Don’t Abandon Geophysics
The Value of Seismic Data for Decommissioning & Restoration
Late Well Life and Well Abandonment, 27th of June 2018

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### Agenda

- **The big picture** – decommissioning in the UKCS
- **What we are trying to do** – Legislation, guidelines and strategy
- **Subsurface Isolation Strategy** – How we decide where to isolate and the seismic contribution
- **Gannet C Case Study**

- **I will not talk about**:
  - Assessment for ‘Cessation of Production’
Decommissioning in the UKCS

Cost estimates increasing but
£18 BILLION
by 2025
£47 BILLION
by 2050 (today's money)

Over 500 Installations
(>100 platforms by 2025)

3650 wells
1470 by 2025 | 180 per year
3000 pipelines
across 7130km

Total spend
2010: 2%
2015: 5%
2017: 12%
(£2 BILLION)

Wells (P&A)
47% of total costs

OGA target
35% cost reduction by 2020

Cost per well
£2 Million (platform)
£8 Million (subsea)
Despite low rates

Long expected but
94% of projects in early planning

Sources:
https://www.ogauthority.co.uk/decommissioning/, https://www.ogauthority.co.uk/media/1020/oga_decommat_strategy.pdf,
Legislation, Guidelines and Strategy – For ‘Perpetuity’

- **Industry Legislation**: “so far as is reasonably practicable, there can be no unplanned escape of fluids”

- **Industry Guidelines** (Good Practice)
  - 2015 update: Isolate “flow potential” not “permeable zones”
  - Formations can be grouped if crossflow acceptable, allowing fewer isolations

- An integrated **Subsurface Isolation Strategy (SIS)** is created to address:
  - Which formations to isolate
  - Which depth range isolations can be placed

- Integrated SISs reduced **300 days scope and >350,000hrs** exposure from Shell UK subsea abandonment portfolio with significant additions from an optimised execution strategy.

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* (The Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996)
** (Oil & Gas UK Guidelines for the Abandonment of Wells (Issue 5, July 2015)
Considerations for the SIS

- Aim to isolate flow potential from surface

- However, obstructions make it difficult (costly!) to reach some depths and set plugs

- Avoiding obstructions with shallower isolations can create pressure/cross-flow risks

- Data mining is a key challenge
Considerations for the SIS

- Geophysics contributions:
  - Permeable/flow potential identification
  - Aquifer size
  - Connected reservoirs (+ aquifer)
  - ‘Thief’ sand extent & traps
  - Fault mapping (reactivation)
  - Connection to other wells
    - Introducing hydrocarbons/pressure to previously benign formations

- Repeat for the overburden!
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- Discipline integration is key!
Gannet C Introduction

- Stacked Palaeocene/Eocene turbidite reservoirs encircling a salt diapir – all connected
  - Forties, Bittern, Cromarty, Gannet Tay

- Hydrostatic virgin pressure, strong aquifer support

- 4 drill centres, 11 Production wells, 4 E&A wells (plus sidetracks).

- Abandon 7/9 watered out oil rim wells.
Gannet C Overburden

Interpretation over large areas (of no previous interest) to assess flow potential - crucial where there was no well data available. **Shallow gas mapping justified removal of 5 plugs.** *Saving: 3,283 man-hrs, 23 days rig time*

Data courtesy of CGG
Regional Overburden Assessment

Even larger areas interpreted, mapping sand coverage and connectivity to investigate removing additional isolations. Insufficient understanding and legacy wells ultimately prevented this option.

Data courtesy of CGG
Summary

- More than ever we work with large incomplete datasets, short time frames and risk to:

  Improve HSE, cost and asset value

- Seismic data is key whenever we need to see away from the well, or where there is incomplete well data to predict the subsurface properties (particularly flow potential).

- For example, for Gannet C, Geophysics is directly responsible for:

  Saving 3,283 man-hrs, 23 Days rig time

- We still have a lot to learn and a long way to go!
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