

Overview of Global Decommissioning



Presented by

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CCOP & EPPM Workshop on End of Concession & Decommissioning Guidelines
Bangkok, 13th June 2012

Worldwide Location of Offshore Installations



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Where are the Offshore Platforms

Worldwide Distribution of Offshore Structures in 2010



Note: Figures in Blue are sub totals

Estimated Total 7,668+ in 2010

Offshore Installations in USA



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Location of US Offshore Facilities

California Federal Waters (23)

California State Waters
(4 platforms & 5 Islands)



Cook Inlet 16

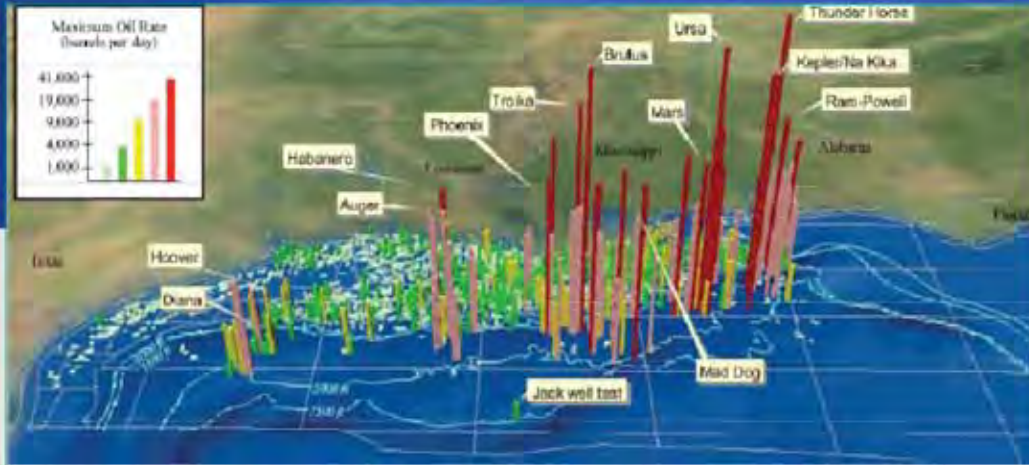
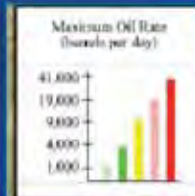
GOM 3450



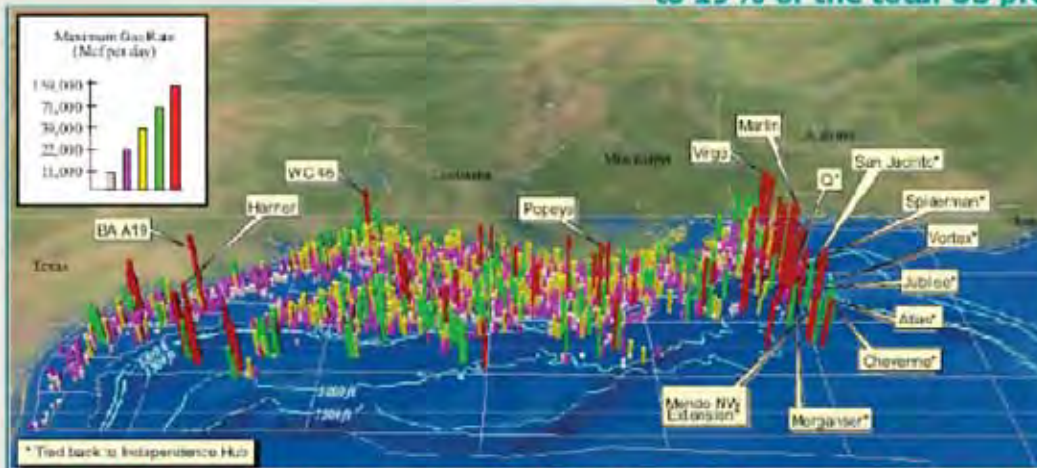
Location of GOM Facilities

Gulf of Mexico OCS Significance to the Nation

Provides about 25% of U.S. Domestically Produced Oil



70% of the oil produced in the Gulf comes from deepwater, equivalent to 19% of the total US production



Provides about 11% of U.S. Domestically Produced Natural Gas

36% of the gas produced in the Gulf comes from deepwater, equivalent to 6% of the total US production

MMS: Securing Ocean Energy & Economic Value for America



Gulf of Mexico Platforms 1942-2010

7209 Total Platforms Installed - 11% of All Platforms Decommissioned Were Reefed



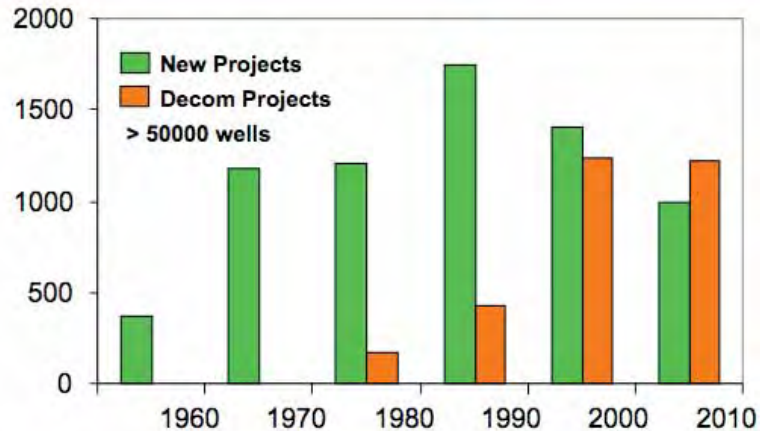
MMS: Securing Ocean Energy & Economic Value for America



ING
INC.

GOM Summary

GOM Shelf Activity



- Mature decommissioning business
- Over 45% of facilities removed to date
- Over 40% of wells abandoned to date
- 140 structures and 450 wells p.a
- \$600m annual spend, rising
- Efficient & innovative supply chain
- Highly regulated with reefing



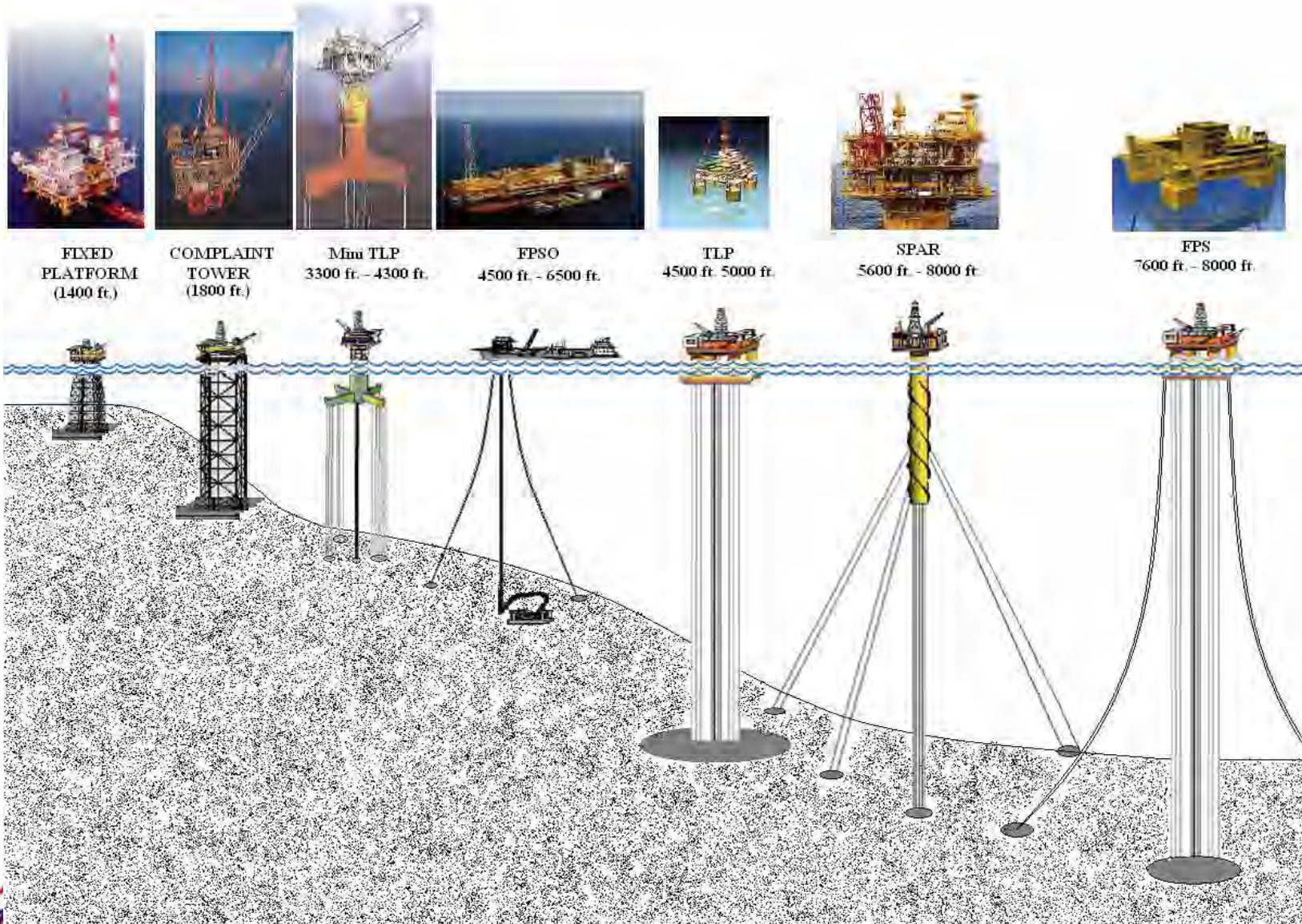
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Data Source EFE GOM Offshore Decommissioning Report 2010



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Types of Offshore Facilities In GOM



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Ref: www.miller-mccune.com



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Offshore Installations in SE Asia



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Location of Offshore Installations in Asia (2010)

Location of Offshore Installations in Asia Pacific



Since 2000
some 766 new
offshore
structures
installed in the
Asia Pacific
Region

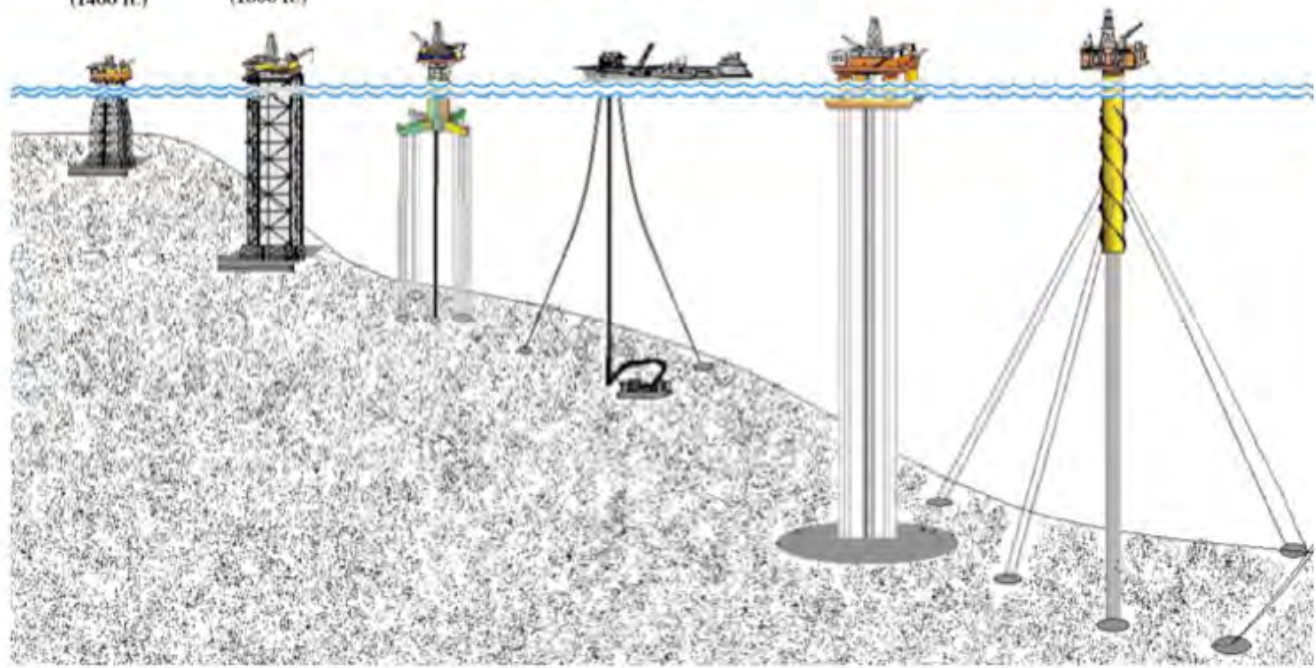
There are now
some 1733
offshore
installations in
the Asia
Pacific Region

Types of Offshore Installations in Asia (2010)

Types of Offshore Installations in the Asia Pacific Region

(9)	(9)	(4)	(1645)	(1)	(1)	(50)	(2)	(1)
								
Stacked Leg (<150 ft)	Jack-Up Production Unit (<150 ft)	Mobile Offshore Barge (<150 ft)	FIXED PLATFORM (1400 ft.)	COMPLAINT TOWER (1800 ft.)	Mini TLP 3300 ft. - 4300 ft.	FPSO 4500 ft. - 6500 ft.	TLP 4500 ft. 5000 ft.	SPAR 5600 ft. - 8000 ft.

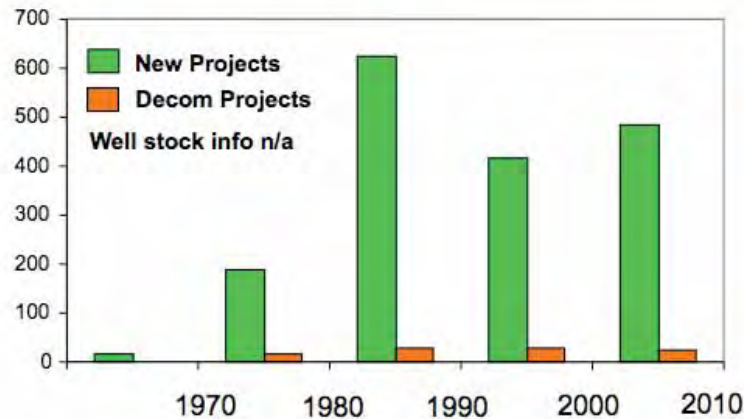
(7)	(5)
	
Gravity Base (<300 ft)	Semi Submersible (<5000 ft)



Asia Summary (2010)



Far East Activity



- Immature decommissioning business
- Poor data base and understanding
- Less than 10% facilities removed
- Over 100 facilities abandoned to date
- Varying conditions and complexity
- Supply chain capability immature
- Variably regulated



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Data Source Brian Twomey Reverse Engineering Services



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Very Rough Estimate of Asia Pacific Decommissioning Costs (Total Removal)

Weight Range (mt)	Weight Range Average (mt)	No of Offshore installations	Cost Per Metric Ton (\$US)	Average Cost Per Platform (\$US)	Subtotal Per Platform Range (\$US)
35 to 300	211	49	3600.00	\$759,600	\$37,220,400
>300 to 1000	818	191	3800.00	\$3,108,400	\$593,704,400
>1000 to 2000	1556	201	4000.00	\$5,912,800	\$1,188,472,800
>2000 to 3000	2553	146	4100.00	\$10,467,300	\$1,528,225,800
>3000 to 4000	3568	58	4200.00	\$14,985,600	\$869,164,800
>4000 to 6000	4905	63	5500.00	\$26,977,500	\$1,699,582,500
>6000 to 10000	7933	48	6000.00	\$47,598,000	\$2,284,704,000
>10000 to 102,500	21900	63	7500.00	\$112,500,000	\$7,087,500,000
TOTAL		819	38700		\$15,288,574,700

- There 1733 offshore installations in Asia Pacific Region, data for 914 offshore installations was not available to presenter at this time – **The total will be much higher in the order of \$30 Billion USD**
- No well P& A costs are included, costs sub installations excluded and assumes pipelines are left in place
- The above cost data is based on limited available regional cost data supplemented with worldwide decommissioning cost data
- **This is just an indication of cost so please use resultant costs with care**

The logo for the Society for Underwater Technology (SUT) features the letters 'SUT' in a bold, white, sans-serif font. Above the letters is a stylized blue graphic consisting of three curved lines that suggest motion or waves.

Society for
Underwater
Technology

www.sut.org

SALVAGE & DECOMMISSIONING

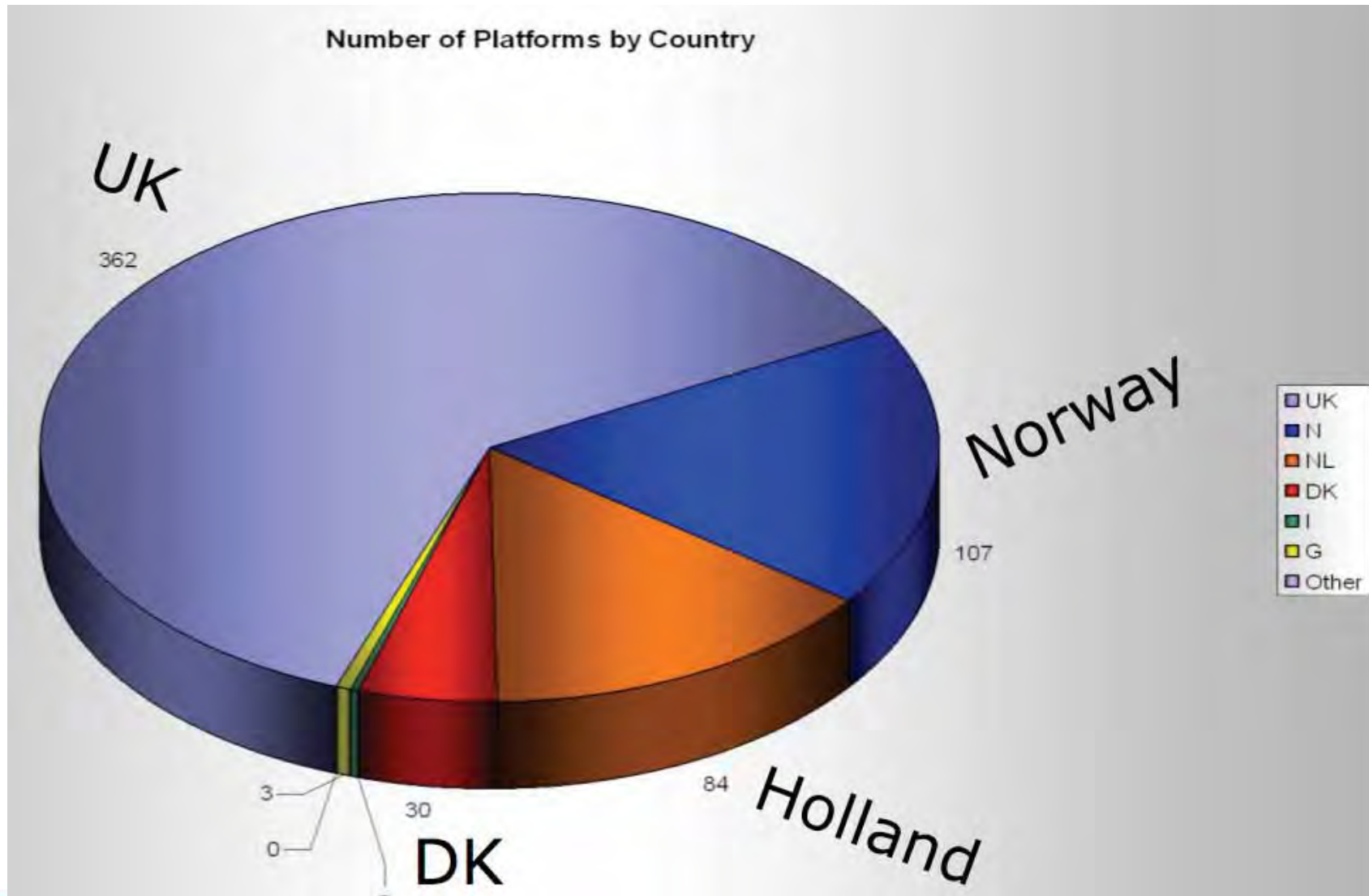
Offshore Installations in Europe

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Northern European Offshore Installations



Offshore Installations in Denmark (Circa 30 Installations)

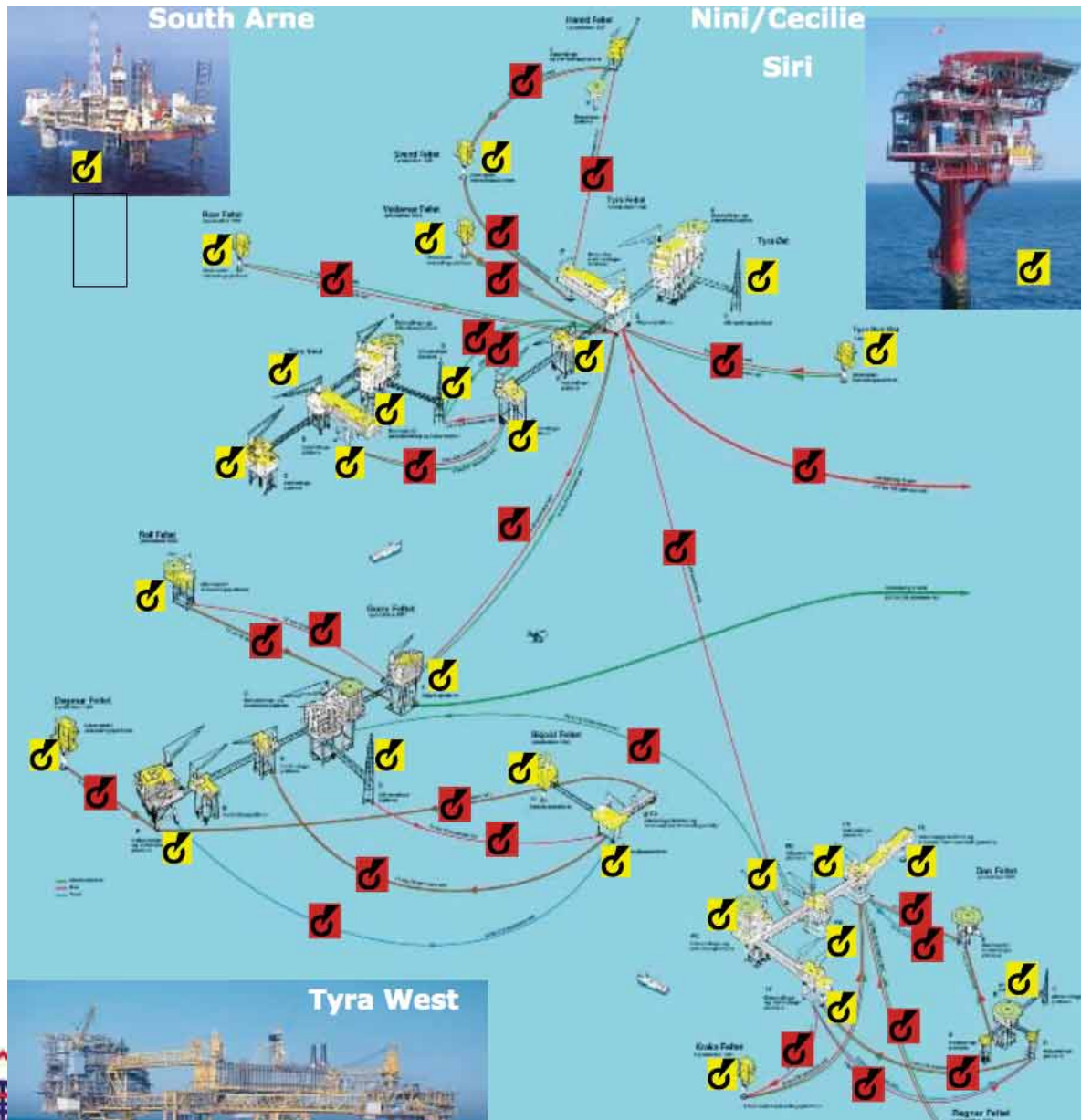


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Location of Danish Platforms



**Oil & Gas
Fields in the
Danish North
Sea**

**Maersk Oil & Gas
Amerada Hess
DONG**

-  Platforms
-  Pipelines



Offshore Installations in Netherlands

(Circa 84 Installations in 2006)

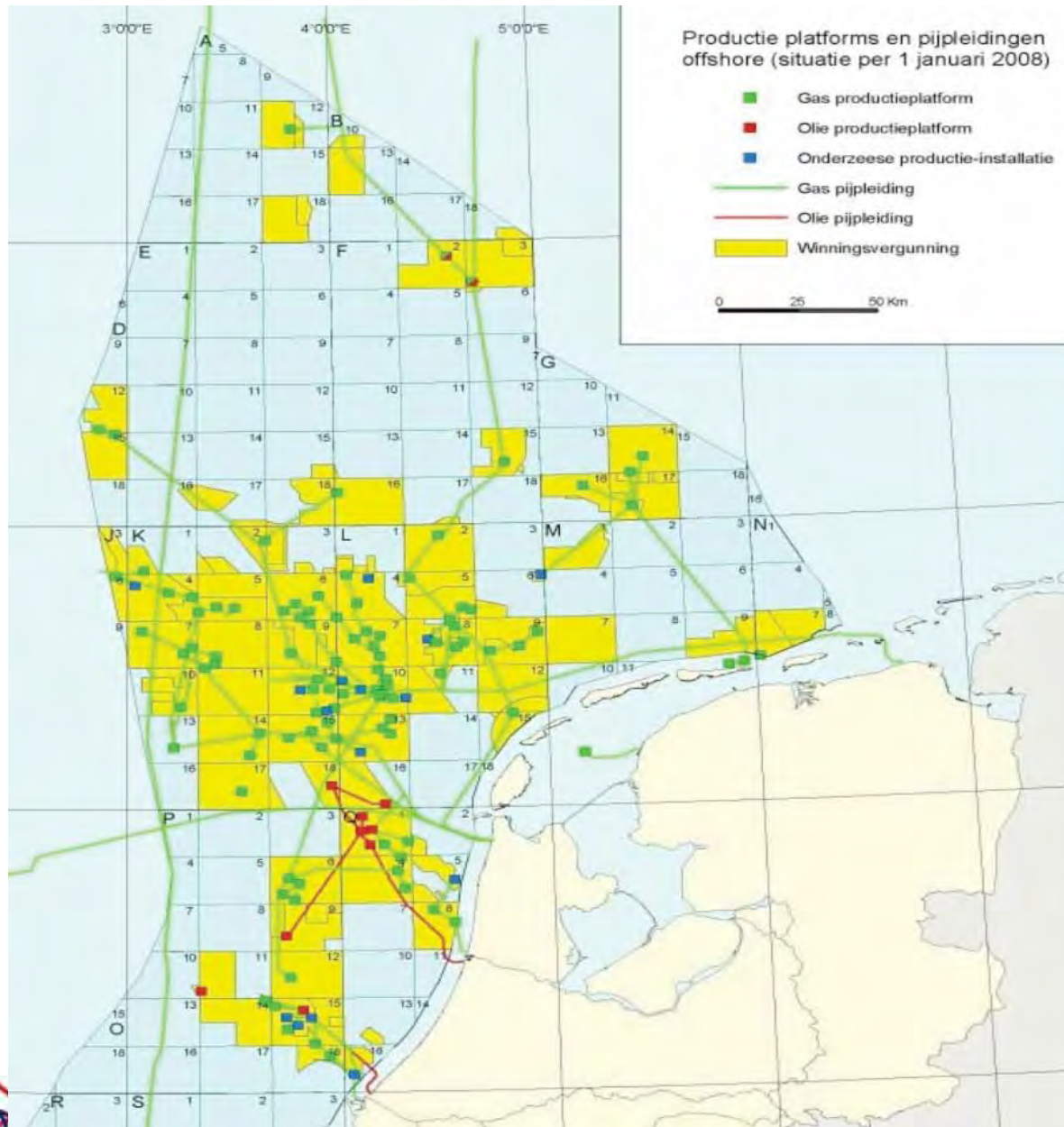


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Location of Dutch Platforms



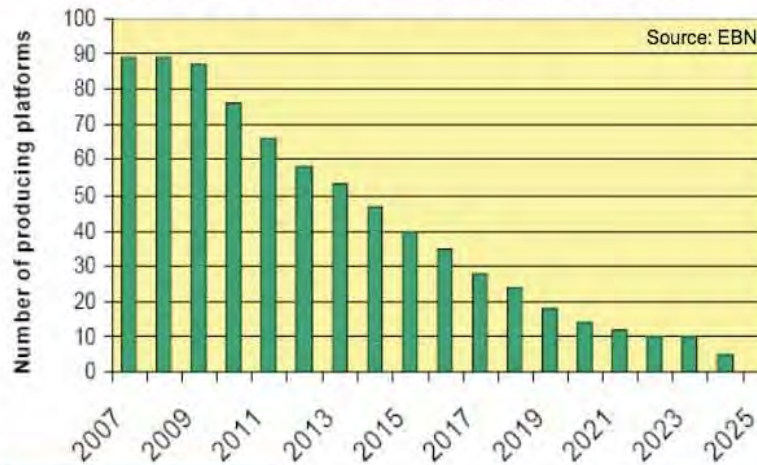
Dutch Platform Removals??



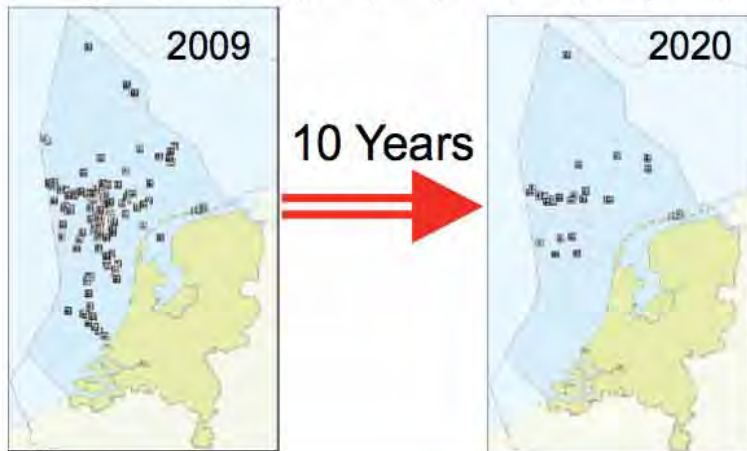
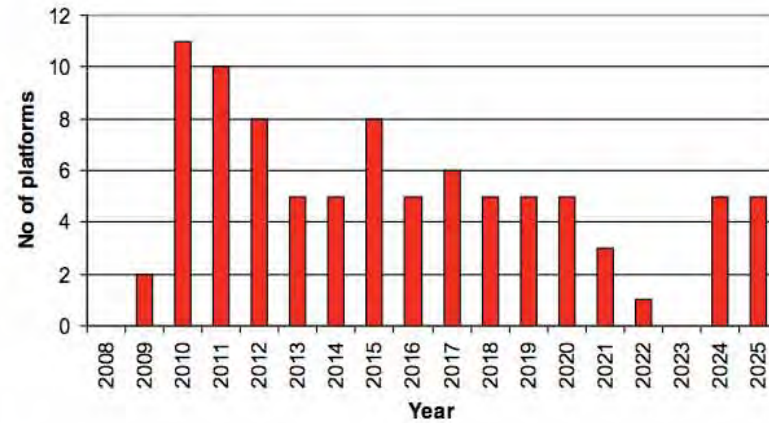
Dutch Continental Shelf



Platform Production Decline



Platform Removals



Source: Seaway Heavy Lifting Engineering B.V.
 Bergen, 16 February 2010
 Aart Ligterink,



Offshore Installations in Norway

(Circa 93 Installations in 2010)

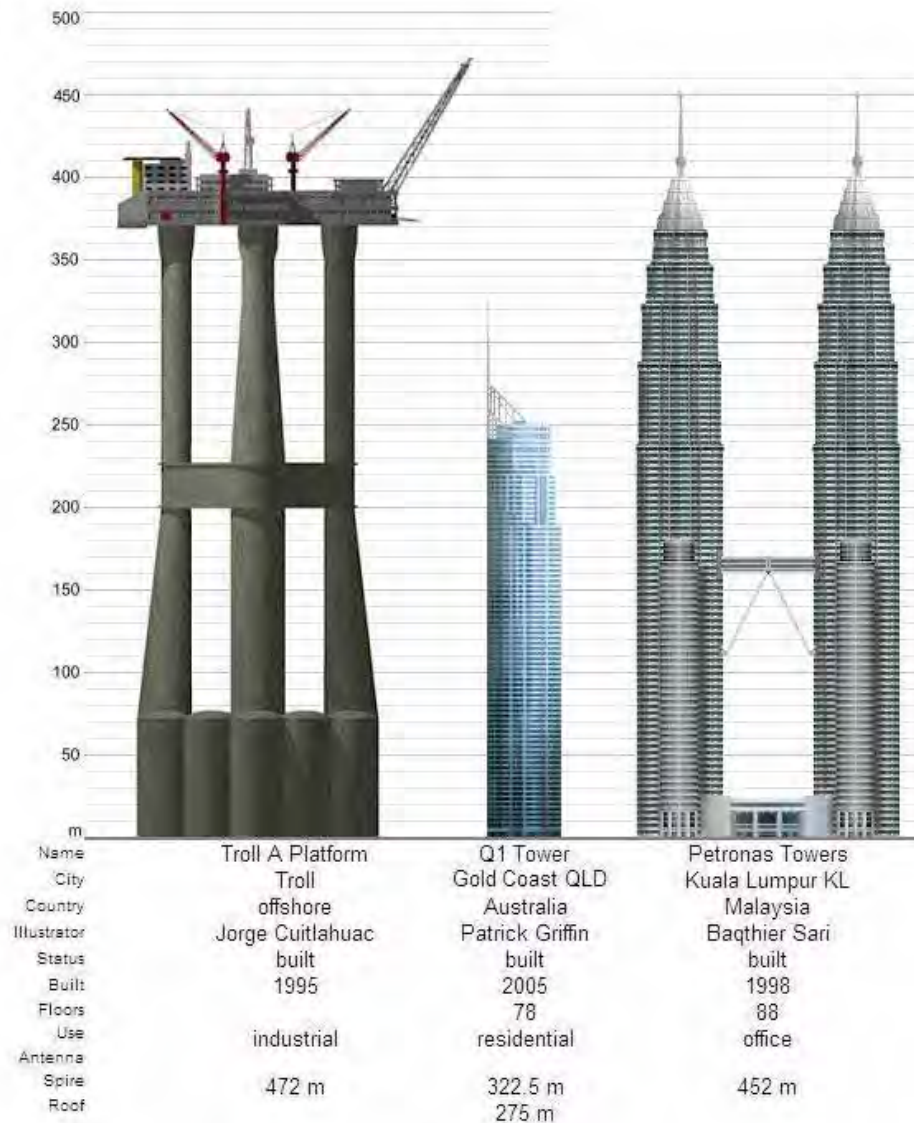


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Size of Troll A Offshore Platform



From Guinness Book of Records:

“The Troll Offshore Gas Platform, located off Norway in the North Sea, **is the heaviest man made mobile object ever made**, with a dry weight of the gravity base structure at **656,000 tonnes**.”

Standing 472m tall, it was made from 245,000m³ of concrete, (the equivalent to 215,000 foundations for ordinary homes) and 100,000 tonnes of steel (approximately 15 Eiffel towers)!”



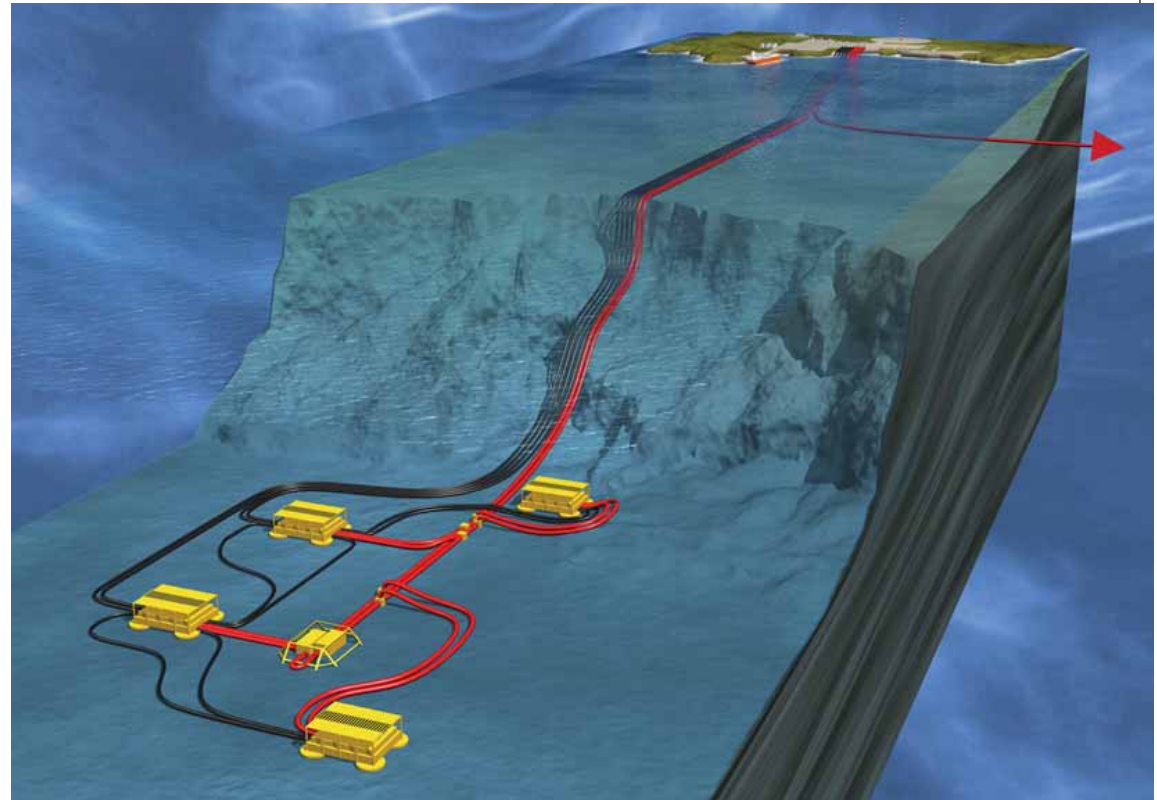
ORMEN LANGE (Norway): Europe's Deepest Subsea Development at 1,000 m (3,300 ft)



It took the world's largest crane barge to lower an Ormen Lange template to the sea floor. (Photo by Mediafota as, courtesy of FMC)



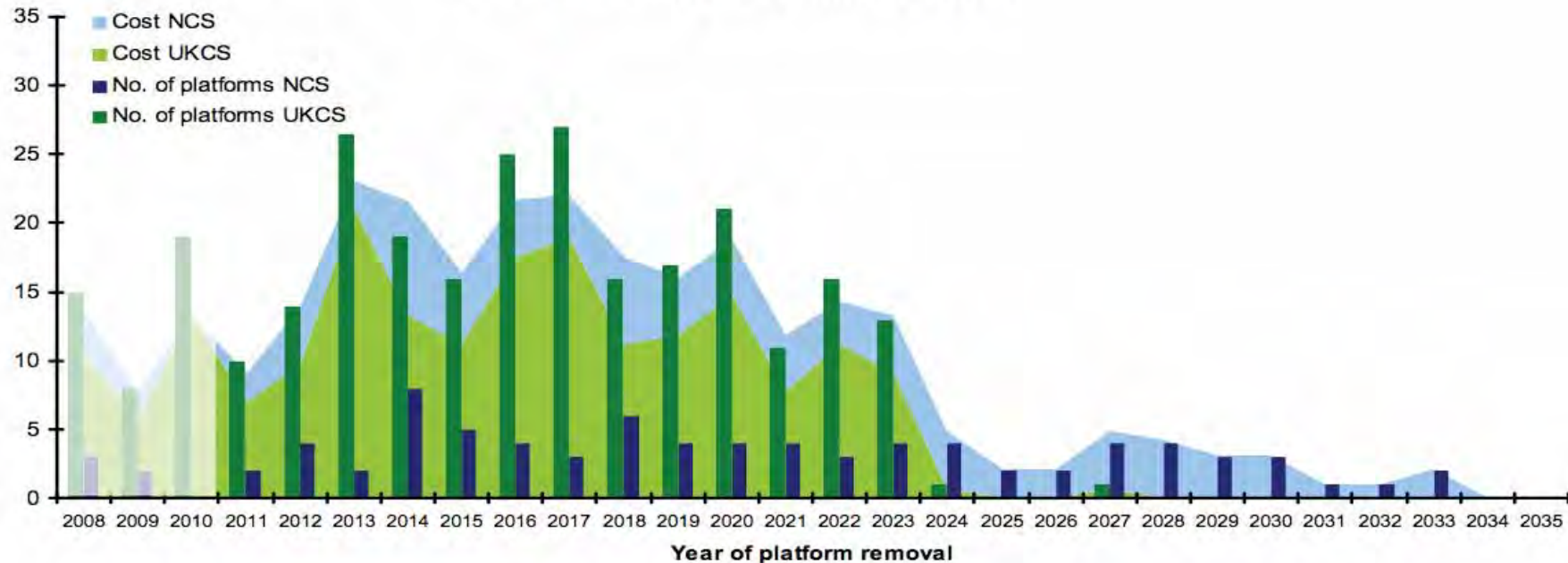
Nexan Spiders cleared a path and dug subsea trenches from Ormen Lange to Nyhamna. (Photo courtesy of Norsk Hydro)



Norwegian Decommissioning Market (2010)

Cost per year (Bn NOK)
No. of platform removals

Decommissioning market UKCS and NCS



- Expect less schedule slippages in the future
 - 44 UK fields produce < 1,000 BOPD
 - KLIF (Norwegian Climate and Pollution Agency) proposal to initiate platform decommissioning within five years after field shutdown (NCS)



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Offshore Installations in UKCS



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UK OIL & GAS FACILITIES TO BE DECOMMISSIONED IN FUTURE YEARS

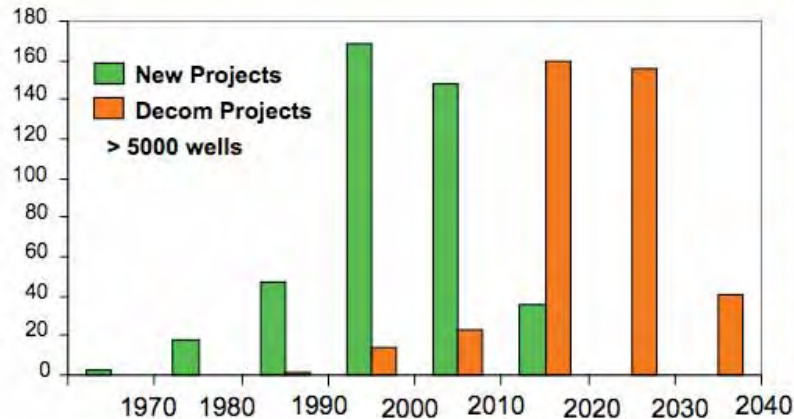
- 8 installations with large concrete substructures
- 31 with large steel jackets (> 10,000 tes)*
- 214 other steel jackets
- 278 subsea production systems
- 21 floating production systems
- 3,300 pipelines – around 25,000 kms
- <5,000 wells
- <200 cuttings piles



Summary of UKCS (2010)



UKCS Activity



- Developing decommissioning business
- Less than 10% facilities removed
- Over 30 facilities abandoned to date
- Varying conditions and complexity
- Estimated \$500m annual spend, rising
- Supply chain capability developing
- Regulated with derogation



Data Source DECC & Oil & Gas UK



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UKCS Approximate Market Timing & Value



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UKCS DECOMMISSIONING

Decommissioning – When – Expected Timeframes

The decommissioning challenge

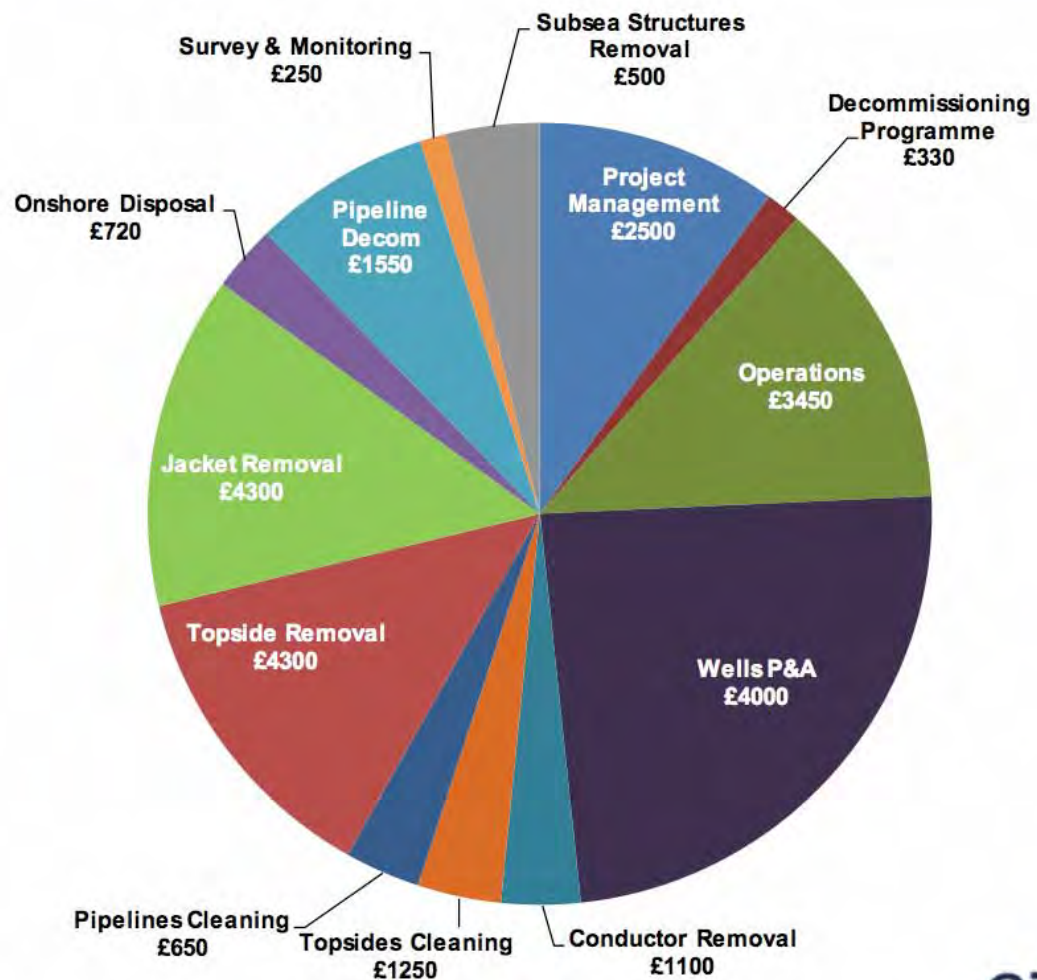
- 630 installations
- 10,000 km pipeline
- 5,000 wells

£27 billion
decommissioning market

- Immature Industry
- Uncertainty on timings
- Lack of investment
- Not the day job!

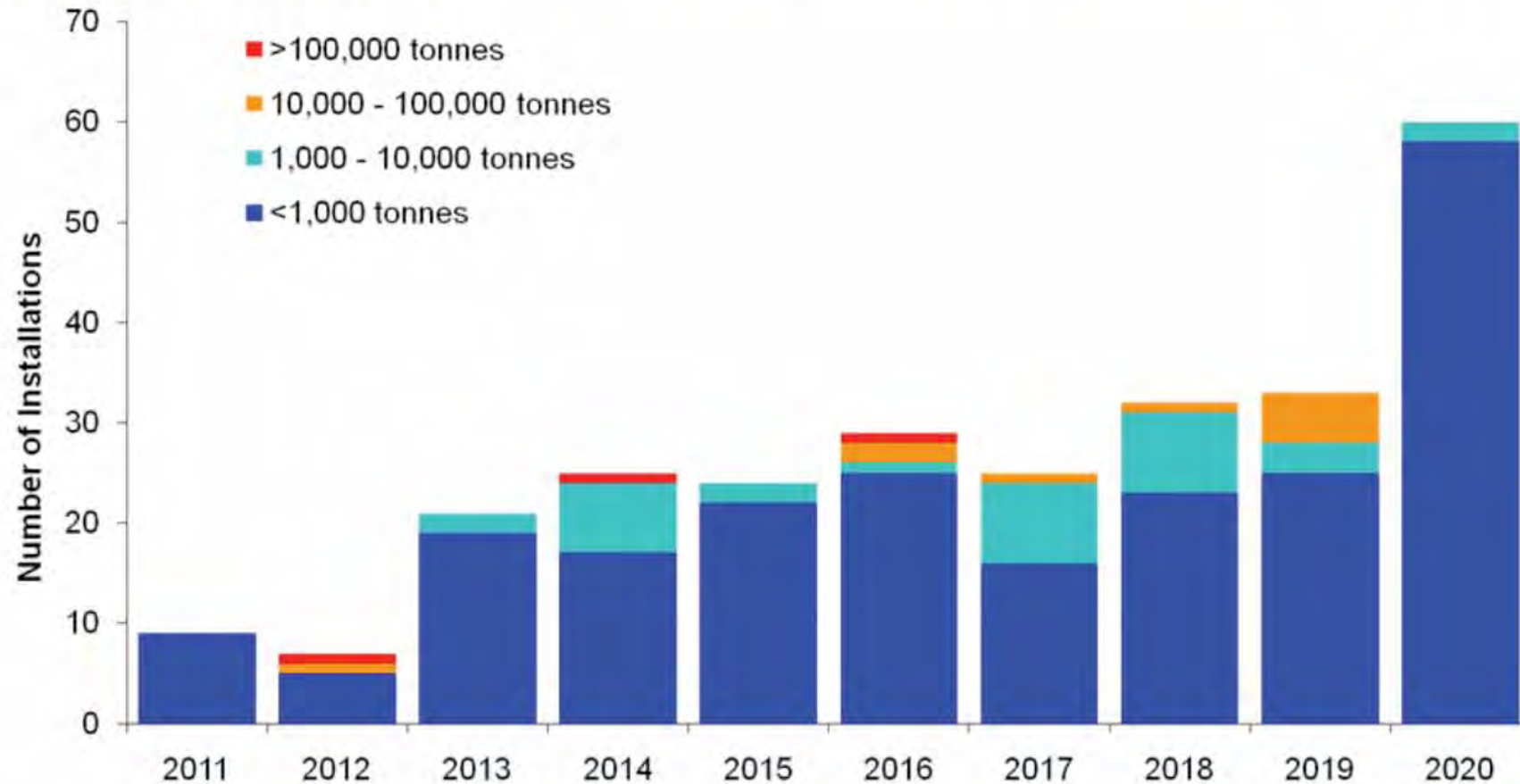
UKCS DECOMMISSIONING

Market segmentation 2011-2050



Jacket/ subsea structure removal

Jacket and subsea structure removal is shown by number of installations rather than fields in order to give an indication of contracts and removal events due over the next decade.



UKCS decommissioning market: The next decade

	2011-2015	2016-2020
Decommissioning expenditure (£ millions 2009 money)	£3.8 billion	£5.4 billion
Wells to be P&A	400	530
No. of installations/elements of infrastructure to be removed	114	170



Examples of Decommissioning in Southern North Sea



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TYPICAL SOUTHERN NORTH SEA GAS PLATFORMS

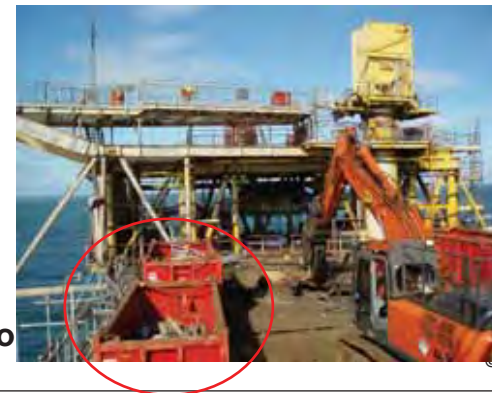


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Alternative Method of Topside Removal Piece Small



of Concession & Deco



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Decommissioning in Northern North Sea



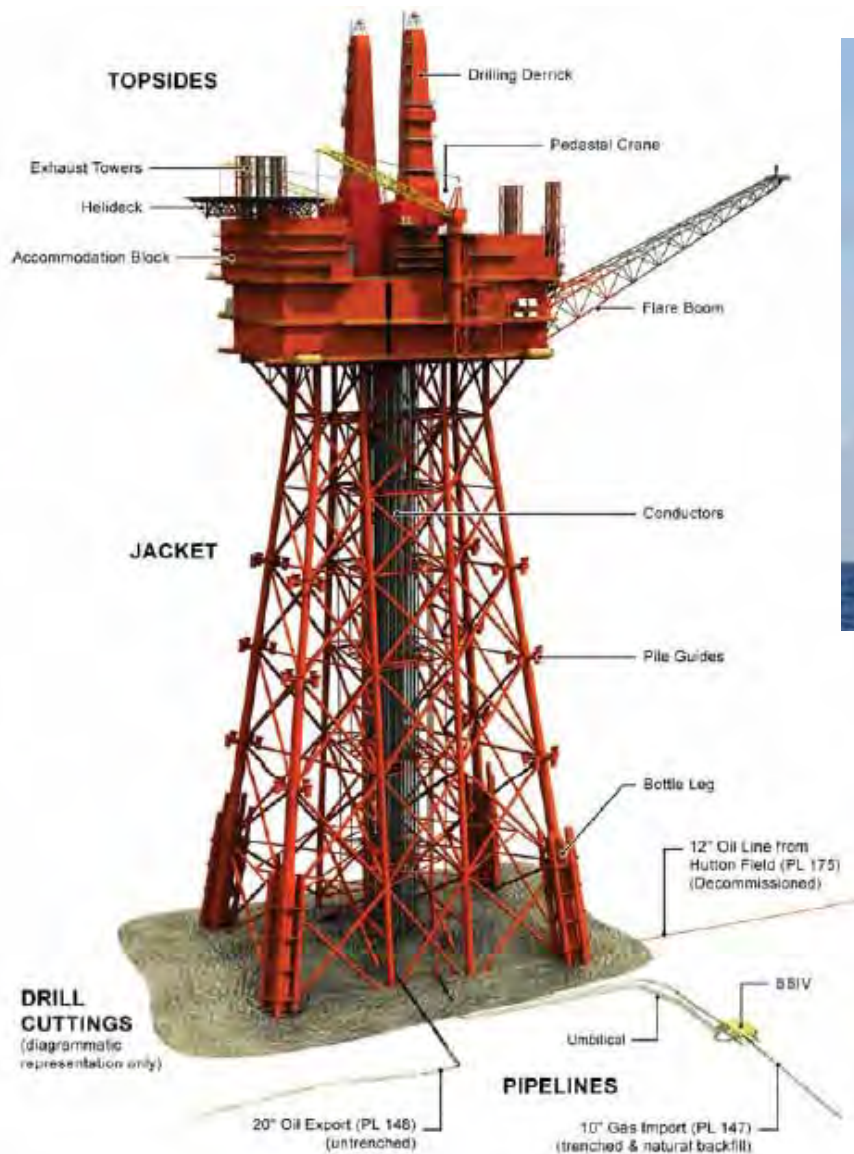
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Typical NNS Offshore Platform

NW Hutton Platform



Topsides 20,160 tonnes

Jacket 18,000 tonnes

Water depth 144 metres

Operational Crew: ~120

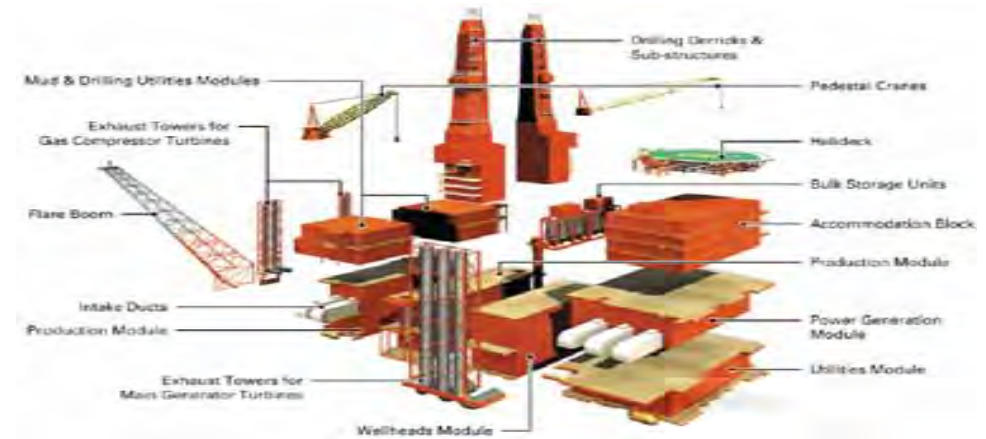
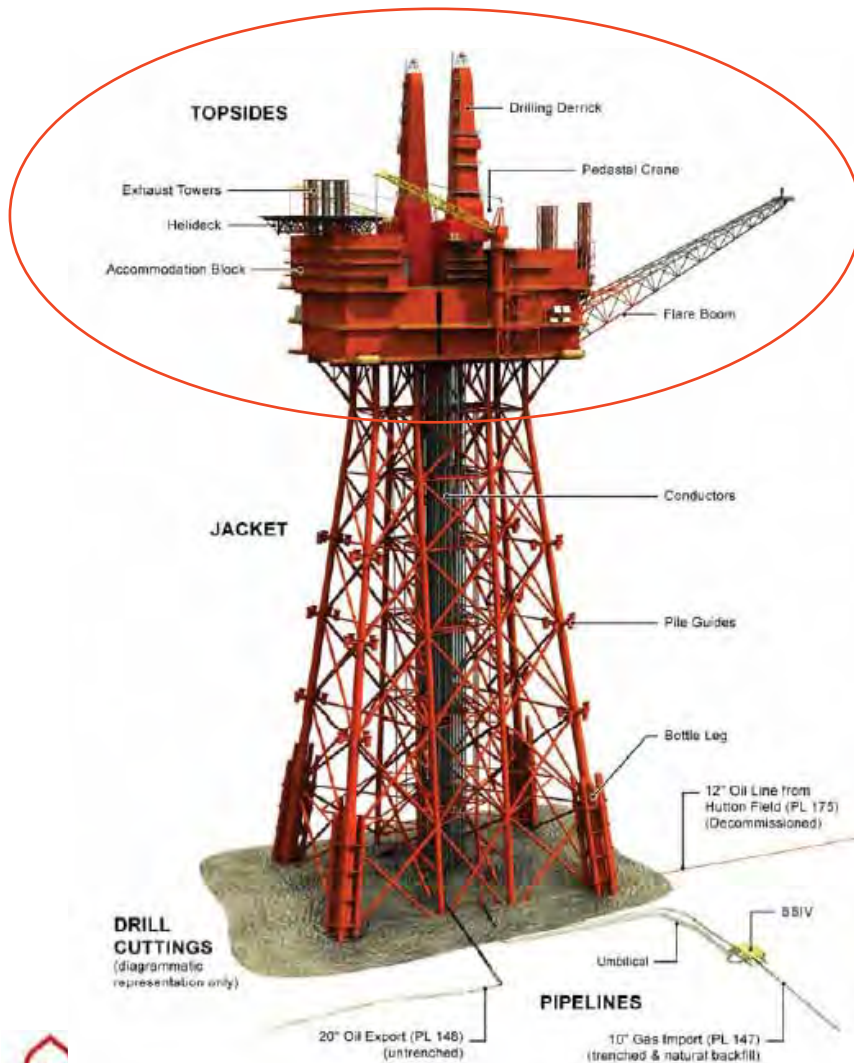
Commissioning 12-14 June 2012



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Installation of A Northern North Sea Platform



22 Main Lifts



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Installation of A Northern North Sea Platform



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DECOMMISSIONING OF NNS PLATFORM



Giant Crane Vessel Decommissioning NW Hutton

(Only 4 in the world)

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Installation of Large Jackets Using Buoyancy

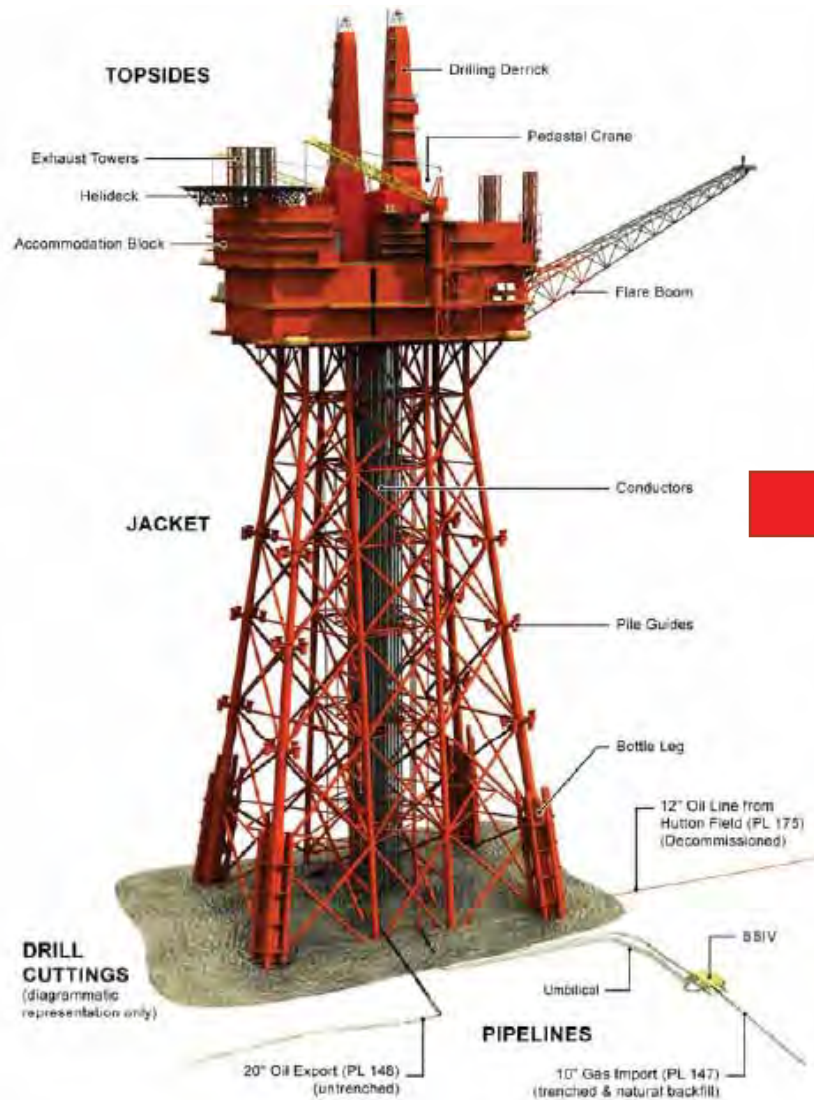


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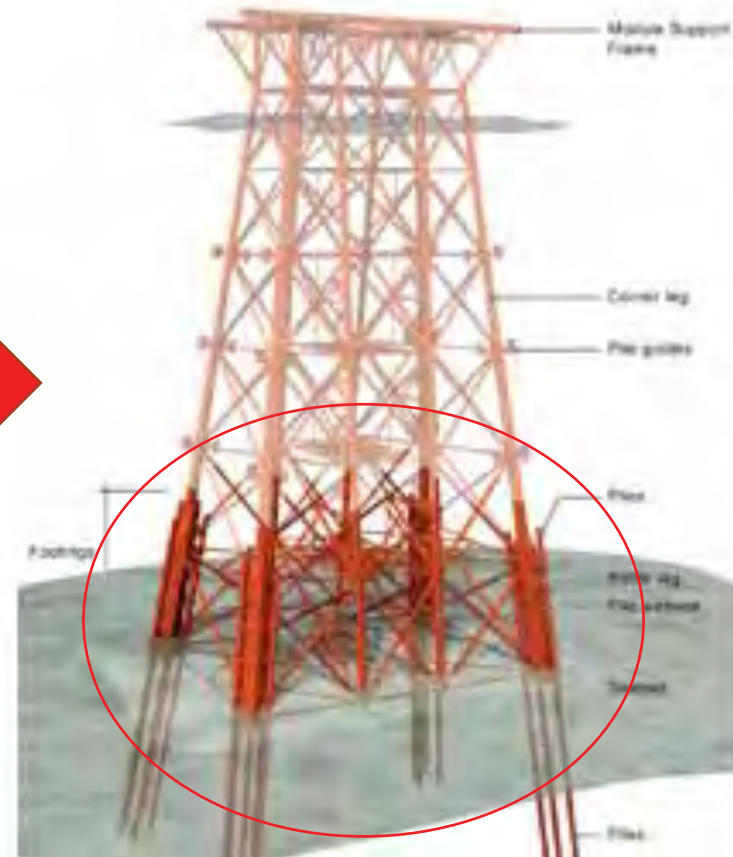


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NW HUTTON JACKET DECOMMISSIONING



Jacket + Piles ~18,000mt



Allowed to leave "Footings" ~ 8,500mt approximately

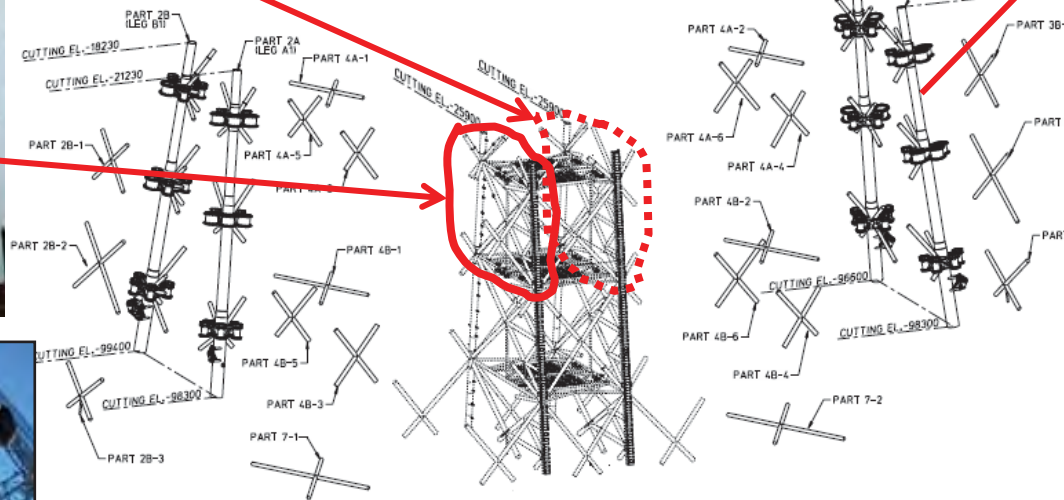
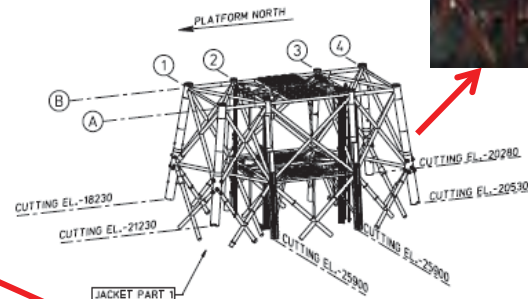


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DECOMMISSIONING NWH JACKET



“Footings left”

Hundreds of complex subsea cuts using cranes, ROV's and 4 types of cutting tools



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DECOMMISSIONING NWH JACKET



**Installed Barge Launched
with Buoyancy**



**Decommissioned in Pieces
(Major subsea cutting needed)**



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Subsea Jacket Cutting During Decommissioning



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Subsea Cutting Methods Used To NWH Jacket



Abrasive Water Jet (AWJ)



Diamond Wire Cutting System (DWCS)

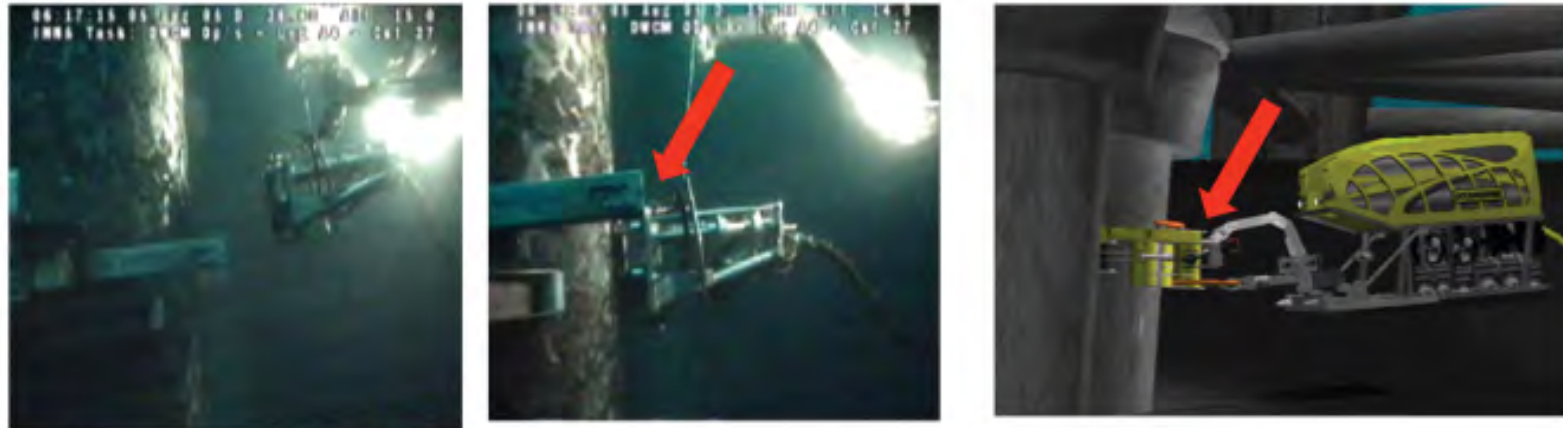


Gated Hydraulic Shears



ROV Deployed Subsea Diverless Cutting Tools

ROV flyable Diamond Wire Cutting System



Subsea docking of ROV Flown (DWCT) Cutting Tool



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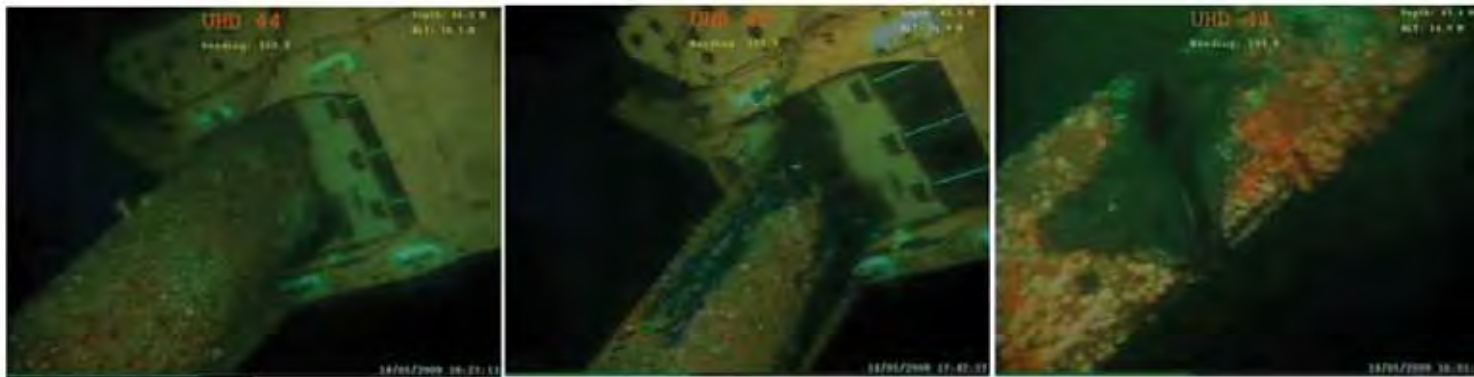
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Crane Deployed Diverless Subsea Cutting Tools

Prime Shears – LBT Enterprises



Installation on cut location



Performing cut



Thank you for your attention

Any Questions ?