble” well suspension

Point®
Bringing clarity to well integrity management

Performance eye
3D perspective on well performance

Well delivery Well performance
Annular seal integrity & zonal isolation

Annular seal integrity

Cflex™
– From the specialists in well barrier technology
– Annular seal integrity with unique staged cementing capability

Key benefits
– Fullbore ID: No need to drill out
– Slimmer OD: Easier flowpath
– Any material: Inbuilt integrity
– V0 rated: Zero bubble
– Locks permanently: Security
Temporary or permanent well suspension

Safe & secure “zero-bubble” well suspension

VMB plug
- From the specialists in well barrier technology
- Safe & secure V0-rated well suspension plugs
- Precision engineered products take well integrity assurance to a new level
- Temporary or permanent well suspension

Key benefits
- Safety & security
- Efficiency, lower cost
Diagnosis

Dealing with well integrity issues

Integrity management challenges

77%

Gathering & analysing data
Competency
Equipment availability

Bringing clarity to well integrity management

The Point™ system
- Unique technology reveals serious integrity failures rapidly and precisely
- Bringing clarity to well integrity management, improving well efficiency and extending well life

Key benefits
- Fast, precise location of failures
- Confidently select and target correct remediation

Where is the leak?

Better data, better decisions…
Where is the leak?

Better data, better decisions...

Visualising & measuring the well in 3D

Performance eye
- Breakthrough in wellbore spatial imaging technology
  - Operates in all well fluids
  - Hi-definition 3D images
- Enabling operators to manage wells more effectively, improve well performance and extend well life.

Key benefits
- Rapid, complete diagnosis
- Improved well performance
Revealing the well in 3D with startling clarity

Overview of Archer
Our purpose:

Deliver better wells to help our customers produce more oil and gas.
Our portfolio structure

Drilling services
- Platform drilling
- Land drilling
- Modular rigs
- Directional drilling
- Drill bits
- Drilling & Completion fluids
- Tubular handling
- Cementing tools
- Plugs & Packers
- Underbalanced services
- Rentals
- Engineering

Well services
- Wireline intervention
- Wireline logging
- Integrity diagnostics
- Imaging
- Production monitoring
- Coiled tubing
- Completion services
- Fishing
- Specialist intervention

Our global reach

[Map showing locations around the world with labels for various regions and cities]
Thank you.

Questions?