



# Annulus plug update

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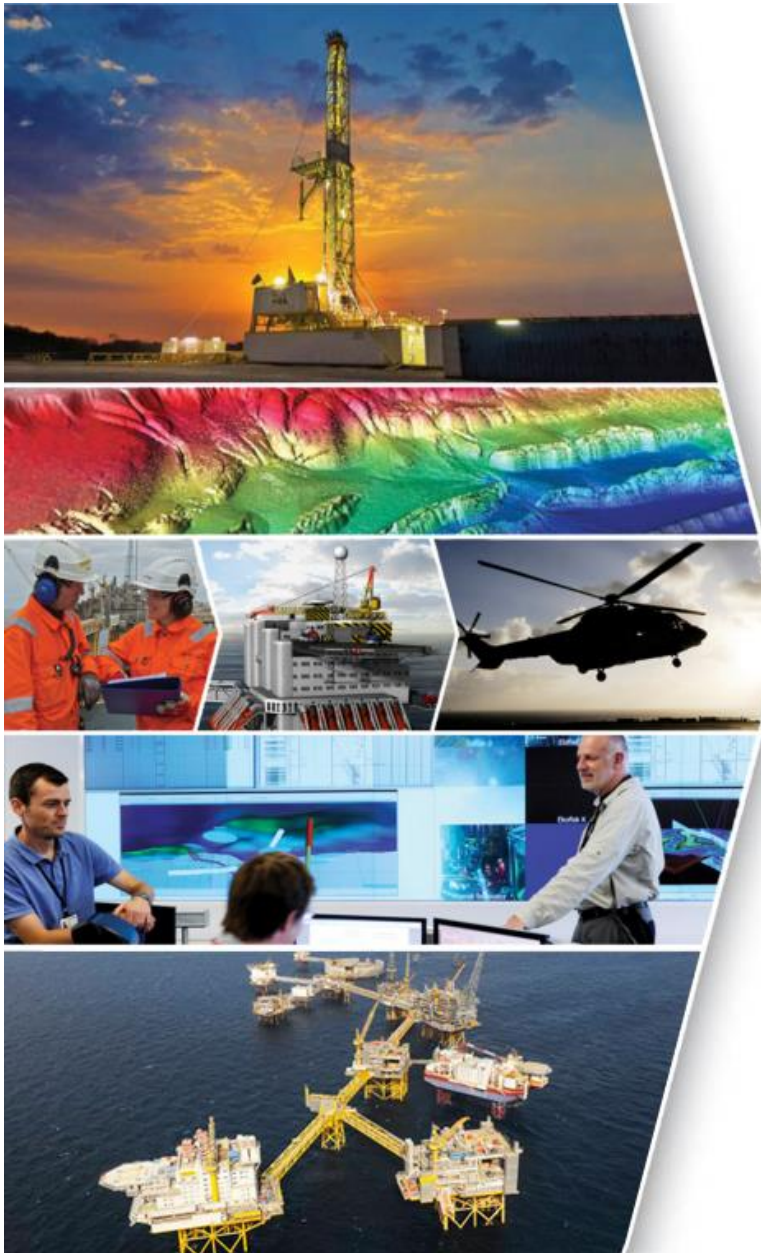


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# We are looking for

Our goal is to set perfect P&A plugs – in one run. And then to do it FASTER.

What we need:

- Big hole – more open area
- Disappearing guns
- Foundation
- Logging

In order to do perfect operations in one run.

Our message to suppliers:

- Need bundling/larger scope per contract
- Will support developments

Our message to other operators:

- Cooperation is needed
- Share information openly



# ConocoPhillips P&A work

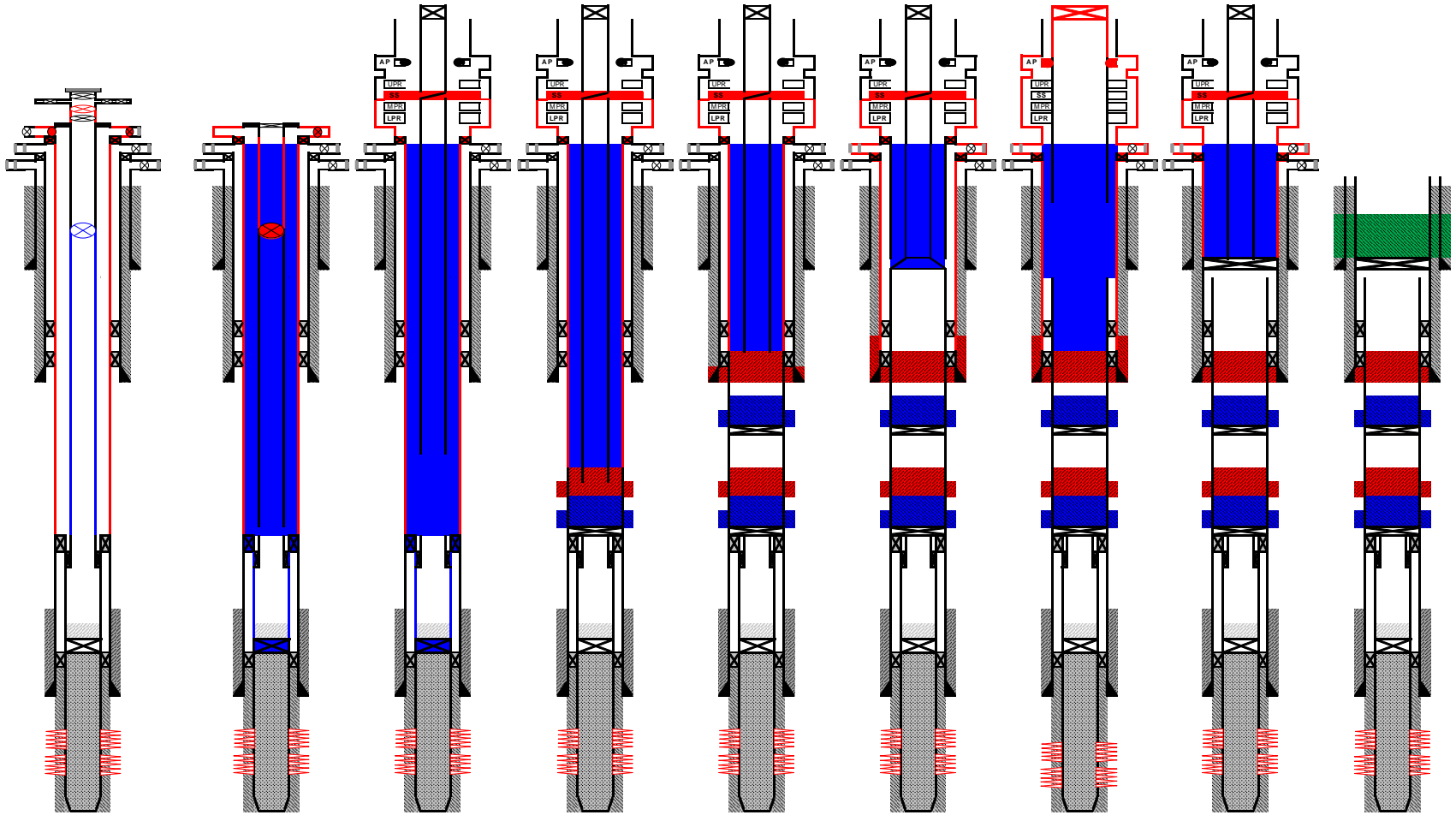
- As of Q4 this year we expect to do both slot recovery and permanent type P&A work for years
- Will have three strings doing permanent P&A work as of mid 2015
- The typical Ekofisk P&A requires 5 plugs and the SOW > 50 days (number refers to a permanent P&A)



# Typical Ekofisk P&A

Nipping topside    Retrieve tubing    Set reservoir plugs    Set Miocene plugs    Cut 9 5/8" casing    Pull 9 5/8" casing    Perf 13 3/8" casing

TR DHSV
20" Conductor
CTC
9 5/8" Integral csq hanger
13-3/8" Casing
Min setting depth Miocene plug
Mid Miocene
Min setting depth res plug
5 1/2" Scab liner top packer
Seal stem assy
9 7/8" TOC (CBL)
TOC above retainer calc
Cmt retainer
5 1/2" liner top packer
9-5/8"x9-7/8" Prod Casing
Top Ekofisk
Top Perf
5 1/2" liner



# ConocoPhillips – P&A fundamentals

## Fundamentals

- Work as per NORSOK guidelines
- Well design in combination with depletion history, drilling practices and the “cross sectional” requirement from the guidelines will normally force an “annulus cement operation”
- Energy/power to remove steel + lift same + clean out annulus => jointed pipe

## Options to achieve a cross sectional barrier (today)

- Prove cement bond and fill casing
- Section mill and place cement
- Standard P/W/C (read SPE paper # 148640)
- Jet type P/W/C

## Other options (parked/in the future)

- Burn
- Expand
- Creeping shale

# Status and forward plans annulus set plugs

## Current status for nested strings

- Currently undergoing a field trial
- In the market for dual string cement bond verification tools

## Current status jet type P/W/C for single string

- Tested/drilled out & logged
- Status as a contingency solution

# Annulus plug

Issues to be considered;

- Foundation
- Read back (washing technique)
- Backcementing (go slow – wash, dilute and place)
- U-tube (during connection)
- Cement volume – going slow leads to higher cement volume
- Cement through top drive



# ConocoPhillips funds technology developments

With the ambition to do perfect P&A operations in one run;

- Big hole – more open area
- Disappearing guns
- Foundation
- Logging

Other elements:

- Returns handling
- Fluids
- Step change technology, possibly with Coil, Wireline or other



# Questions?

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