



## Shelley Decommissioning Project



# Shelley Decommissioning Project

## Premier Oil Company Overview

- Independent oil and gas Operating Company with corporate office in London. Established 40 years ago.
- JV Partners in several UK (Wytch Farm, Scott & Telford, Kyle, Nelson) , Norway (Froy and Bream), West Africa and Pakistan Assets.
- Operator in oil and gas fields offshore Indonesia and Vietnam.
- Acquired Oilexco in 2009 - Balmoral and Shelley Operating Assets.
- Acquired Encore in 2011.
- Several Operated development projects underway; Solan and Catcher.
- Several Non Operated development projects underway; Huntington and Greater Rochelle.
- A growing organisation.

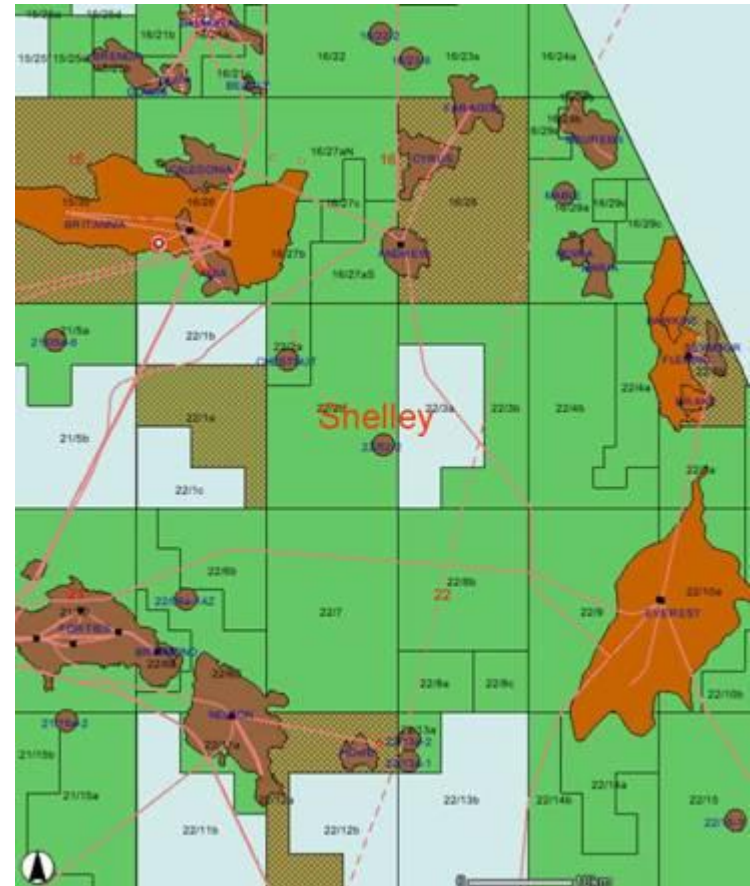
# Shelley Decommissioning Project Agenda

- Shelley Field Overview
- Project sequence
- Project equipment re-cycle for re-use, free issue and disposal
- Project budget & schedule overview
- Summary

# Shelley Decommissioning Project

## Field Overview

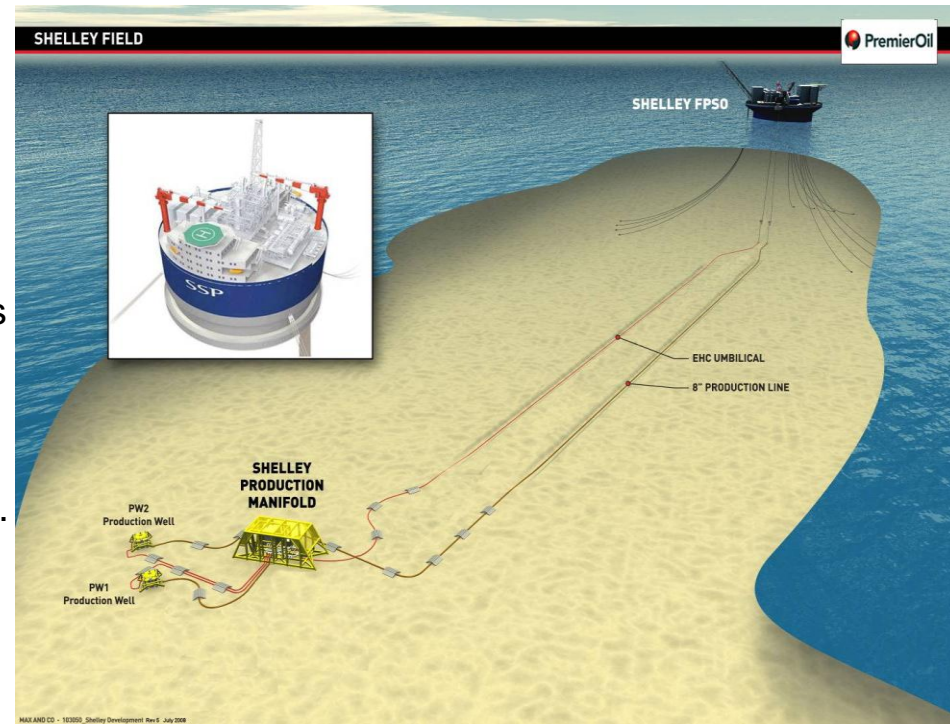
- The Shelley field is located in block 22/2b and 22/3a, in the Central North Sea, approx 192km North East of Peterhead.
- Originally developed by Oilexco with first oil in August 2009.
- The estimated total recoverable reserves for the field was 20million barrels of oil. Subsea design life 3 years.
- Unfortunately due to poor reservoir performance Cessation of Production resulted in July 2010.
- The field was developed based on a 2 well tie back to the FPSO Sevan Voyageur.
- Water depth 96m.



# Shelley Decommissioning Project

## Field Overview

- 2 subsea production wellheads, xmas trees and fishing friendly structures.
- 2 dual Electrical Submersible Pumps (Schlumberger).
- A production manifold and protection structure, containing SCM and 2 off subsea multiphase meters (Framo).
- 2km 8" production flowline trenched and buried including rock dump.
- 2.4km EHCU (OMUK) trenched with natural backfill.
- Stabilisation mattresses.
- 2 risers from seabed to FPSO.
- 8" production riser (335m). Pliant Wave Distributed Buoyancy type design (22 buoyancy modules). Clump weights on seabed.
- Dynamic umbilical riser (319m). Position maintained by two clump weights.

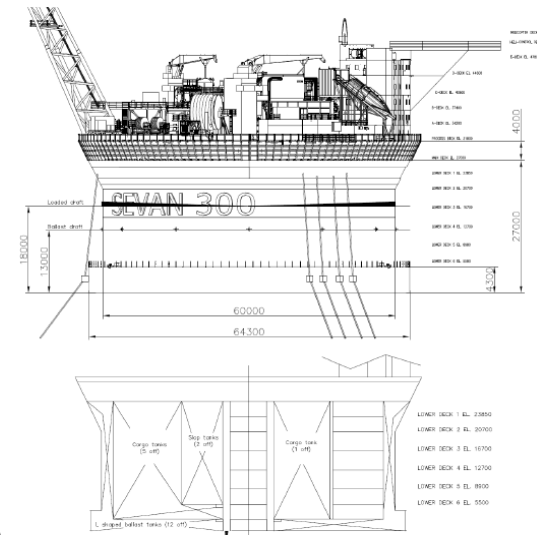


- A Leased Sevan 300 FPSO vessel with mooring lines and suction anchors. Duty holder Wood Group.
- Oil export via shuttle tanker.

# Shelley Decommissioning Project

## Sevan Voyageur Overview

- A cylindrical vessel with a main hull diameter of 60m and an oil storage capacity of 300,000 barrels total fluids.
- Living quarter (LQ) with a maximum POB of 57.
- The top of the cargo tanks was the Main Deck.
- The Process Decks was arranged over two levels. The process consisted of two-stage separation and produced water clean-up. Oil was routed to the cargo tanks. Gas was routed to fuel and flare. Produced water was cleaned-up and discharged to sea.
- The FPSO was equipped with two offloading stations, one on the port side and the other to starboard.
- The mooring system consisted of twelve anchors and mooring lines positioned in three clusters of four around the platform.
- Each mooring line was fixed to the seabed by a suction anchor, a cylindrical steel can 6 or 7m in diameter and 15m long.
- A design life of 25 years for the vessel hull, topside and related systems.



Fluid	Voyageur
Total liquid [BLPD]	50,000
Oil [BOPD]	20,000
Water [BWPD]	30,000
Gas [mmscfd]	25

# Shelley Decommissioning Project

## Activities – Sequence of Events

- At Cessation of Production the Sevan Voyageur was depressurised, flushed clean of all hydrocarbons and made safe from production mode, in preparation for relocation.
- The risers and mooring lines were disconnected and laid on the seabed.
- The FPSO was towed away.
- Several dive construction vessels were utilised to support the phased programme of activities.
- The subsea wells were plugged and abandoned using a semi submersible.
- The trees and wellheads were recovered and the casing cut below seabed.
- All equipment recovered to surface was taken ashore for either refurbishment and re-use on other projects or disposal.

# Shelley Decommissioning Project

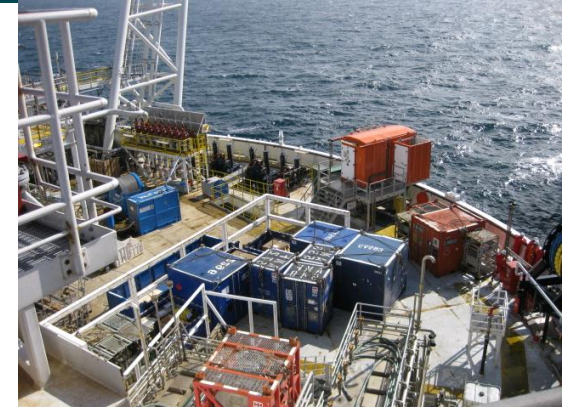
## Sequence of Events – Phase 1

### 14 Jul 2010 COP (Sevan Marine, WoodGroup and POUK)

- Depressurise FPSO and prepare for topside flushing.

### 17 Jul 2010 - Arrival of DSV Wellservicer (Technip)

- Commence subsea flushing operations from wells, wellheads, jumpers, manifold and the production pipeline, until residual oil in water less than 30ppm arriving at FPSO.
- All flushed material pumped to the FPSO for process treatment. Potential existed to transfer to shuttle tanker as part of the last cargo offload. Additional clean up of slops required onshore.
- Similarly the hydraulic fluid and other chemicals in the umbilical flushed and returned to the FPSO.
- Isolations in place and umbilical and riser disconnected from the topside system. Pulling heads installed ready to lower the umbilical and riser.
- Dynamic section of umbilical cut and both risers recovered to the DSV by lowering them from the FPSO.
- DSV removed the four protection structure legs from the trees to allow access for Sedco 704.





# Shelley Decommissioning Project

## Sequence of Events – Phase 1



# Shelley Decommissioning Project

## Sequence of Events – Phase 1

### Aug 2010 to May 2011 Sevan Marine (Owner Scope)

- FPSO disconnected from moorings on 22 Aug 2010 and towed to Kristiansand for refurbishment and re-use.
- Polyester sections of the mooring system recovered shortly after.
- The anchor chains and suction can were recovered in May 2011 again for potential re-use (Normad Oceanic).



# Shelley Decommissioning Project Sequence of Events – Well P&A

## 31<sup>st</sup> Oct 2010 – Arrival of Transocean Sedco 704

- Commencement of well P&A (22/2b – P1Z & 22/2b-P2S)

## 29<sup>th</sup> Dec 2010 – Skandi Skolten SCV

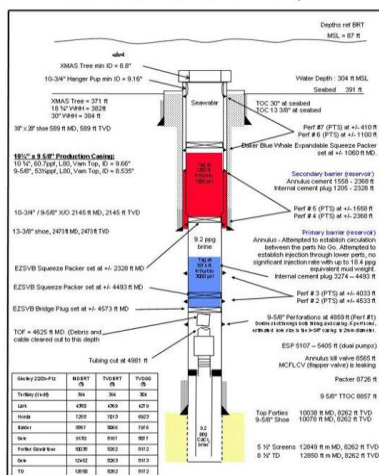
- Cut and recovery of Horizontal XMAS trees by NCA

## 14<sup>th</sup> Apr 2011 – Skandi Aker SCV

- Recovery of wellhead recovery



**Shelley 22/2b-P1z  
Suspension Diagram**  
Phase 1 - Subsurface abandonment complete,  
XMAS Tree & Wellhead remain in place

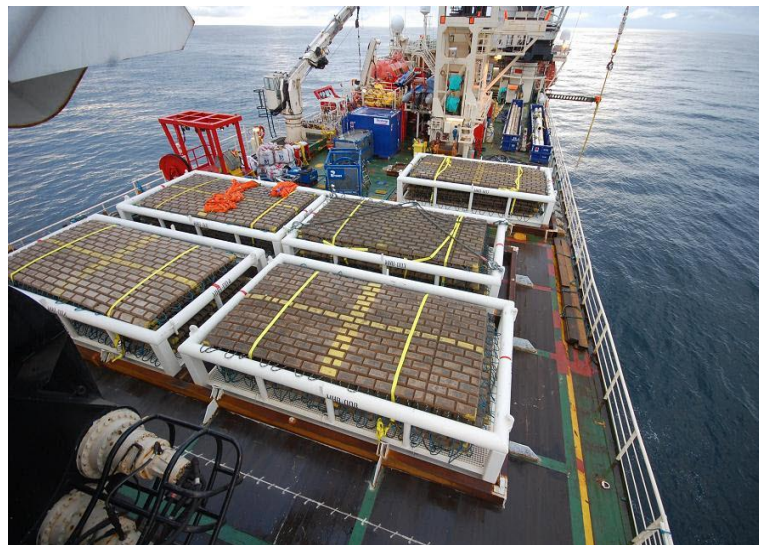


# Shelley Decommissioning Project

## Sequence of Events – Phase 2

### 24<sup>th</sup> May 2011 – Arrival of DSV Orelia (Technip)

- Disconnected all control and production jumpers from the production manifold.
- Recovered the Shelley manifold.
- Recovered all concrete mattresses from the FPSO end.
- Cut and recovered the rigid production pipeline at both ends up to rock dump section.
- Recovered concrete mattresses from the manifold end.
- A total of 120 concrete mattresses (recovered to project baskets)



# Shelley Decommissioning Project

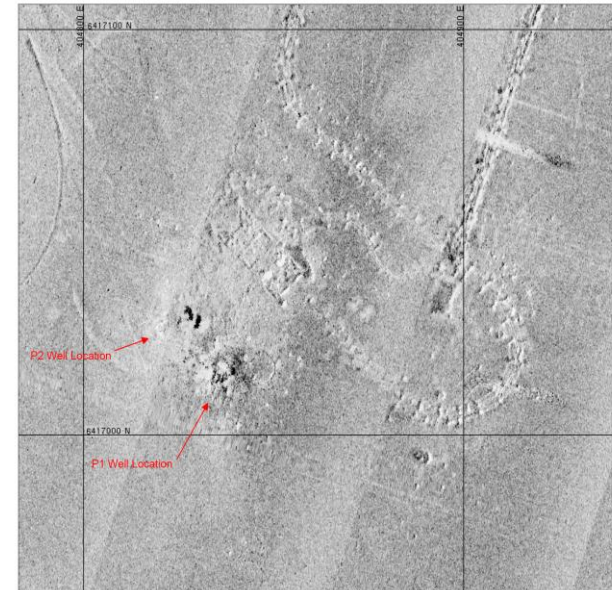
## Sequence of Events – Phase 2

### 13<sup>th</sup> Jul 2011 – Arrival of DSV Orelia (Technip)

- Recovered remaining mattresses.
- Recovered well control jumpers.
- General debris clearance.
- Recovery of manifold protection structure.

### 13<sup>th</sup> Aug 2011 – Arrival of Fugro Symphony

- Recovered static section of umbilical and all the production jumpers.
- Completion a side scan as-left survey of the Shelley site.
- Post decom environmental survey to be completed by Q2 2013.



# Shelley Decommissioning Project

## Sequence of Events – Phase 2

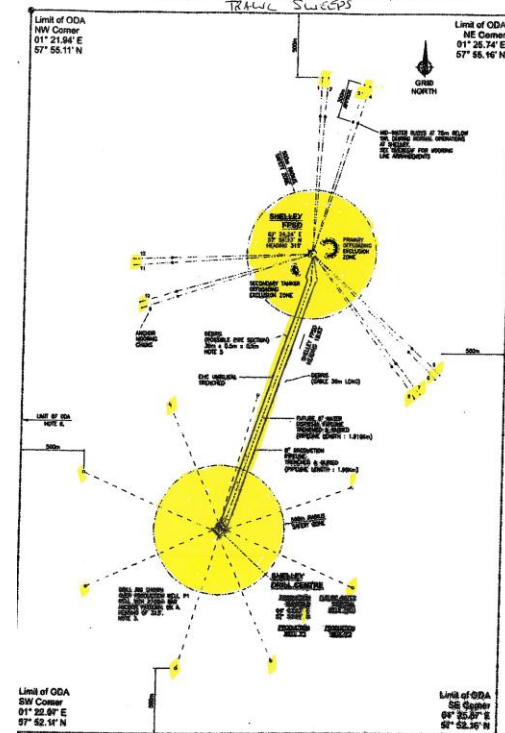
### Aug 2011 – Arrival of MV Amythyst Fishing Vessel

- On behalf of SFF completed seabed trawl and verification sweep.



(Clearance Certificate Dated 30<sup>th</sup> September, 2011 Refs) Appendix 1

Premier Oil PLC: SHELLEY OILFIELD  
DECOMMISSIONING PROGRAMME:  
POST-DECOMMISSIONING CLEANUP/VERIFICATION  
TRADE SWEEPS



# Shelley Decommissioning Project

## Total credits from refurbishment, recycle and disposal

Scope	Item	Comments
2010	Production Riser	Sold to third party for re-use
2010	Bouyancy Module	Sold to third party for re-use
2010	Clump Weights	Sold to third party for re-use
2010	Ballast Blocks	Disposal
2010	Dynamic section umbilical	Disposal
2011	Manifold Roof Panels	Disposal & scrap value
2011	Umbilical SUTU	Disposal & scrap value
2,011	Ballast Blocks	Disposal & scrap value
2011	General Scrap (Pipe)	Disposal & scrap value
2011	Barracuda Credit	Sold to third party for re-use
2011	Buoy credit	Sold to third party for re-use
2011	Rigging	Disposal & scrap value
2,011	Control jumpers	Sold to third party for re-use
2011	Production Jumpers	Sold to third party for re-use
2,011	Umbilical end fittings	In storage
2011	Trees	Sold to third party for re-use
2011	Protection Structure	Disposal & scrap value
2011	Manifold	Sold to third party for re-use
2011	Static section umbilical	Disposal
2011	SCM	Sold to third party for re-use
2011	Concrete Matts	Given to farmer to save disposal costs
2011	Matt Baskets	Sold to third party for re-use

<b>Total Value</b>	<b>£4,636,928</b>
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# Shelley Decommissioning Project

## Refurbishment and recycle





# Shelley Decommissioning Project

## Total credits from refurbishment, recycle and disposal

- Relatively new infrastructure allowed for refurbishment and recycle of 98% of the Shelley infrastructure.
- 2% of infrastructure was not used further ie protection structure and EHCU.
- An inquiry for purchase of the EHCU was made 1 week prior to planned recovery. Too late for Management of Change process to be put in place in terms of offshore procedures, risk assessments and additional equipment requirements.

# Shelley Decommissioning Project

## Budget & Schedule

Task	2010						2011											
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
COP	▼																	
Phase 1: Preparations	■																	
Phase 2: Subsea Decommissioning (Flushing & Riser Recovery)	■	■																
Phase 3: FPSO Removal (FPSO Disconnection & Tow)			■															
Phase 3: FPSO Removal (Mooring recovery)			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Phase 4: Subsea Decommissioning (Infrastructure recovery)													■	■	■	■	■	■
Phase 5: Well Abandonment																		
Close out report to DECC																	■	■

Item	Premier Estimated Cost (£m)	Sevan Estimated Cost (£m)	Premier Actual Cost (£m)	Sevan Actual Cost (£m)	Premier Variance	Sevan Variance
2010 programme to remove subsea facilities	7.3	0	3.3	0.0	4.0	0.0
2010 programme to remove the Sevan Voyageur FPSO	0	9.7	0.0	8.1	0.0	1.6
2011 programme to remove subsea facilities	5.6	0	4.6	0.0	1.0	0.0
2011 programme to plug and abandon wells	11.9	0	15.3	0.0	-3.4	0.0
OPEX and other charges post-COP	0.5	0	0.5	0.0	0.0	0.0
Post Decommissioning Surveys	0.5	0	0.5	0.0	0.0	0.0
<b>Total</b>	<b>25.8</b>	<b>9.7</b>	<b>24.2</b>	<b>8.1</b>	<b>1.6</b>	<b>1.6</b>

# Shelley Decommissioning Project Summary

- The project was completed with a small integrated team, safely and within the planned schedule and budget.
- Significant re-cycle and re-use was achieved to support ongoing Operated and Non Operated projects.

# Voyageur Spirit on route to Huntington



# Safety in Decommissioning

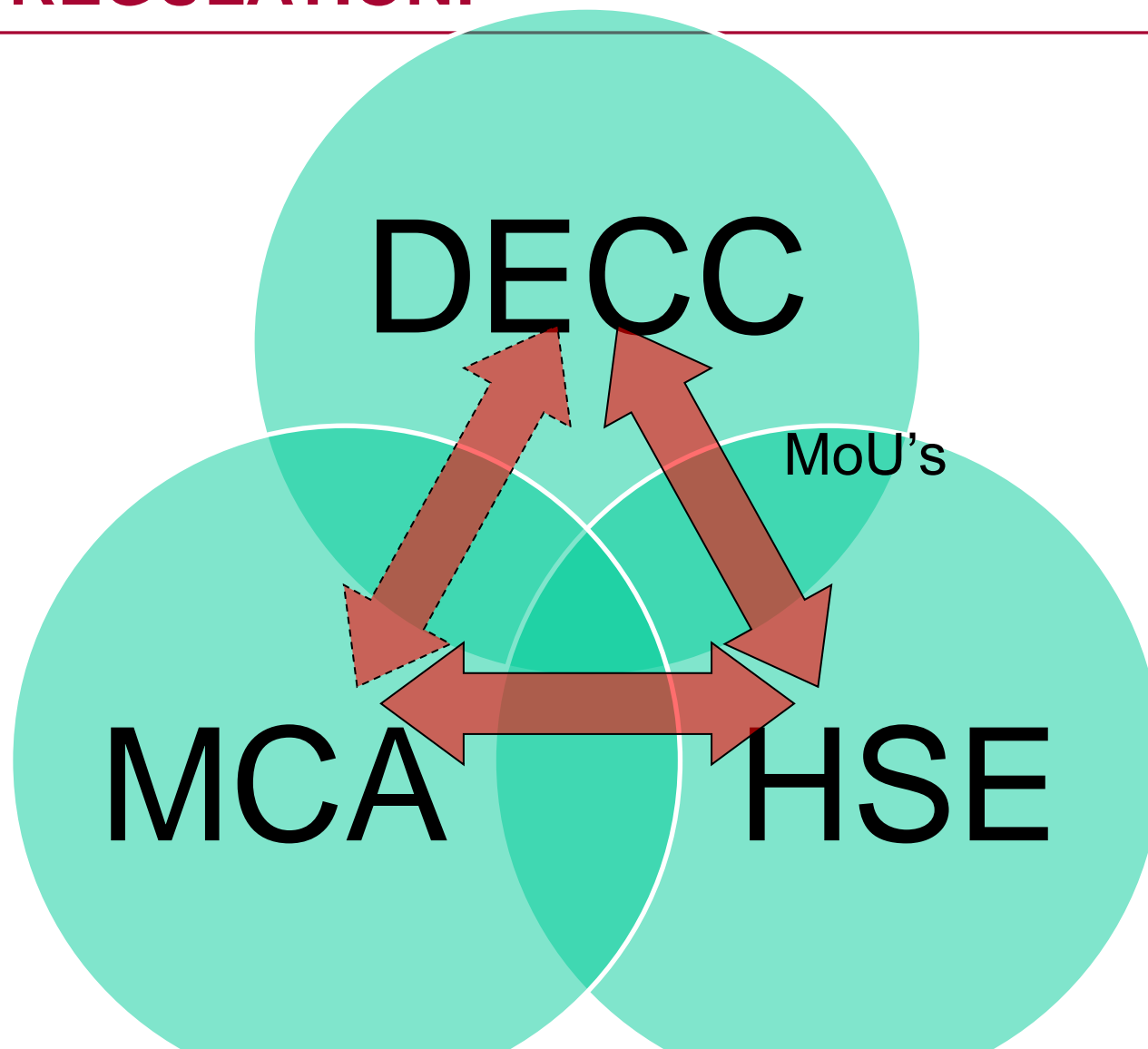
**Stewart Millar**  
**HSE Decommissioning focal-point**

# Presentation Structure

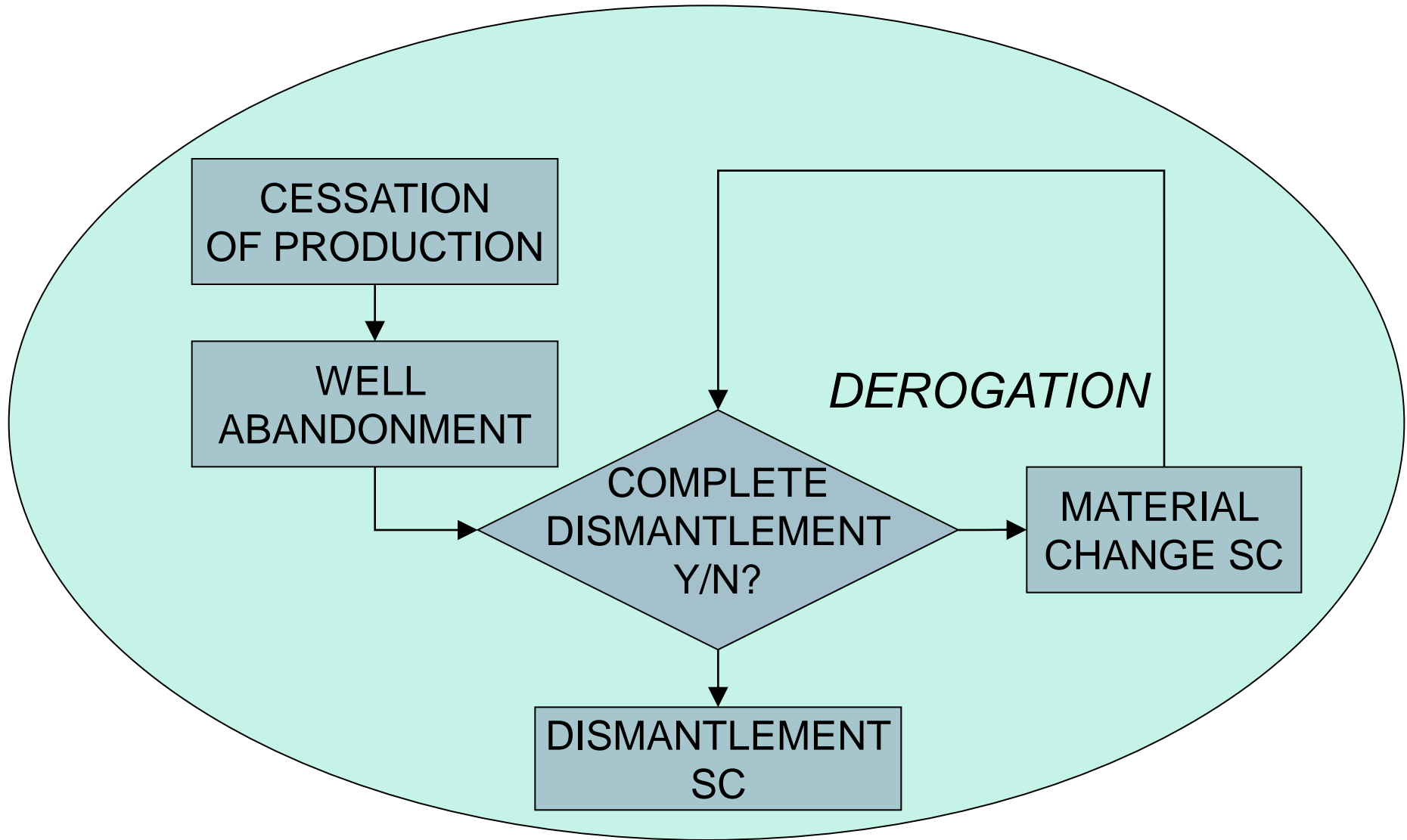
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- CO-REGULATION set-up
- Decommissioning Programme - PHASES
- PLANNING –  
Dismantlement Safety Case Requirements
- LESSONS for future safety case submissions –  
previous assessments / project execution
- SYSTEMS and FRAMEWORKS for lesson-learning?

# Decommissioning CO-REGULATION:



# The Decommissioning Programme





# The 'Phases of Decommissioning' and the Safety Case requirements



- Reg 14.2 Material Change covers:
  - Run-down to CoP
  - Well shut-in
  - Installation hydrocarbon-free (i.e. 'dead')
  - Partial dismantlement for 'derogation'
    - DECC has jurisdiction / HSE safety role
    - Still an installation if any part above sea-level
- Reg 11 Dismantlement covers *final* dismantlement

# PLANNING: 'FINAL' Dismantlement SC Requirements



- Reg 11 (SCR05)
- (DECC) Decom Program
- Safety Case submission (HSE)
- Schedule 5 contains details of a Reg 11 Safety Case.



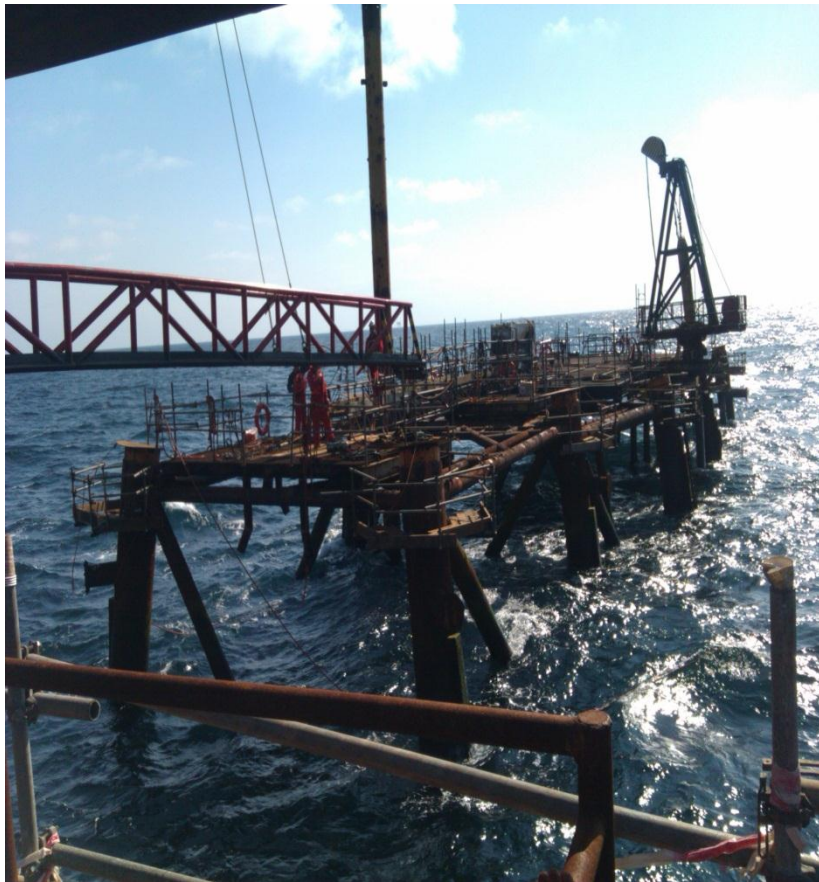
# DECOMMISSIONING *UP-FRONT PLANNING*

## Schedule 5 Requirements:



- ***Start & End*** dates of dismantlement plan
- ***Safety Reps consultation*** re. work plan
- ***Max. no. of persons*** on 'installation' during work
- ***General duty*** for protection of these persons from F&E, and provision of ER
- ***Toxic gas protection*** arrangements
- ***HOW*** Installation & plant to be *dismantled*

# Knowledge Capture



- Capturing lessons learned
- Culture of collaboration
- Cost and Availability considerations
- Metocoean restrictions
- Co-regulation with 'Beach'

# FURTHER WORK – knowledge capture from previous dismantlements



- Project Management
- Human Factors
- Communication
- ‘Piece Small’ versus Heavy Lift
- Contractualisation
- NO ‘ONE SIZE FITS ALL’ APPROACH



# Experience-based LEARNING

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- All installations are unique
- Have some common elements
- Face some common hazards
- Need to be mindful of what can go wrong
- Applying lessons learnt

# Working Groups

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- **DTLG**  
*...Regulators Forum*
- **Decom North Sea**  
*...Northern Sector UKCS*
- **ODFOS**  
*... Southern Sector UKCS*

# Message



- Schedule 5 (SCR05) provides framework for planning
- Knowledge capture from previous projects
- Working groups
  - Shared database
  - Communication and Coordination?





## Contact Details

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