



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

Archer
The well company

Agenda

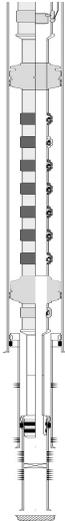
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1. Industry challenge
2. Life-of-well integrity solutions
3. Overview of Archer
4. Questions

Industry challenge

A typical well...

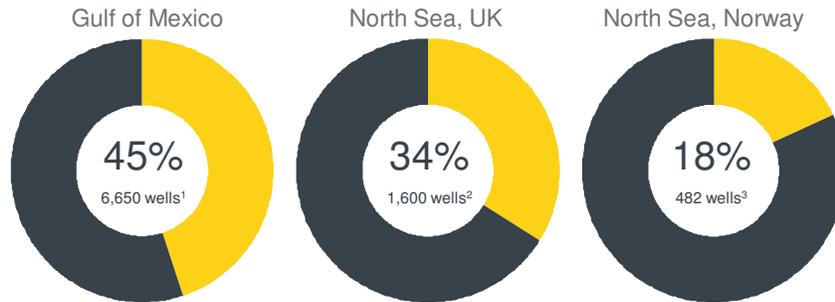
- > 2000 components
- harsh conditions
- wells fail



A global challenge

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% of wells with integrity issues



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 forum 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.

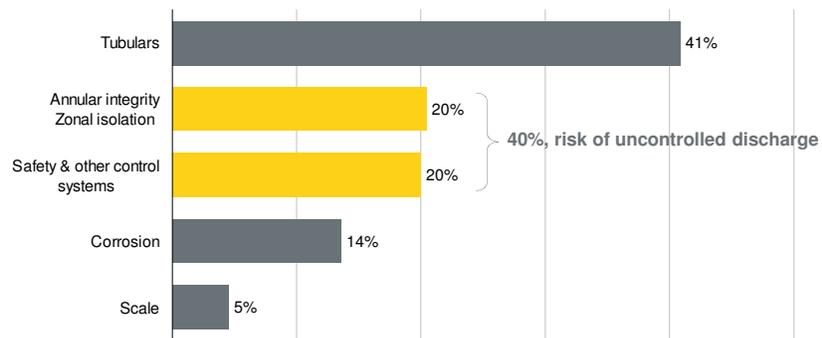
³ Norwegian Petroleum Safety Authority, Well Integrity study, 2006. Study sampled 406 of 2,682 wells. 18% of wells had well integrity failures or issues. 7% completely shut in owing to integrity issues

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Failures affecting well integrity & performance

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Integrity and performance failures



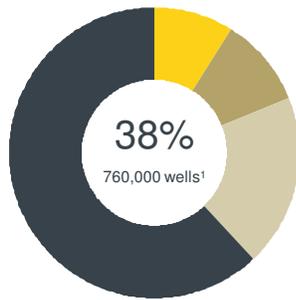
¹ OTM Consulting & Archer market survey 2010. Data shows relative distribution failures affecting well performance encountered by survey participants. Based on global industry sample of 20 well performance experts.

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The cost of well integrity failures

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Global wells affected by integrity issues



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

19% shut-in, ~\$1 billion/day lost ²

¹ OTM Consulting 2009. 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.

² BP Statistical review of world energy 2010; US EIA-28 2009; OTM Consulting 2011. 2009 oil production 79,948 thousand boepd; 2009 gas production 284.5 billion cubic feet per day, 50,271 thousand boepd. Average 2009 oil price \$61/bbl, average gas price \$4.4/thousand cubic feet ~\$25/boe. [BP 2010].

Aggregate global lifting costs (combined oil and gas calculated using \$ per bbl or boe) \$11.50. [US EIA-28, 2009]. Aggregate global revenue oil \$49.5/bbl, gas \$13.5/boe.

Global operating wells oil ~900,000; gas ~1,100,000 [OTM Consulting 2011]

Assume 19% of operating wells are shut-in due to integrity issues then production comes from oil 729,000 wells (average 110 boepd/well); gas 891,000 wells (average 56/boepd/well).

Assume that shut-in wells would produce same average per day then potential production oil is 110*171,000=18,810 thousand boepd; gas is 56*209,000 = 11,704 boepd.

Therefore lost revenue oil is 18,810*49.50 = \$931 million/day; gas is 11,704*13.50 = \$158 million/day. Total lost potential revenue is **\$1,089 million/day**.

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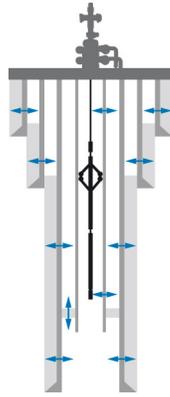
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Life-of well integrity solutions

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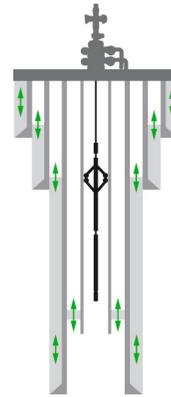
Two main types of well integrity issue

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Leak flow

tubing, casing, valves, packers...



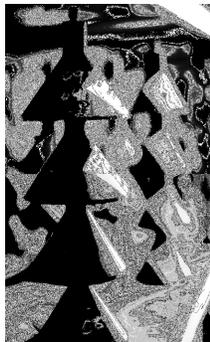
Annular flow

cement integrity, packers, plugs...

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Life-of-well integrity solutions

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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



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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

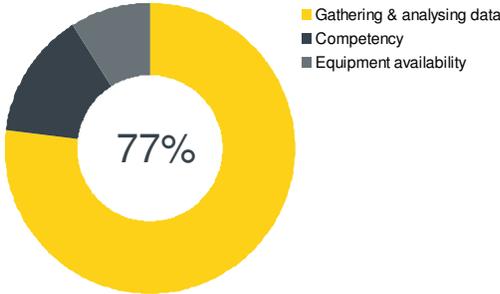
- Safety & security
- Efficiency, lower cost



Diagnosis

Dealing with well integrity issues

Integrity management challenges



1 SPE North Sea Well Integrity forum, Nov 2009 & Drilling Engineering Association (DEA) Europe, March 2010. Data compares main challenges faced by operators in managing well performance. 100+ operator participants.

Bringing clarity to well integrity management

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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

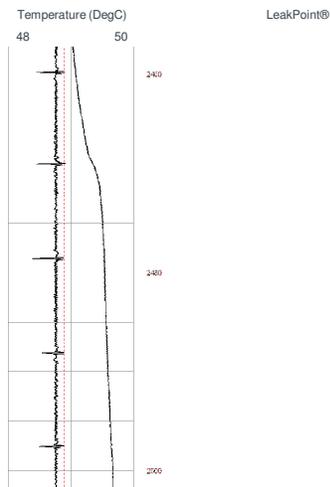


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Where is the leak?

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Better data, better decisions...

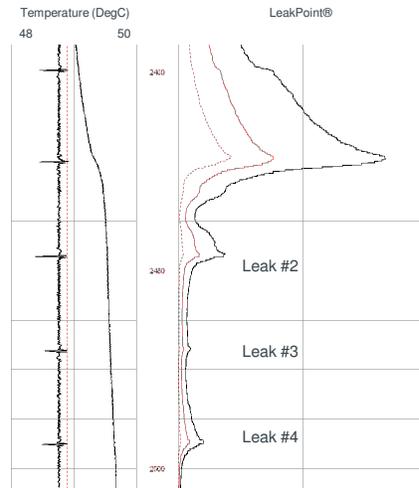


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Where is the leak?

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Better data, better decisions...



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Visualising & measuring the well in 3D

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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



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Revealing the well in 3D with startling clarity

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Overview of Archer

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Seawell
Noble Platform Drilling
Peak Well Solutions
TecWel
Gray Wireline
Universal Wireline
Allis-Chalmers Energy



We are Archer
The well company

Our purpose:

**Deliver better wells to help our customers
produce more oil and gas.**

Our portfolio structure

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Our global reach

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Thank you.

Questions?