MCE Deepwater Development 2014
Madrid, Spain

Well Intervention Campaign's Across 3 Continents

& Q7000 Overview

HELIX
WELL OPS

Agenda

- Overview of Light Well Intervention vessel's (LWIV's)
  - *the added value*
- Helix Well Ops position within the contractor's marketplace
- Helix Well Ops Fleet – current
  - Key features of a LWIV
    - Subsea Intervention Lubricator
- Well Intervention Campaign's Across 3 Continents – project delivery considerations
- Case Study
- Helix Well Ops Fleet – future
  - Q7000 overview
- Close

Overview of Light Well Intervention vessel's (LWIV's)

- **First operation conducted from a vessel in the North Sea in 1987 – MSV Seawell**
  - Over 25 years experience
- **Integrated Onshore/Offshore Management**
  - Project Management – all in-house
  - Knowledgeable, experienced, integrated crews
  - long-serving staff – continuity
- **A '*one key fits all*' approach to operations**
  - Key equipment – SIL – configured to work on all OEM XT/XT types for well access
  - Saturation Diving
  - Coiled-tubing
  - Wireline (slickline & E-line)
  - Pumping
  - XT deployment/recovery
  - P&A
  - Light Construction
    - MPT/Crane – deployment/recovery
    - Saturday Diving & ROV for tie-ins

- **Single-source management of operations**
  - Vessels
  - Personnel
    - 3rd party management of service companies
  - Intervention systems – SIL & IRS
  - Saturation Diving & ROV ops

the added value

Efficiency = the Added Value to the Client

Time & Cost = efficiency

- Transiting – from wellsite to wellsite (10 – 12knts.)
  - DP vessels
- Set-up at wellsite – *HOURS* versus *DAYS*
  - Rig 3 – 5 days?
  - LWIV 36+/- hours – then well access
    - Marine/DP settings/ROV site survey/TC/SIL ops
- No additional support assets
  - AHV/Stand-by/Supply Vessel's

Operations & Project = efficiency

- Campaign wells based
- Shared across Business Units, Assets & multi-Operator
- Cost effective v MODU
  - Brownfield/LoF production extension
  - Annual well integrity/maintenance/P&A well-work

Broad Functionality of Vessel = efficiency

- Variable deck lay out – multi-service
  - reduce need for port calls; additional load-out
- Rapid onshore mob & de-mob/interim project port-calls
  - in & load-up (de-mob) & sail

Helix Well Ops position within the contractor's marketplace

***Helix Well Ops** – the only SIMOPS contactor in the World…combining both well intervention & saturation diving capabilities…*

+

=

Drilling Contractor

MODU – Jack-Up, Semi or Drillship

- Drilling
- Completion
- Well-Workover

Marine Contractor

DSV's – Diving Support Vessels

- IRM – Inspection, Repair & Maintenance
- SURF – Subsea Umbilicals, Risers & Flowlines
- EPIC contracts – Engineering, Procurements, Installation & Commissioning

Helix Well Ops Fleet – current

MSV Seawell light well intervention – first campaign 1987

Unrivalled experience; only company world-wide with over 25 years well intervention operations completed from assets

- 930> subsea well interventions to date
- North Sea, GoM, Canada, South America, Africa & Asia-Pacific – **Global Reach**

Unique contracting/single in-house offering

- *Own* Assets & Crew (projects/well ops/deck/marine)
- *Own* Well Intervention Systems – SIL & IRS
- *Own* ROV/Saturation Diving – equipment & personnel
- *Own* Projects Management – onshore & offshore

Q4000 medium/heavy well intervention, construction & deco – first campaign 2002

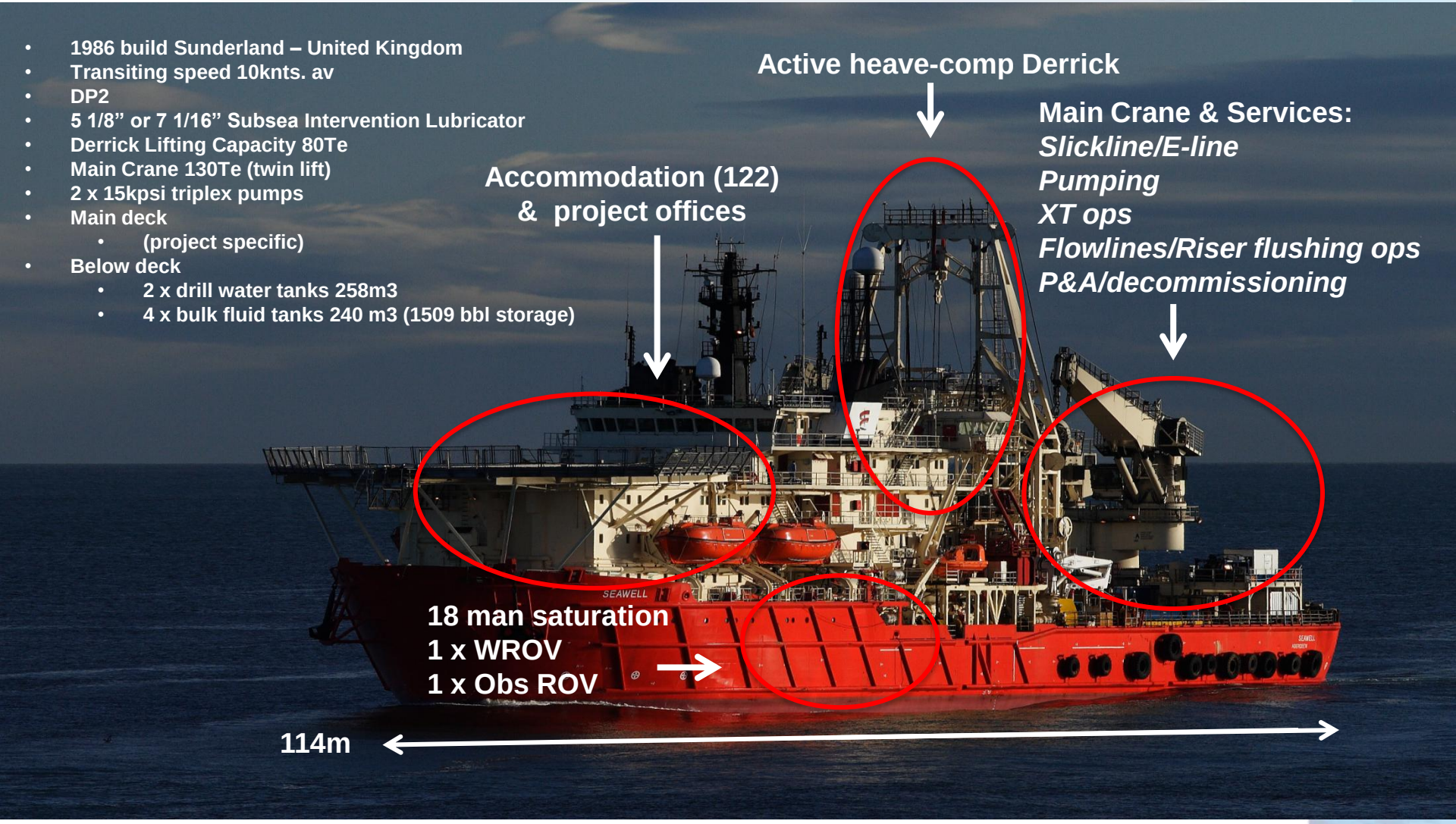
Skandi Constructor light well intervention – first campaign 2013

Helix 534 heavy intervention & deco – first campaign Q1 2014

Well Enhancer light/medium well intervention & deco – first campaign 2009

Key features of a LWIV

- 1986 build Sunderland – United Kingdom
- Transiting speed 10knts. av
- DP2
- 5 1/8" or 7 1/16" Subsea Intervention Lubricator
- Derrick Lifting Capacity 80Te
- Main Crane 130Te (twin lift)
- 2 x 15kpsi triplex pumps
- Main deck
  - (project specific)
- Below deck
  - 2 x drill water tanks 258m3
  - 4 x bulk fluid tanks 240 m3 (1509 bbl storage)



MSV Seawell

Subsea Intervention Lubricator

The Subsea Intervention Lubricator (or SIL) provide both vertical & horizontal XT wellbore access for interventions. Its primary functions are:

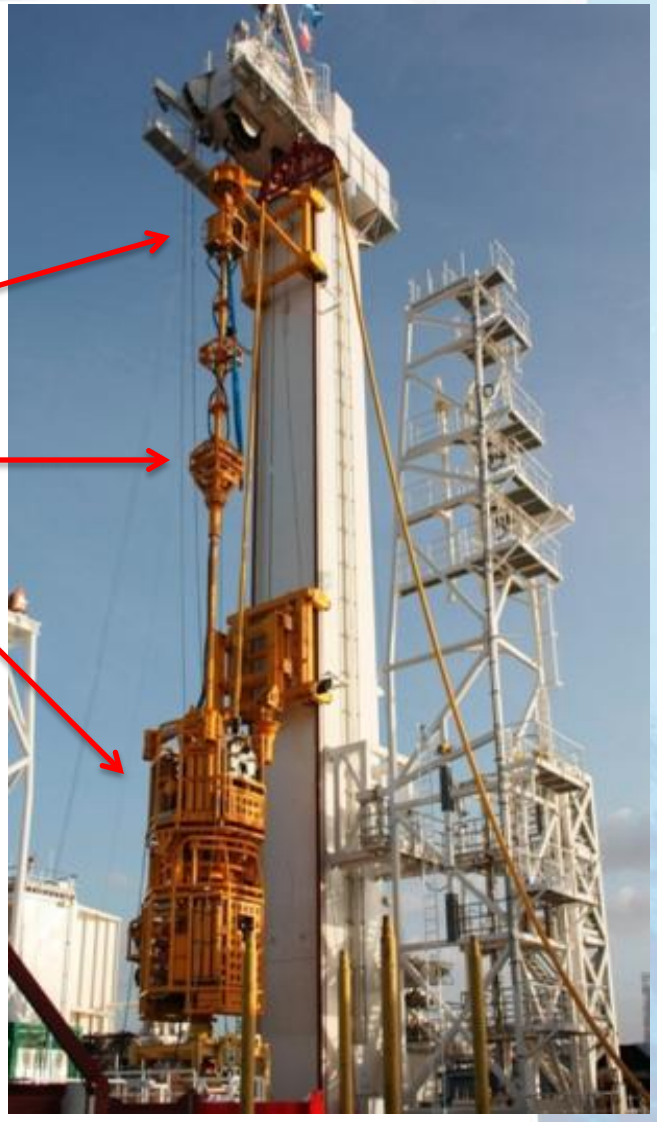
- *A means to enable access into a live subsea well in a controlled manner*
- *It the primary well control equipment through the well Intervention process*

The SIL is made up of 3 elements:

- Subsea stuffing box/grease injection head c/w OWL & gate valve
  - Slickline – static seal on rubber packer
  - E-line – dynamic seal using grease
- Riser/lubricator section
- LRP/EDP assembly c/w gate valve & wireline BOP's blind ram and shear/seal) – **well control package**

The SIL has a x-over interface between the flange of the LRP (SIL) and the Client TRT (Tree Running Tool) which interfaces with the Tree to be intervened upon

The SIL is deployed, via guide wires (to the wellhead guideposts) to the XT. The communications and controls to operate the SIL are via an umbilical which is deployed with the SIL and controlled from surface



Well Intervention Campaign's Across 3 Continents – project delivery considerations

Exec Summary

Project planning & delivery when working with e&p companies across different regions, have a number of considerations to take into account, when preparing campaign subsea well intervention well-work. Summerising on the United Kingdom Continental Shelf (UKCS), Canada and Equatorial Guinea, we look at how planning, vessel assurance, field/operations & logistical matters are taken in to consideration prior to the in-field activity/execution phase

The LWIV's have the ability and are proven to work 'all year round' and in a variety of water depths, environmental/weather conditions and with varying well intervention & subsea requirements. The key to delivering success and *'getting it right'* is experience, professional and through Project Management solutions in order to – Plan, Develop, Execute & Close-out, safely, efficiently and successfully

Follow the following overview a Case Study from the actually West African campaign, completed in 2014 in Equatorial Guinea will be reviewed

Background

The vessel, Skandi Constructor, although built for the LWIV market in 2009, hadn't undertaken any such operations with its former, nor, current owner, prior to Helix Well Ops entering into a charter agreement with vessel owner – DOF Subsea. The following summarises the key considerations and factors in delivering on three well intervention campaigns, in the following regions;

- **United Kingdom – Central North Sea, UKCS (Q1/2 '14)**
- **West Africa – Zafiro, Equatorial Guinea (Q4 '13/Q1 '14)**
- **Canada – Grand Banks Area, East Coast offshore (Q2/3 '14)**

Well Intervention Campaign's Across 3 Continents – project delivery considerations

project planning

- **client location impact on project preparation**
  - Not an issue as client office is in Aberdeen, Scotland across road from Helix Well Ops office! Therefore easy access to client office and vice versa for meetings, planning, discussions, etc
  - Client planning team based in Houston (corporate) with client execution team based in Malabo, Equatorial Guinea
  - Client office based in St. John's, Canada. Managing offshore East coast Canada operations
- **engineer interfacing**
  - Assigned engineer as desk engineer based in client office
  - Engineer flew across to Houston and was based in client office during planning stages, Client team from Houston and WA flew into Aberdeen for well on paper planning meeting and risk assessments. Weekly calls between UK – Houston – WA
  - 2 x PE's working in client office in St. John's Canada on a 4 week rotation, Client PM spends 1 week of every month during planning and development phase in Helix Well Ops office in Aberdeen, Scotland

vessel compliance

- **local regulations**
  - Standard UKCS
    - OPEP Oil Pollution Emergency plan
    - PON – Chemical usage permit
    - CON – Combined Operations Notification
    - HSE
  - Local Client
  - C-NLOPB; Transport Canada; Client
- **marine assurance**
  - Client vessel assurance audit
  - Local Client audit
  - Client audit

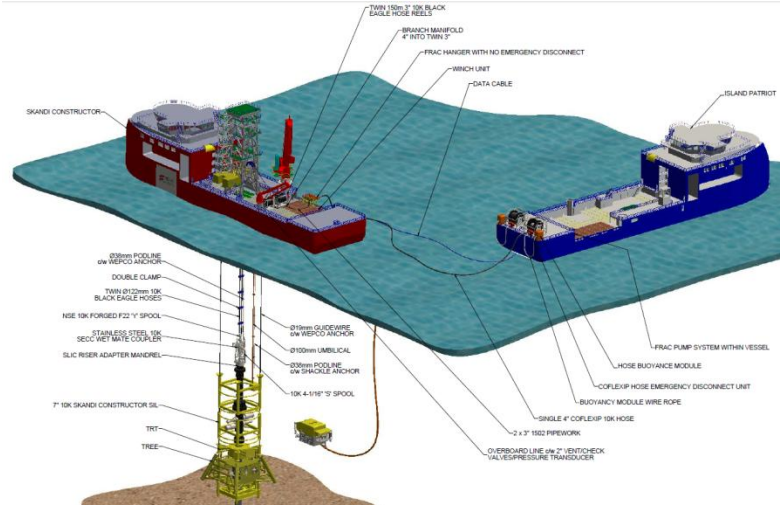
field location/operations

- **wells/XT's**
  - 4 x wells, 3 horizontal, 1 vertical
  - 6 x wells, 4 vertical, 2 horizontal
  - 6 wells, all horizontal
- **water depths**
  - all approx. 85m
  - 350m to 660m
  - all approx. 95m
- **scope of work**
  - 1 x scale squeeze, 3 x logging, re-perf and acid stimulation
  - 4 x GLV change out, 1 x logging, 1 x safety valve lock out
  - All logging with possible re-perf and water shut off

Well Intervention Campaign's Across 3 Continents – project delivery considerations

Logistics

- **People**
  - Planning for 2 vessels (ops specific) at same time
  - LOI's/Visa's to enter country a big issue, none issued except for first crew by EG government so had to crew change via Cameroon
    - Chartered flight from Aberdeen, via Amsterdam, to Douala. Ferry to Malabo for crew-change
  - Crew change could be a problem as it variable and often foggy conditions, could mean planning to do entire operation without going into port – tbc
- **Equipment – 3rd party & Interface**
  - Supplied all subsea interface equipment and 3rd party commercial management
  - Hardware via FMC. 3rd party via Helix via Aker QServ
  - Equipment procured/designed/manufactured via Helix. 3rd party direct contracting
- **vessel transit (**to location from UK Port)
  - Under 24 hours
  - 21 days
  - 10 days



Execution of project

- 80 days in field
- 52 days in field (see following Case Study for overview)
- 40 days in field

ExxonMobil (MEGI) – Case Study
Equatorial Guinea, West Africa
Skandi Constructor
December to March 2014

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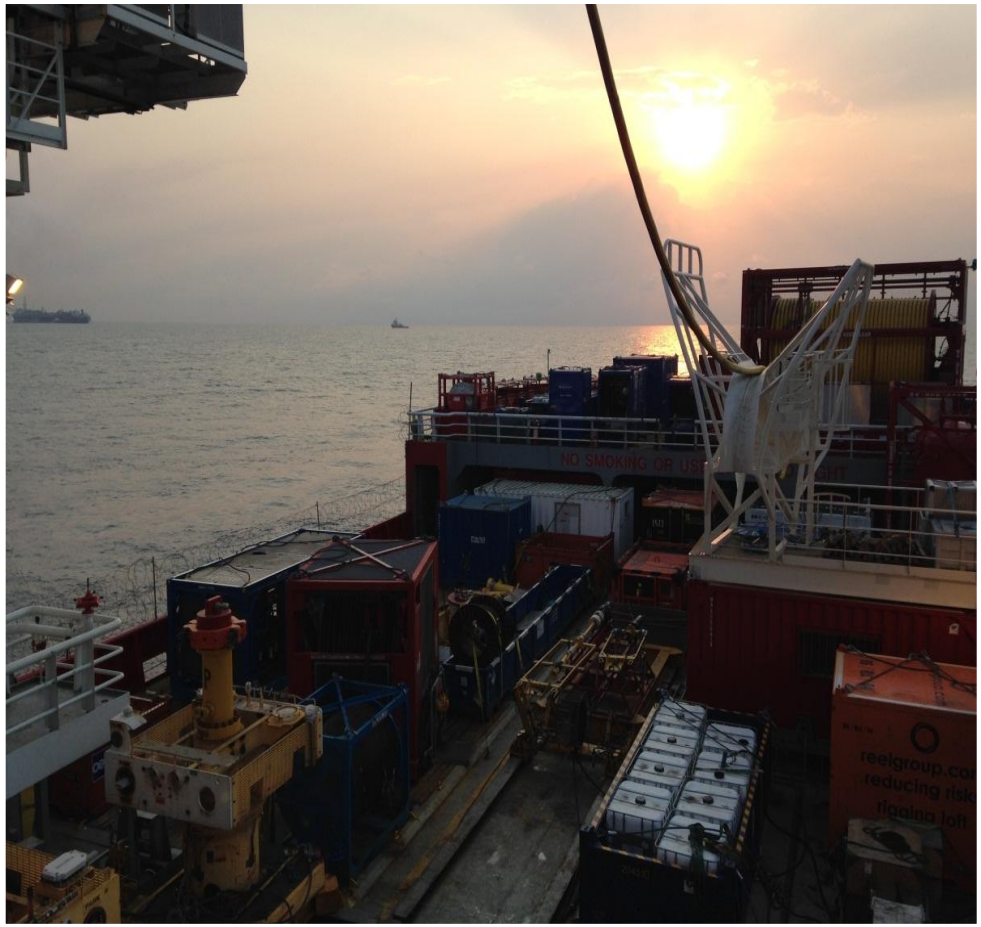
Case Study – Contents

- **Campaign Overview**
  - Objectives
  - Location/Host Facilities
  - Vessel
    - SIL system
- **Project Planning**
- **Well Operations**
  - Phase 1
  - Phase 2
- **Campaign Summary**



Campaign Overview – Objectives

Following a successful maiden well intervention campaign of 2011/12, **ExxonMobil (Mobil Equatorial Guinea Inc. – MEGI)** again contracted Helix Well Ops to undertake a 60+/- day program at the Zafiro Field, 42Nm NW of Bioko Island, Equatorial Guinea

As in 2012, with the chosen well-sites within the Zafiro Field varying, distance wise, from 0.5km to 8km apart, the speed, mobility and operational efficacy of a Helix Well Ops DP3 monohull vessel was the preferred option for the client

- transit average speeds of 12knts = **optimisation of in-Field non-operational time spent**
- well access in under 40 hours (following DP/Marine prep, TC ops, SIL ops) = **reduces costs v MODU**
- reduces need for additional support assets for MODU in-field (stand-by, AHV, supply vessels) = **additional costs**

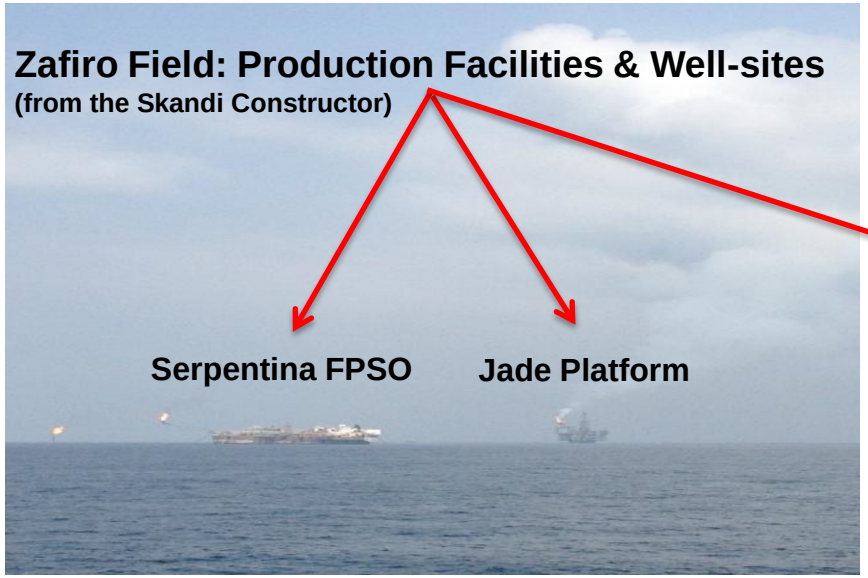
The key client objectives for Helix Well Ops (Project Team) were to facilitate production gains through gas lift valve (GLV) change-outs, as well as to perform investigative well work

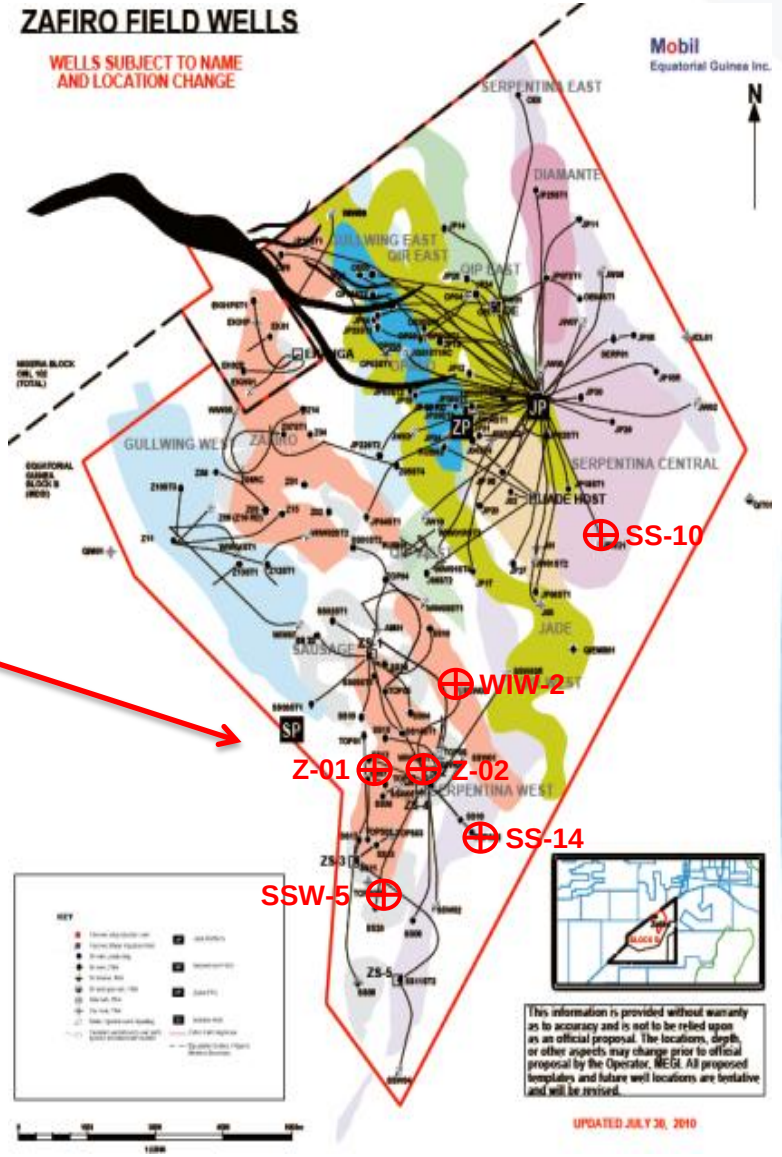
Vessel: Skandi Constructor (below)
Date: December 2013 – March 2014 (94 days inc Mob to De-mob (UK to UK – 3 weeks to and from))
- 50 days = Light Well Intervention in-Field ops
- 2 days = Transits/port call mid-campaign (crew changes & mobilise Horizontal XT TRT)

Campaign: 6 x Subsea Wells
- 4 x Production – Dual Bore XT's
- 2 x Water Injectors – Horizontal XT's

Workscope:
- 4 x wells perform GLV change-outs & Well Integrity Ops
- 1 x well perform SCSSSV Lock-out
- 1 x well conduct Pulsed Neutron Log (reservoir evaluation/monitoring)

Campaign Overview – Location/Host Facilities



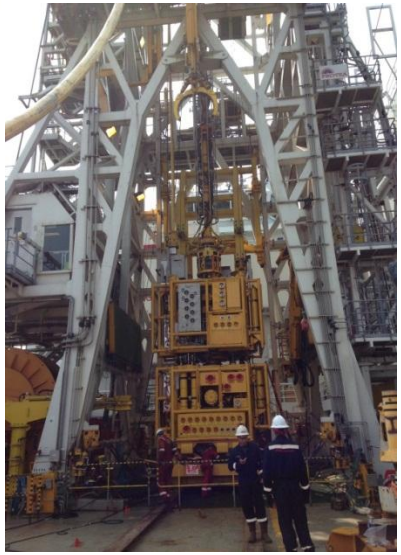


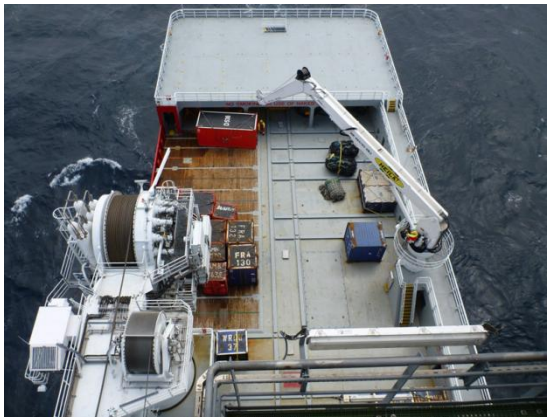
Skandi Constructor – vessel overview

- 2009 build/X-bow design Ulstein – Norway
- Transiting speed 12knts. av
- DP3 – full redundancy (engine failure/fire/flood)
- 7 3/8" Subsea Intervention Lubricator
- Tower Lifting Capacity 150Te AHC
- Main Crane 150Te AHC

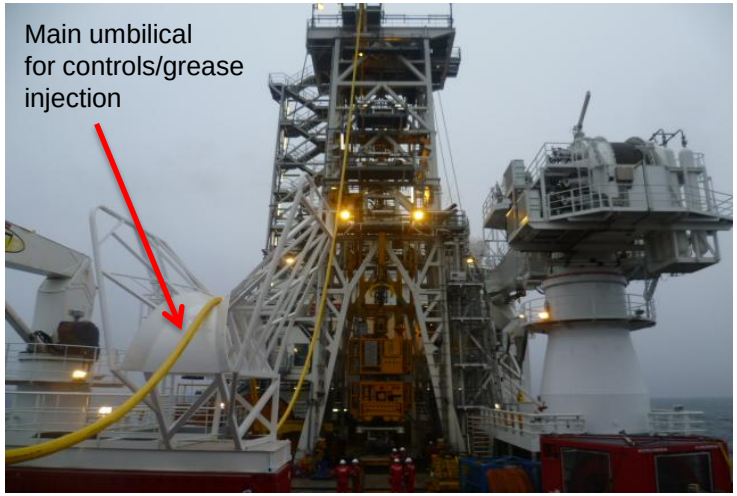
- 2 x 10kpsi SPM600 pumps
- Main deck area
  - 1,470m2
- Below deck (fluids storage)
  - 700m3 project specific chemicals
  - 3,150m3 (technical fresh water)

Skandi Constructor –Tower; AHC Crane; SIL; Back Deck (pre/post equipment load-out); Subsea (ROV footage)



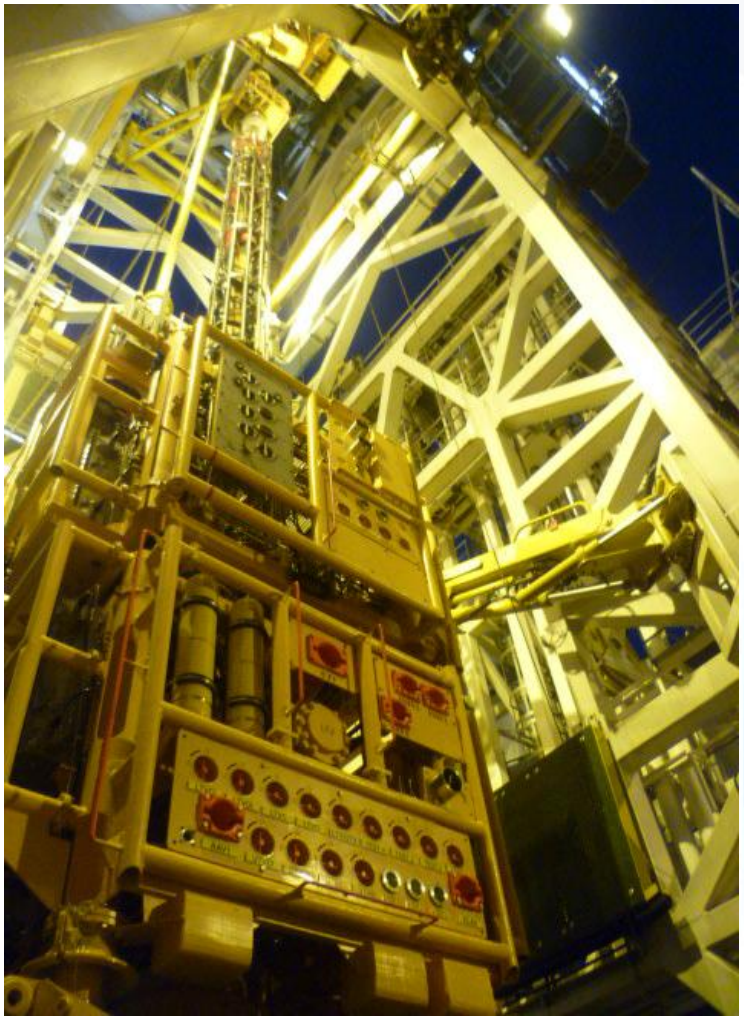


Campaign Overview – Subsea Intervention Lubricator



Subsea Intervention Lubricator (SIL) spec:

- DNV Certified equipment
- 7 3/8” ID thru-bore – HXT crown plug access/recovery
- 10k psi working pressure range
- -18 – 121c (0 – 250f) temperature range
- Sour service H2S NACE MR 01-75
- Independent dual power & comms for full redundancy (evolved design)
- 1500m water depth rated – deployment/operational
  - Slickline
  - E-line
  - Trees deployment/recovery
  - High rate pumping capability through SIL main bore



7 3/8” SIL assembly (comprising Stuffing Box/OWL; Riser (lubricator) EDP, LRP & spool connector > client TRT) positioned in the MPT prior to deployment

Project Planning

Due to the geographic nature of this specific project;

Field Location

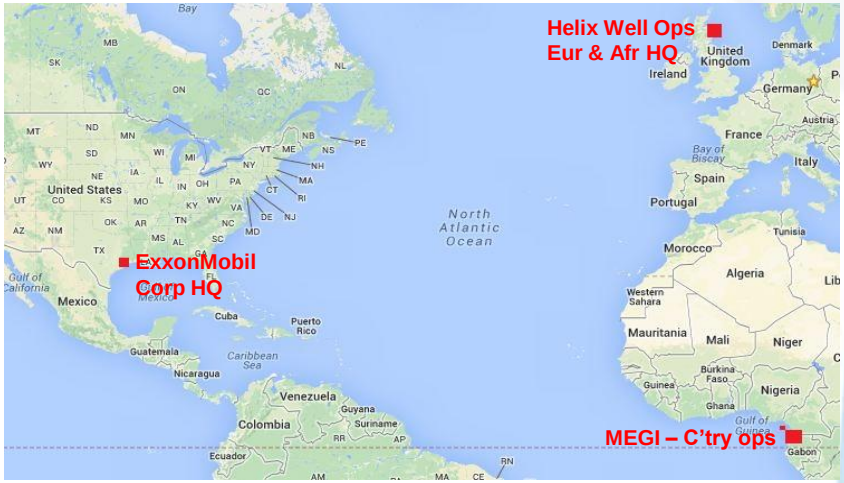
- Zafiro – Equatorial Guinea

Operator Location

- Projects Team Houston – USA
- Operations Team Malabo – Equatorial Guinea

Helix Well Ops Vessel & Project Team Location

- Aberdeen – UK



Helix Well Ops dedicated Project Engineering resources from Aberdeen to work with the Client Projects Team in Houston. Key roles included;

- Prepare all documentation for the campaign (well intervention work) with client management system
- 3rd party well servicing company interface, equipment and management
- Assist with procurement/manufacture of new subsea equipment/project specific hardware (Horizontal TRT, electrical control umbilicals, etc)
- Weekly calls were held between the 3 key locations
- Client/Helix Well Ops drew on their experiences of the 2011/12 campaign, as well as liaising with 3rd party service providers/suppliers in-Country, proved valuable for upfront planning and logistics

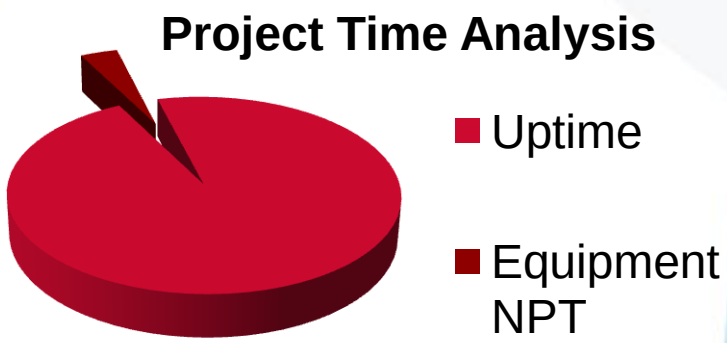
- Additional Helix Well Ops Project Engineers were dedicated to MEGI's onshore support base, to support operations. Daily morning calls; operational calls were coordinated between the UK Helix Well Ops office (Project Management), Vessel (Client, Project Management/Engineers) and Client office in Malabo, EG

Well Operations – Phase 1

3 wells = 25 days (arrival onsite, well-work, transits)

Water depth ranges 623ft – 1365ft (190m – 416m)

- Uptime 96.4%
- Equipment NPT 3.6%
- Vessel NPT 0%
- WOW 0%



Intervention Objectives:

- **Investigation Tubing Integrity** and potential trapped annulus on all **3 x wells**
- **Replace GLV's** on each of the **3 x wells**, utilising KoT
  - **Set plugs in tubing for GLV testing** as contingency if required
- **Investigate tree cap integrity** – **2 of 3 wells** utilise tree cap to complete host hydraulic controls
- **Investigate tree Integrity** on **1 x well** (shut-in)

Outcome:

- **Replaced tree cap couplers** to reinstate hydraulic control for host
- **Deployed, Installed and tested SIL/TRT (both styles)** – in total **10 SIL deployments** (including tree cap recovery ops using SIL)
- **Drifted all wells on Slickline** (c/w memory & P/T gauges and CCL)
- **Replaced GLV's** (6 of.) **– on 2 x wells** (1 well did not require GLV replacements)
- **Tubing/Annulus communication tests – 3 x wells**
- **Trouble-shoot tree valve functions – on 1 x well** (re-instated previously shut-in well, back into production)
- **EV Camera and multi-arm calliper deployed on E-line** to investigate tubing condition **–1 x well**

A total of **20 wireline runs** (18 x Slickline, 2 x E-line) were conducted during Phase 1

Well Operations – Phase 1 (equipment spread)

1) SIL Main Umbilical
2) Eline and Slickline Units
3) Pumping Spread
4) Additional Chemicals
5) Kill Hose and 5-core Downline
6) Tractors and Logging Tools
7) Vertical TRT (Tree Running Tool)

Well Operations – Phase 1

3 x Wells 2 x Tree Styles 2 x TRTs

SIL c/w "FMC Phase I" TRT recovering Tree Cap

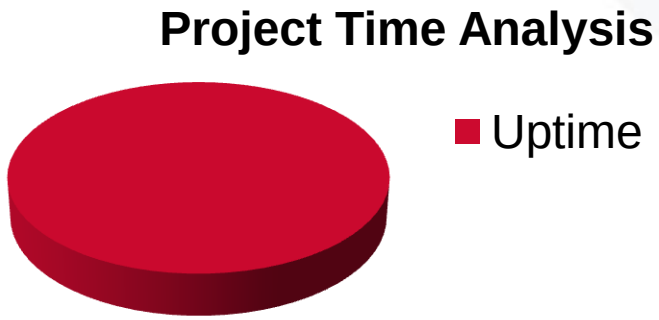
SIL c/w "FMC SEA" TRT pre-deployment

Well Operations – Phase 2

3 wells = 25 days (arrival onsite, well-work, transits)

Water depth 1076ft – 2142ft (328m – 653m)

- Uptime 100.0%
- Equipment NPT 0%
- Vessel NPT 0%
- WOW 0%



Intervention Objectives:

- **Investigation Tubing Integrity** and potential trapped annulus on all **3 x wells**
- **Replace GLV's** on each of the **3 x wells**, utilising KoT
  - **Set plugs in tubing for GLV testing** as contingency if required
- **Install & test SCSSSV insert** on **1 x well** (Horizontal Water Injector)
- **Perform Pulsed Neutron Log** on **1 x well**, Horizontal Water Injector, to evaluate fluid saturations across reservoir intervals

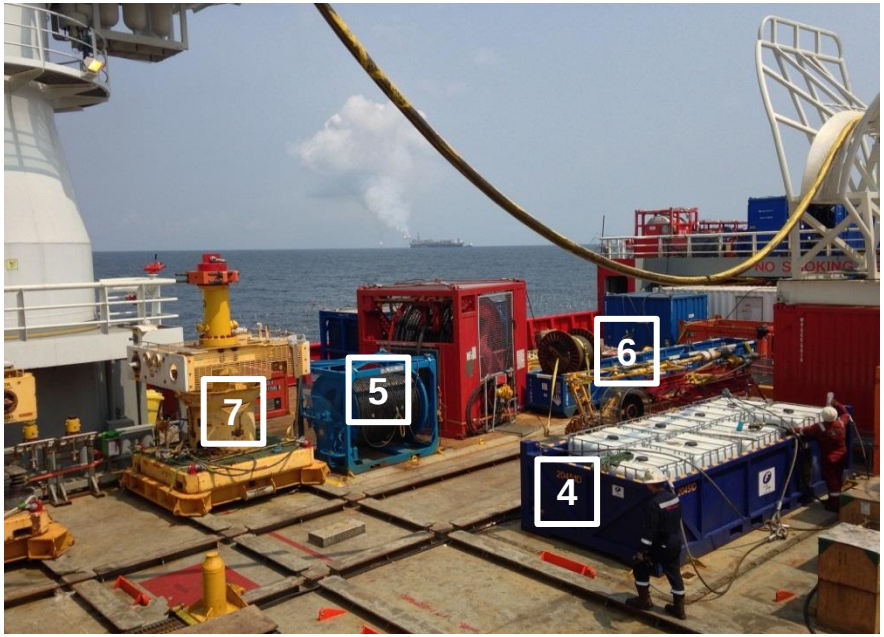
Outcome:

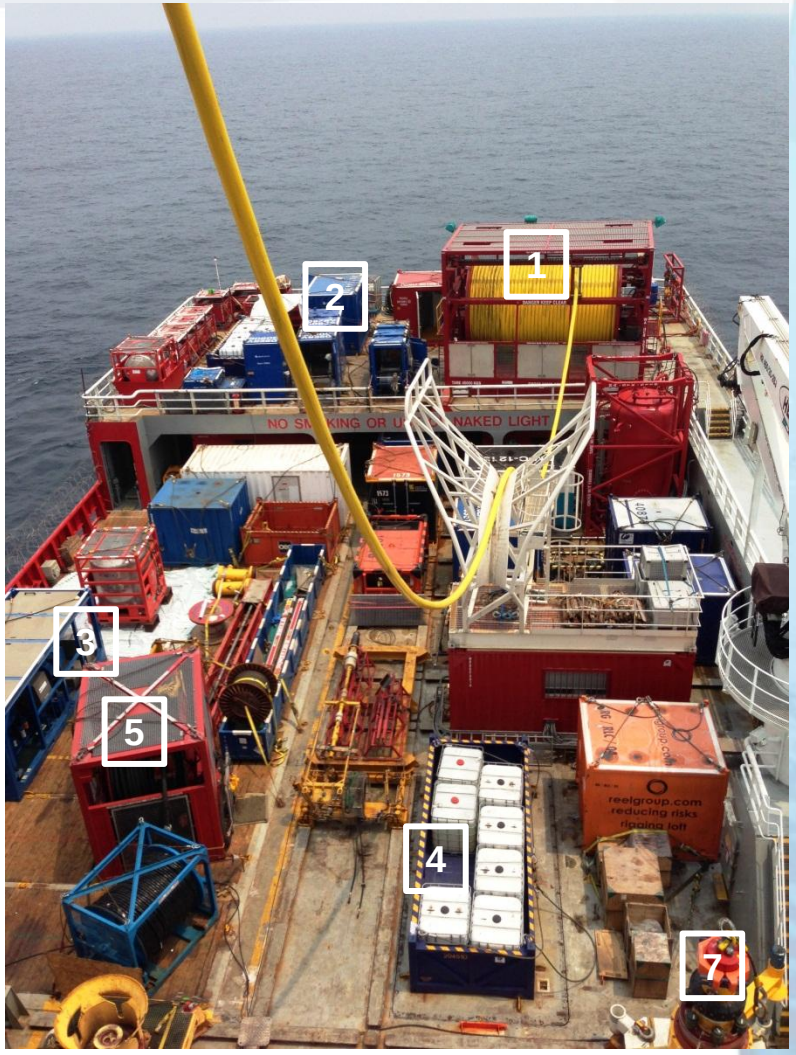
- **Deployed, Installed and tested SIL/TRT (both styles)** – in total **3 SIL deployments** (including tree cap recovery ops using SIL)
- **Remove (insert sleeve), then install new Crown Plugs** on Horizontal Water Injectors
- **Drifted all wells on Slickline** (c/w memory & P/T gauges and CCL)
- **Replaced GLV's** (4 of.) **& Tubing/Annulus communication tests – 1 x well**
- **Utilised E-line Tractor to perform Pulsed Neutron Log at High Deviation (93°)** for evaluating fluid saturations **– 1 x well**

A total of **32 wireline runs** (30 x Slickline, 2 x E-line) were conducted during Phase 2

Well Operations – Phase 2 (equipment spread)

1) SIL Main Umbilical
2) Eline and Slickline Units
3) Pumping Spread
4) Additional Chemicals
5) Kill Hose and 5-core Downline
6) Tractors and Logging Tools
7) Vertical and Horizontal TRT





Well Operations – Phase 2

3 x Wells 3 x Tree Styles 2 x TRTs

SIL c/w "FMC SEA" TRT pre-deployment

SIL c/w "FMC Horizontal TRT" pre-deployment

Campaign Summary

- ***Logistical Demands – achieved!***
  - Planning – Houston/Aberdeen
  - Execution – Equatorial Guinea
- ***Performance Expectations – achieved!***
  - **ZERO incidents/accidents – no harm People/Environment**
  - 6 well campaign – nearing ***100%*** uptime on in-Field ops
  - Client estimate MODU circa 80 – 90 days
  - LWIV campaign estimate = 60 days
  - **LWIV campaign actual = 52 days**
    - 50 days = Light Well Intervention in-Field ops
    - 2 days = Transits/port call mid-campaign
- ***Operational Objectives – achieved!***
  - <u>Successfully executed following ~8 months extensive planning, meetings & collaboration by international multi-functional teams</u>
  - Increased production through GLV change-outs on 3 x wells
  - Increased production by bringing back online 2 x previously shut-in wells
    - SCSSSV Insert (allowing water injection to recommence)
    - Tubing Integrity investigation and Tree Valves troubleshooting
  - Successful crew-changes, post experiences/learnings of 2011/12 campaign
    - via Cameroon
  - Coordinated & operated a multiservice campaign, utilising:
    - Slickline/E-line
    - Pumping/Filtration
    - ROV ops
  - **Deepest water *'riserless'* well intervention, to date, for Helix Well Ops UK @ 2142 ft (653m)**

UPTIME			EQUIPMENT NPT			VESSEL NPT			WOW		
Hrs	Days	%	Hrs	Days	%	Hrs	Days	%	Hrs	Days	%
1234.25	51.43	98.83	14.75	0.61	1.17	0	0	0	0	0	0

Helix Well Ops Fleet – future

Gulf of Mexico Market

Q5000
Delivery Mid 2015
Intervention Semi Sub
10,000ft (3000m) w/d operability
Deck Space 2850m2

Brazilian Market

Helix Siem 1 & 2
Delivery Q2 & 4 2016
Large monohull vessel
10,000ft (3000m) w/d operability
Deck Space 3000m2

UKCS, Mediterranean & Africa Market

Q7000
Delivery Mid 2016
Intervention Semi Sub
10,000ft (3000m) w/d operability
Deck Space 2700m2

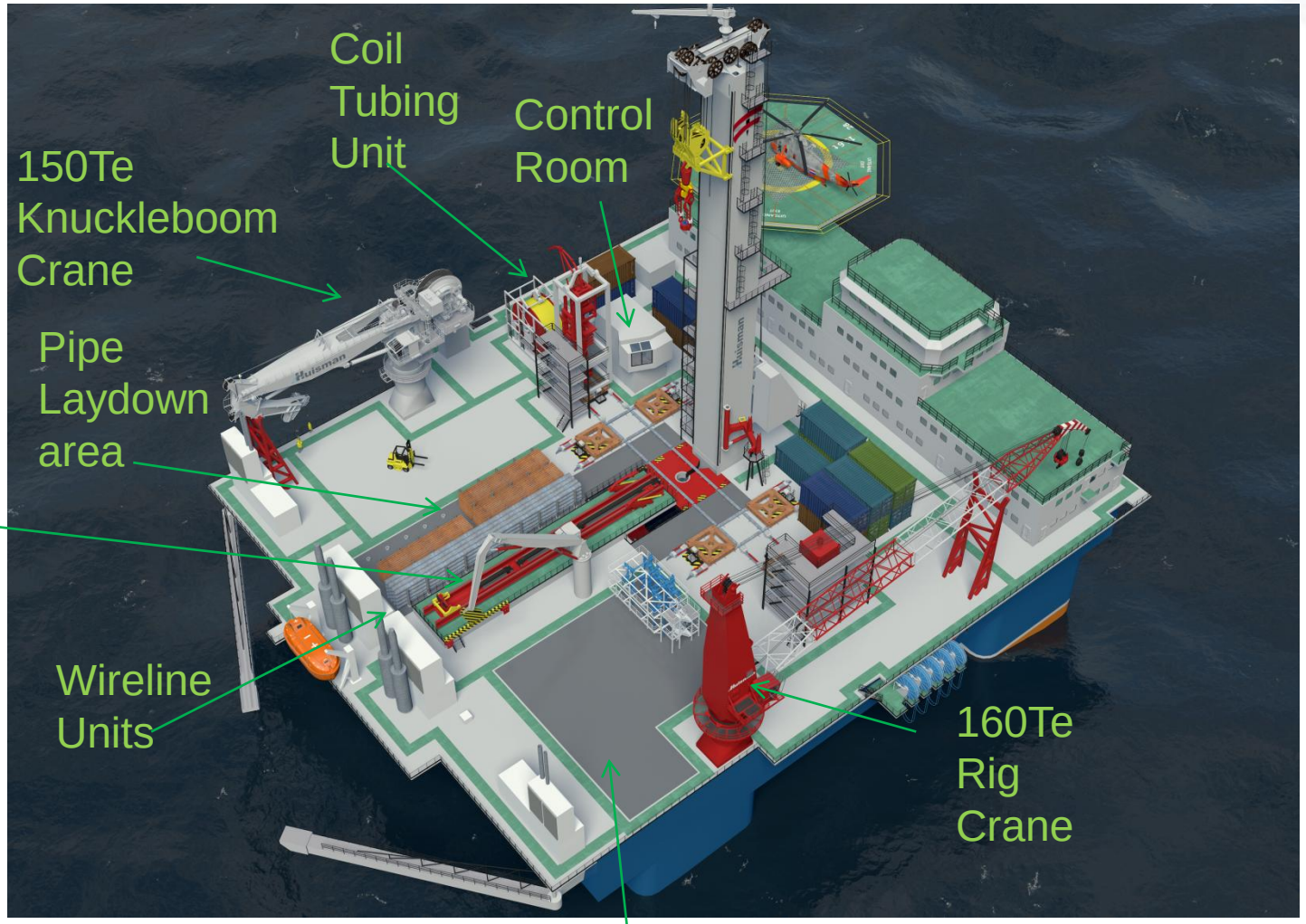
UKCS, Mediterranean & Africa market – Q7000 custom built Vessel vs MODU – Key Features

- Customised design for THD, Intervention, well work-over & Deco market
  - Multi-service functionality
- Key features designed into custom solution vs MODU
  - Efficiency of rig-up & changes between services
  - Operational familiarity
    - Crew dedicated to perform 100% intervention ops
  - Deck capacity improvements
    - Add space, crane capacity, multiple CT reel storage and easy change-out, etc
  - Safety improvements
    - No man-riding, over-side work or crane lifts to moonpool
  - Reduction in campaign costs
    - DP3 semi faster to move & position vs moored MODU
    - Significantly more efficient vs a MODU
    - Cost effective
  - Concept of flush deck and open tower on 3 x sides
    - Efficient access for equipment to moon pool
    - Faster rig ups for operations

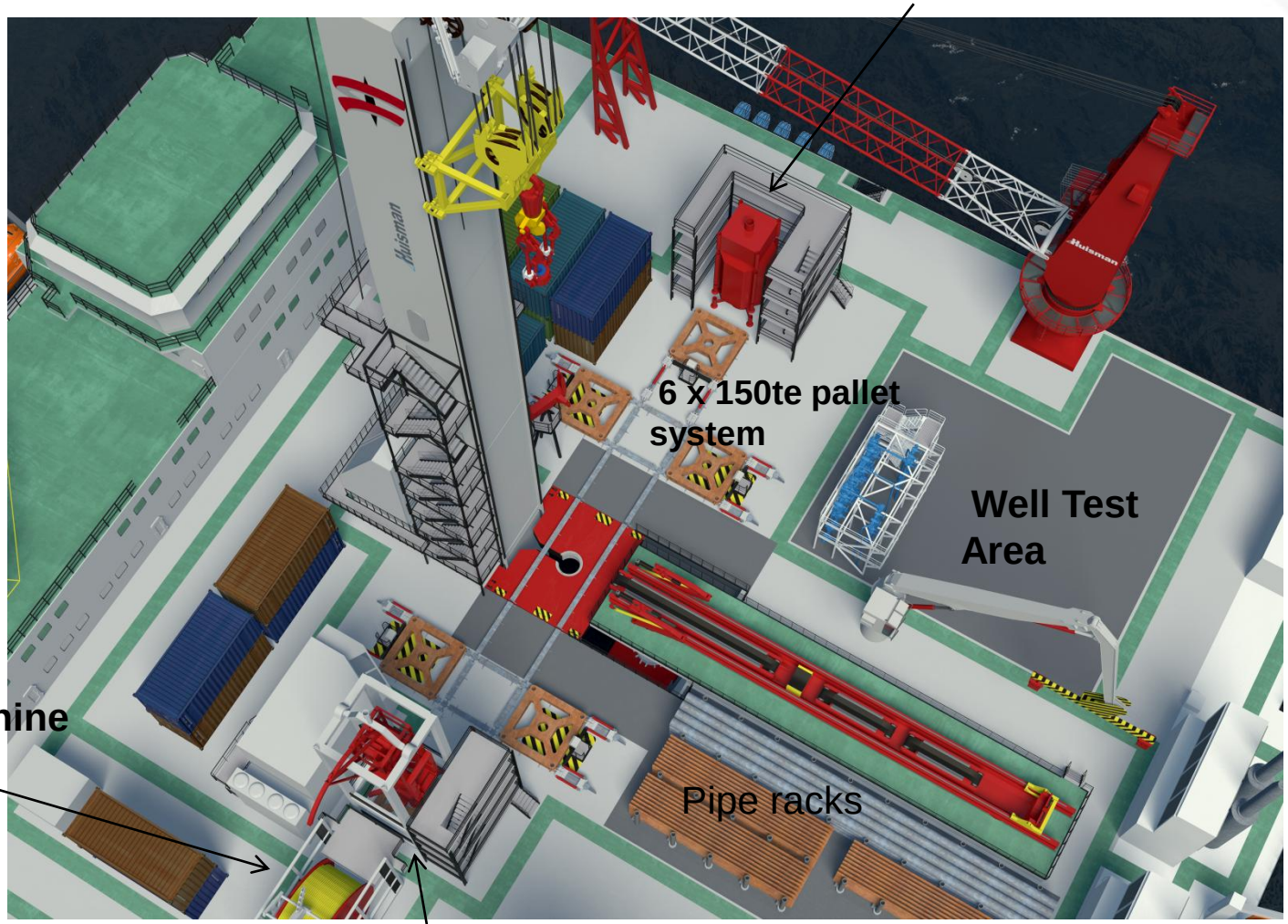
Q7000 – Modes of Operation

Function	Comments
Heavy Intervention Services	WL & CT (2 7/8” - 3 ½” CT) Wireline, Slickline, Pumping, Cementing
Extended Intervention Services	New well clean-up & extended well tests
	CT Drilling
Heavy Lift Services	Support field development Subsea infrastructure installation
Top Hole Drilling	Drilling & setting of conductors
Well Abandonment Services	Isolation & XT removal
	Completion recovery & annular cement assessment
Future Completion Services	Upper completion recovery / replacement
Future Well Abandonment Services	Poor remedial cement rectification
Future Deep Water Completion Services	Open water completions & deco to 3000m

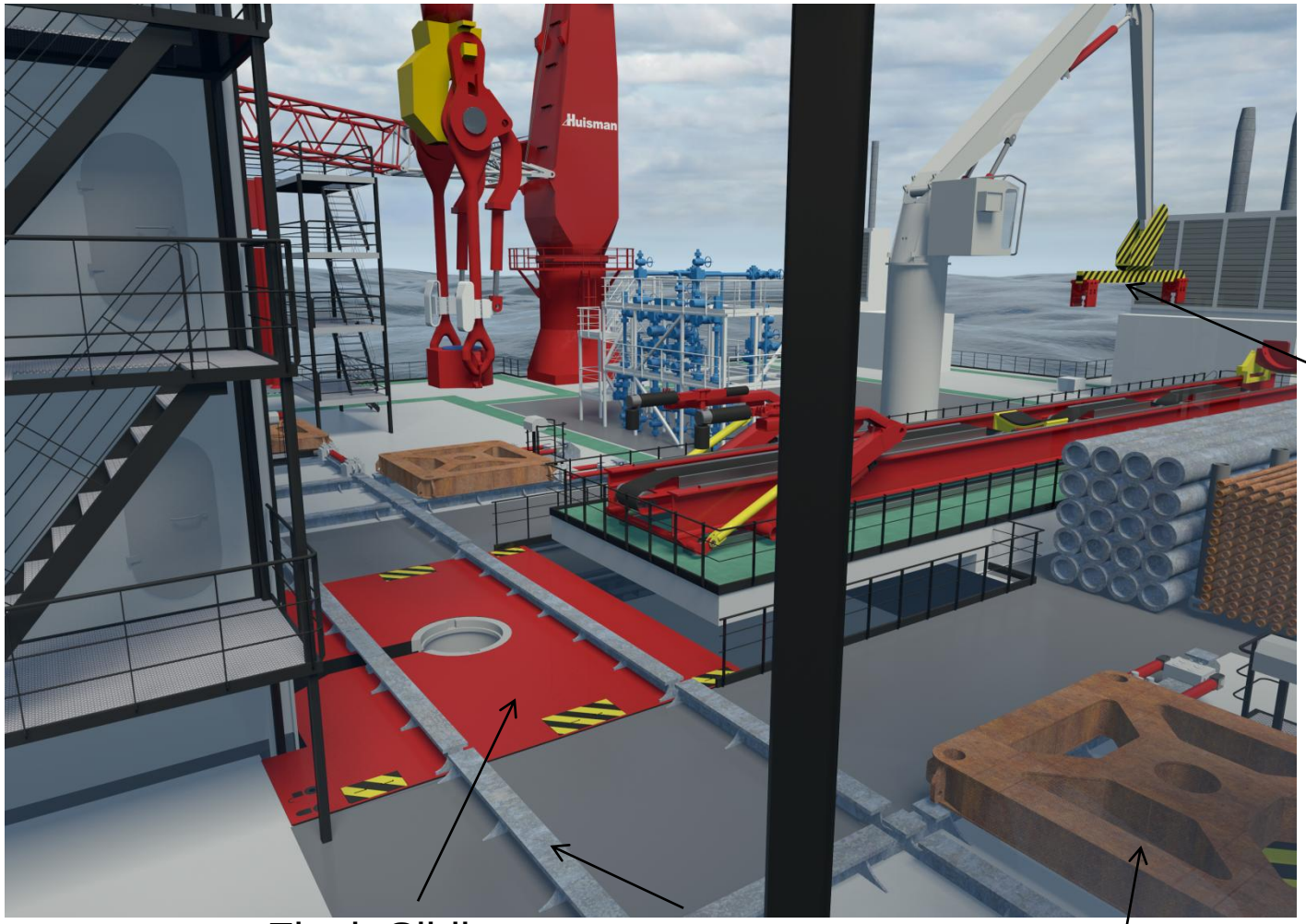
Q7000 Services – key locations



Q7000 – Deck Layout



Q7000 – Moon Pool and Pipe handling system



Q7000 – summary

- DP 3 semi-sub suitable for intervention, workover & decommissioning c/w
  - 7 3/8” 10ksi HP riser system (+ possible 18 ¾” BOP & LP riser)
- Services
  - Subsea well services covering C/T, E-line and Slickline
  - Clean-up, well test & spill response
  - Well abandonment starting with completion recovery & casing assessment
  - Field development activities & upper completion change possible
- Many operational efficiencies
  - Ship shaped pontoons with high transit speed for well set up
  - Vastly reduced set-up & turnaround times for down-hole services
  - Crew 100% dedicated to intervention activities
  - Improved weather operability to MODU
- Short duration contracts mitigate risks during long term planning
- Reduced operator rig teams as PM & Eng performed by Helix
- Provides platform to perform intervention jobs not normally possible
  - Due to limit of riserless or MODU availability

Thank you for listening today, any questions please?

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