Decommissioning in the North Sea:
Market Overview, Challenges & Opportunities

Karen Seath
Interim Chief Executive
Decom North Sea

www.decomnorthsea.com

Today's discussion

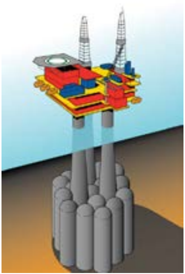
DECOM North Sea

- **What Structures?**
- Why Decommission?
- What is involved?
- Scale, Cost & Cost Drivers?
- Decom North Sea Leadership

Steel Piled Jacket (SPJ) structures:
CNR International – Murchison Platform

- Programme progressing (COP January 2014)
- Topsides - 24,548 tonnes – 26 modules
- Steel jacket - 24,640 tonnes (excl piles)
- Water depth 156m – 150 miles NE of Shetland
- 33 platform & subsea wells
- Drill cuttings pile – degrade naturally in time
- Export pipeline – remedial rock placement
- Infield pipelines & branches - removed

Gravity Base Structures (GBS):
Shell Brent Field



- Production ceased December 2011
- Contracts for topsides removal, transportation and onshore disposal recently awarded (removal 2015)
- GBS ~ 400,000 tonnes likely to remain in place
- P&A of wells underway – many years of work
- Topsides preparation underway – years of work
- >300 studies - programme not yet submitted
- First project for Pioneering Spirit

Southern North Sea
Steel piled jackets / platforms

- @400 installations
- Typically less than 1,500 tonnes jacket weight
- < @1,400 tonnes topsides weight
- Many unmanned
  (i.e. no accommodation)
- Mainly gas producers
- Total removal expected

Subsea infrastructure

- wells P&A
- manifolds
- flowlines
- umbilicals
- mid height arches
- protection covers
- mooring systems

Today's discussion

- What Structures?
- **Why Decommission?**
- What is involved?
- Scale, Cost & Cost Drivers?
- Decom North Sea Leadership

Why Decommission?

General situation in UK Continental Shelf

- £13 billion CAPEX in 2014 with forecast of £12 billion in 2015
- £39 billion of capital investment approved and under development

However:

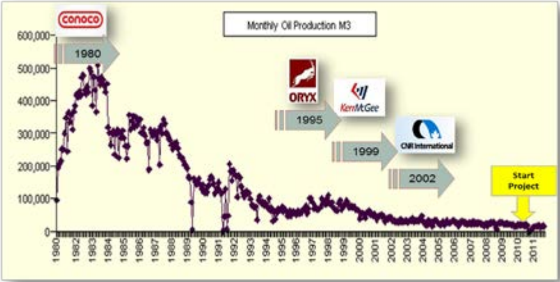
- Production in UKCS fallen for 11 straight years (41% 2012-2014)

Although, OGUK Activity Survey 2015 states 2014 production represents the best year on year performance in 15 yrs. due to >focus on production efficiency, impact of new start ups.

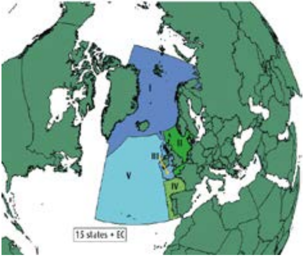
- Concerns over unplanned shutdowns, reliability of equipment etc.
- Operating costs rising – produced water, energy consumption, asset integrity, etc.
- Production efficiency falling
- Some operating assets are more than 30 years old
- Oil price uncertainty

Resulting in several assets nearing CoP and decommissioning

CNRI Murchison: Falling Production Profile



State of Play:
Regulations for offshore decommissioning



The Convention for the Protection of the marine Environment of the north east Atlantic - *'OSPAR Convention'.*

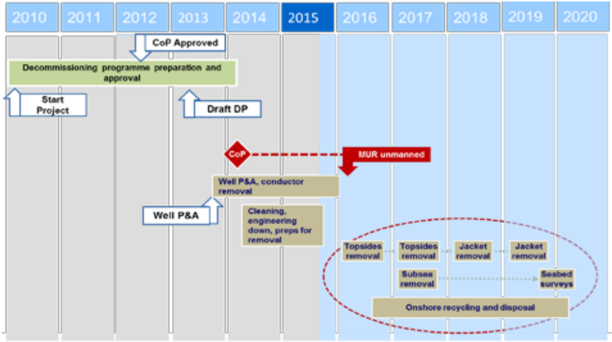
Signed and ratified by all Contracting Parties to the original Oslo or Paris Conventions (Belgium, Denmark, the European Union, France, Germany, Iceland, Ireland, the Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom and Northern Ireland) and by Luxembourg and Switzerland.

Today's discussion

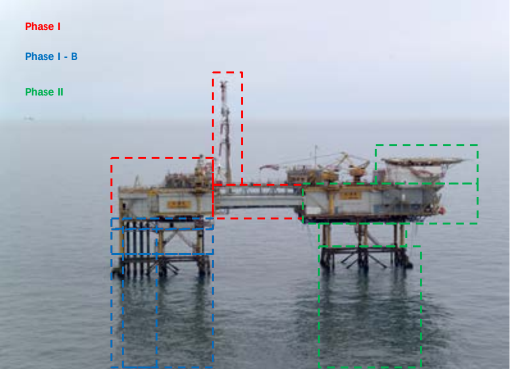
DECOM North Sea

- What Structures?
- Why Decommission?
- **What is involved?**
- Scale, Cost & Cost Drivers?
- Decom North Sea Leadership

CNRI Murchison Project Timeline



Wintershall Project Example



1. Vent boom
2. Bridge
3. WH upper deck
4. Conductors (11)
5. WH lower deck
6. WH leg extensions
7. WH jacket
8. Living quarters
9. PP main deck
10. PP leg extensions
11. PP jacket

~~1. Vent boom~~
~~2. Bridge~~
3. WH upper deck

Calculated: 835 t
Weighted : 620 t

1. ~~Vent boom~~
2. ~~Bridge~~
3. ~~WH upper deck~~
4. Conductors (9)
5. ~~WH lower deck~~
6. ~~WH leg extensions~~
7. WH jacket
8. Living quarters

Calculated : 500 t
Weighted : 520 t

SCALDIS

1. ~~Vent boom~~
2. ~~Bridge~~
3. ~~WH upper deck~~
4. ~~Conductors~~
5. ~~WH lower deck~~
6. ~~WH leg extensions~~
7. **WH jacket**
8. ~~Living quarters~~

Calculated : 1220 t
Weighted : 1000 t

Disposal Yard

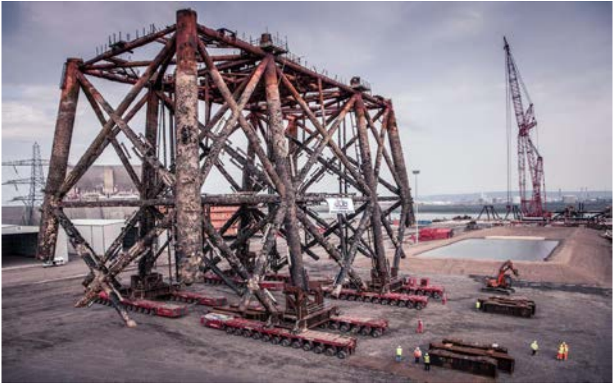
SCALDIS

HOONDERT
's-Heerenhoek

Big Things Disappear Quickly but Reuse what you can !

Statoil

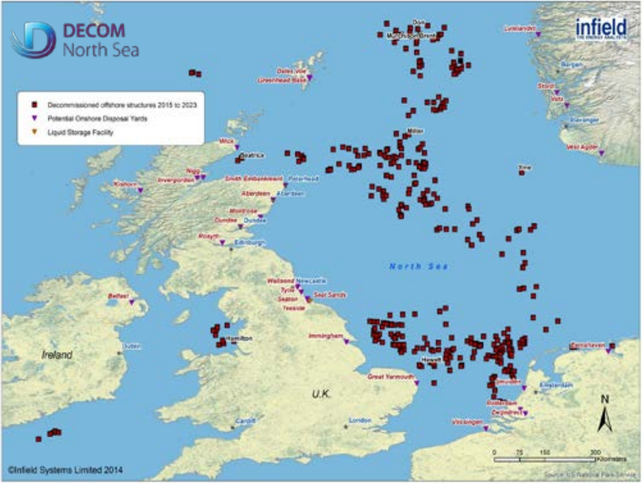
Big Things: Big Engineering



Game Changing Solutions

Today's discussion

- What Structures?
- Why Decommission?
- What is involved?
- **Scale, Cost & Cost Drivers?**
- Decom North Sea Leadership



DECOM
North Sea
infield
Decommissioned offshore structures 2015 to 2023
Potential Onshore Disposal Yards
Liquid Storage Facility
North Sea
Ireland
U.K.
Belfast
Dublin
Hamilton
Cardiff
London
Great Yarmouth
Immingham
Wallsend
Newcastle
Tyne
Seaton
Seal Sands
Teesside
Rosyth
Edinburgh
Dundee
Montrose
Aberdeen
Smith Embankment
Peterhead
Invergordon
Nigg
Kishorn
Wick
Beatrice
Dales Voe
Greenhead Base
Miller
Brent
Lutelandet
Bergen
Stord
Vats
Stavanger
Vest Agder
Eemshaven
Amsterdam
IJmuiden
Rotterdam
Zwijndrecht
Vlissingen
Hewett
N
0 75 150 300 Kilometers
©Infield Systems Limited 2014

State of Play:
What has been decommissioned so far?

North Sea:
120 O&G Installations
255 wells P&A over the last 5 years
966 pipelines

UKCS:
2 with large steel jacket (> 10,000 tonnes)
3 installations with large concrete substructures
25 other steel jackets
24 floating installations
22 subsea installations
11 other facilities (loading buoys, flares etc.)

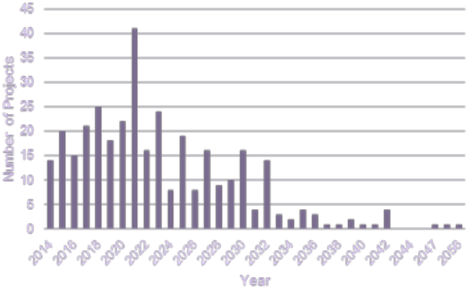
@10% of installations decommissioned to date

State of Play:
Infrastructure still in place

North Sea:
More than 600 Installations
21 FPSO (15 UK; 6 Norway)
3,300 pipelines – around 25,000km
100 Offshore rigs operating
Approx 10920 EAD wells
Approx 200 cuttings piles

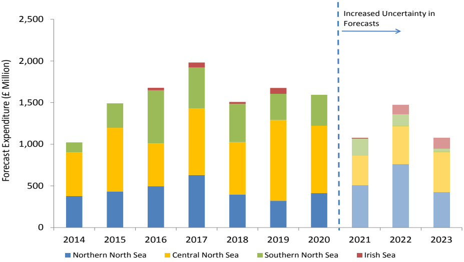
UKCS area:
302 O&G installations (282 operational)
8 installations with large concrete substructures
31 with large steel jackets (> 10,000 tonnes)
240 other steel jackets
3 Jack-Up Platforms
5 Floating Process Facilities (FPF)
15 Floating Production Storage and Offloading (FPSO)
<311 Subsea production systems

Summary of Forecast Activity



- Circa 40 programmes in progress
- Circa 60 further programmes under discussion

Forecast Expenditure (2014 to 2023)



Source: Oil & Gas UK

So What Does That Mean For Specific Operators?

Summary of Activity

Operators current expectations are being outlined, however scopes are sometimes not firm and still subject to change/approval.

Activity in Central & Northern North Sea

Schiehallion/Loyal

- regulatory approval obtained in June 2013
- offshore removal & onshore disposal is underway of subsea pipelines and production flowlines etc.

Don

- expected start date of 2015/16 – subsea flowlines, injection equipment, control umbilicals and manifolds etc.

Miller

- removal of ~28,000 tonnes topsides scheduled for 2016
- removal of ~18,000 tonnes six leg jacket scheduled for 2017
- overall completion by end 2018

Activity in Central & Northern North Sea
Brae Field Decommissioning Programme

Three fixed steel jacket platforms (Brae Alpha, Brae Bravo & East Brae)

- 85 platform drilled wells to P&A
- 87kT topsides to remove; 33kT sub-structures to remove

Three subsea tiebacks (Central Brae, West Brae & Braemar)

- 19 subsea drilled wells to P&A
- 1000 T manifolds, templates and structures to remove
- 75 km flowlines, 38 km umbilicals, 195 km of pipelines, 57 km submarine cables

Decommissioning Activities

- Project team established; Compliance activities on-going
- Studies in support of Decommissioning Programme
- Drill cuttings piles survey and sampling

- **Brae Alpha drilling rig reactivated– completion Q1 2014**
- **Pilot well plug and abandonment to commence (3 – 4 wells) – completion Q1 2015**
- **Brae Bravo / East Brae rig recertification study to commence Q1 2015**

Activity in Central & Northern North Sea
Brent Field Decommissioning Programme

- 4 Platforms (Alpha, Bravo, Charlie, Delta), 3GBS, 1 Steel Jacket.
- PreDecom Programme Study being finalised, robust stakeholder engagement ongoing.
- Finalising DECC Submission, separate for Delta.
- P&A complete on Delta, ongoing on Bravo, 57 of 142 complete.
- Engineering Down Delta prior to single lift
- Onshore working closely with Able, Quay Upgrading ongoing
- Contracts with:
    - Allseas (lift), Able (onshore disposal),
    - WGPSN (decom services), Baker Hughes

      (Conductor Cutting/Removal, Archer (drilling services).

Activity in Central & Northern North Sea

Quad 9 UK Sector, Leadon:

- Decommissioning Programme complete and submitted to DECC, Public Consultation now complete
  - Awaiting further advice from DECC.
- Programme and Environmental Statement submitted
  - Awaiting further advice from DECC.
- Preparation/engineering for well P&A ongoing (18 wells),
  - Harkand contracted
  - Subsea Structures (3x300Te) and bundles remain in place
  - Awaiting DECC response to programme.
- Removal of controls equipment, concrete mattresses, infield jumpers and tree spools has commenced.
  - No topsides;
  - FPSO was relocated in 2006.
- Onshore recycling/disposal contract in place and items recovered to date have been recycled
- Maersk Oil had a DSV on-hire for 365 days in 2014, which allowed decommissioning works to commence at Leadon. Decommissioning of both drill sites on Leadon field under consideration

Activity in Southern North Sea

Viking Complex & Vulcan East Fields

- Pre planning/Studies/EIA/Stakeholder engagement in support of 3-6 programmes.
- DECC Submissions for 3 – 7 programmes in 2015/16
- Well P&A with 4 wells abandoned out of 34-well initial tranche, followed by a further 104 wells.
- 20 pipelines being flushed/decommissioned in 2015/2016
- Expectation limited pipeline retrieval/recovery required.
- Topside Prep Q2 2015 for 9 –19 topsides in 2015/17.
- Topside removal/partial decommissioning Q3/Q4 2015, for 6 –16 topsides. Tender process ongoing.
- Substructure removal Q3/Q4 2015 for 6 – 16 jackets. Tender process ongoing.
- Onshore recycling/disposal anticipated requirement to process 6 –16 topsides & 6–16 jackets. Tender process commencing.

ConocoPhillips

The Wood Review (Feb 2014)

New Regulator Action A25:

- A new single decommissioning forum responsible for delivering significant decommissioning cost reduction, promoting innovation & great cooperation, jointly led by the new regulator and industry
- Be more ambitious in what it seeks to achieve
- Set a radical target to reduce cost
- Work with the supply chain

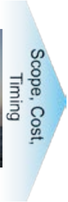
A26: Technology

A27: No premature decommissioning

A28: Late Life Business Models

A29: Game changing decommissioning concepts

The Decommissioning Challenge
Summary of the State of Play



- **Collaboration:**
  Working together for meaningful business benefit

- **Culture:** The way we solve problems and reward success

Today's discussion

- What Structures?
- Why Decommission?
- What is involved?
- Scale, Cost & Cost Drivers?
- **Decom North Sea Leadership**

Decom North Sea Leadership

A strong platform:

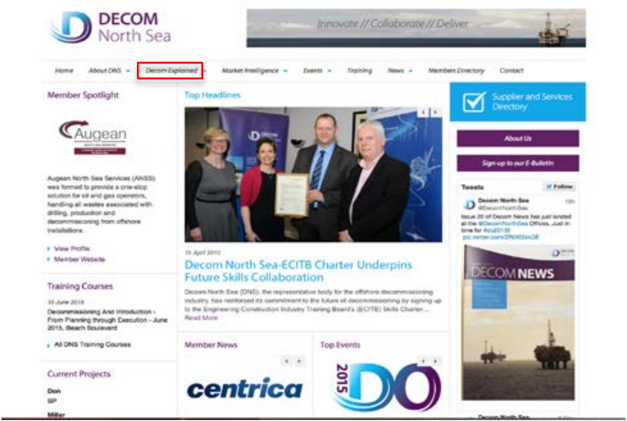
- 298 members
- Engaged, knowledgeable & passionate
- Growing UK wide profile
- Making a difference
- Dedicated Board and team

On which to build opportunities:

- Reduce the cost of decommissioning
- Maximise economic recovery
- Create a strategic plan for the future
- Create a centre of excellence for decommissioning
- For our Members

Decom North Sea Leadership: Industry Projects

- Streamlined template for decom programme DECC approval
- Working with operators on Earlier selection and engagement of contractors to stimulate innovation and alignment
- Reuse Project team to deliver methodology and guidance
- Late Life Planning Portal (L2P2)
- Lessons Learned
- Mapping of decom initiatives
- Meaningful Market Data from Operators
- Streamlined roadmap for EIAs
- Collaborative multi-party approach to wells P&A (with DECC/OGA)
- New innovation and technology for well P&A (with ITF)
- Regular conferences, consultation events, networking events etc.
- Decommissioning Training Courses
- Created Southern North Sea special interest group with EEEGR



DECOM North Sea

Summary:
Scope, Timing, Cost, Challenges

- The decommissioning market is here and it's growing.
  - In 2014 > £500 million was spent on decommissioning.
- £14.6 billion Forecast from 2015 to 2023 compared with £14.4 billion capital expenditure in 2013.
- The costs are escalating, this cant (wont) go on.
- Volume/demand increasing against finite resources
- Uncertainty is growing, global oil prices
- Regulatory action will increase

A Refocused Purpose

- Decom North Sea members play a vital role in the decommissioning of Oil & Gas Assets.
- We nurture the skills that are the lifeblood of innovation
- We facilitate, coordinate, promote and drive collaboration, removing barriers and encouraging the most efficient end of asset life solution development so delivering real business benefits for our members.
- At our core is a drive to safely reduce decommissioning costs and reduce the liability for the Tax Payer

Thank you

DECOM North Sea