Use of a Ship-Shaped Floating Production Unit for the Phoenix Development

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Phoenix Presentation Agenda

• Helix Today  
  *All the Tools Needed for Phoenix Development*

• Evolution of Phoenix  
  *The Beginning*

• The Phoenix Development Plan

• The Helix Producer I

• Plans for Topsides

• Subsea Development

• Summary of Progress
The Helix Group of Companies

Helix ESG

Production (ERT) • Production in GOM ~200 MMCFE/D • ~500 BCFE of Proven Reserves (2006) • Discovered Noonan deepwater field in 2007 >100 BCF • Acquired Typhoon field from Chevron and BHP

Subsea Well Operations UK/USA • Seawell • Q4000 • Well Enhancer (2009)

Deepwater Contracting • Intrepid • Express • Caesar (07)

Shelf Contracting Cal Dive • Under Cal Dive International (NYSE; DVR) • Helix owns 73% interest in Cal Dive • ~25 construction / diving vessels

ROV (Canyon) • 25 ROV’s • 4 Trenchers

Production Facilities • Gunnison (3,200 ft.) • Marco Polo (4,300 ft.) • Independence Hub (8,000 ft.) • Helix Producer I (2008) • FPSO Shiraz (2008)

Reservoir & Well Tech. Services • Seawell Q4000 Well Enhancer (2009) • Intrepid Express Caesar (07) • Under Cal Dive International (NYSE; DVR) • Helix owns 73% interest in Cal Dive • ~25 construction / diving vessels • 25 ROV’s • 4 Trenchers • Gunnison (3,200 ft.) • Marco Polo (4,300 ft.) • Independence Hub (8,000 ft.) • Helix Producer I (2008) • FPSO Shiraz (2008)

Cal Dive International

Exploration and Drilling Oil & Gas Production Well Operations Shelf Contracting Canyon Robotics Deepwater Contracting Subsurface Consulting Production Facilities
Helix Business Commercial Model
In the Deepwater

Reservoir & Well Technology
Drilling/Completion
Production Facilities
Construction
Well Ops

Key Assets
180 + Engineers
Q4000
Mobile Production Units
Intrepid Express Caesar ROVs
Q4000 Seawell ROVs

Value Creating Methodologies
Reservoir Management
Slimbore Wells
Re-Deployment of Floater
Pipe Burial
Non Drill Rig Intervention

‘Full cycle cost can be reduced by at least 20% compared to conventional approaches’
2005/2006 Production Facilities Focus

- Helix to build and own ship-shaped disconnectable FPU
- Based on existing and proven technologies
- Targeting deepwater developments with 10MMBOE to 50MMBOE reserves
- DP Capable, 150m to 170m length
- Nominal 30,000 BOPD and 50MMSCFD production train
- Five disconnectable riser (three production, one oil export, one gas export)
- Use Telemark Development as basis
**Why Disconnectable?**

**A Hurricane Responsive Concept**

- **Significantly less downtime**
  - Minimal disconnection (and reconnection) lead-time
  - Employees stay on FPU after disconnect (not dependent on helicopters)
  - Maintenance (and overhauls) can be done during storm downtime
  - Resulting in higher uptime especially when nation needs energy

- **No property damage**
  - FPU leaves location for named storms avoiding drill rigs on the run
Comparable Vessels in Service

- FPSO Munin
- Toisa Pisces
- Crystal Ocean
Evolution of Phoenix Project

“Chevron Says Typhoon TLP Suffers Damage During Hurricane Rita”
Chevron Press Release; Monday, September 26, 2005

A difficult event for the entire Deepwater Community

July 2001

September 2005
Typhoon Pre-Rita Layout
Essentials for Typhoon Re-Development

- Assessment of reservoir (Helix ERT)
- Assessment of well conditions (Helix ERT and Well Ops)
- Development of debris clean-up plan and cost estimate (Helix ERT and Deepwater Contracting)
- Creation of New Low-Cost Deepwater Development Plan (Helix ERT and Production Facilities)
- Execution of the Development Plan
  - Procure, Build (Helix Production Facilities and Helix Capital Projects)
  - Well Work (Helix Well Ops)
  - Installation (Helix Deepwater Contracting)
  - Operation (Helix ERT and Production Facilities)
August 21, 2006
Helix ERT acquires 100% WI in Typhoon Mini-Basin
   - Typhoon
   - Boris
   - Little Burn
   - Exploration Prospects Balvenie, Tornado, Kissy-Suzuki
Immediate Implementation of Development Plan that Helix had been working past year.
Phoenix Development Plan

Three Primary Components:

- Ship-Shaped FPU
- Disconnectable Riser System
- New Subsea Risers, Umbilicals, Flowlines
Helix Producer I – Bare Vessel

- Length: 161 m
- Breadth: 29 m
- Depth: 14.2 m
- Draft: 8.6 m
- Max Displmt: 29,000 mt
- Light Ship: 9,475 mt
### General Dimensions

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<tr>
<th>Dimension</th>
<th>Value</th>
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<tbody>
<tr>
<td>Length</td>
<td>161 m</td>
</tr>
<tr>
<td>Breadth</td>
<td>29 m</td>
</tr>
<tr>
<td>Depth</td>
<td>14.2 m</td>
</tr>
<tr>
<td>Draft</td>
<td>7 to 8 m</td>
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### Production Capacities

<table>
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<tr>
<th>Capacity</th>
<th>Details</th>
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<tbody>
<tr>
<td>Nominal 30,000 BOPD</td>
<td>(45,000 w / spares)</td>
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<tr>
<td>72 MMSCFD Gas Train</td>
<td></td>
</tr>
<tr>
<td>50,000 BWPD</td>
<td></td>
</tr>
<tr>
<td>60,000 BPD total fluids</td>
<td></td>
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<tr>
<td>ca 4,000 ton Topsides</td>
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Helix Producer I Development - Contracting

- A marriage between the ship conversion and the topsides production system development

- Ship conversion on-going in Viktor Lenac Shipyard in Croatia

- Topsides Engineering by OFD Engineering

- Topsides Equipment procured by Helix with OFD support

- Module Fabrication and Integration awarded to Kiewit Offshore
Helix Producer I—Ship Conversion

- Ship began life as a roll-on roll-off Train Ferry
- Named MV Karl Carstens

- German design and operation. Thick hull plates
- Well Maintained
Helix Producer I—Ship Conversion

• Ship Conversion Scope
  – Upgrade to DP
  – Add full length sponsons, increase beam from 18 meters to 29 meters
  – Build/integrate new accommodations
  – Addition of foundations for topsides equipment and DTS

• Basic converted ship owned jointly by Helix and Kommandor Rømø of Denmark

• Conversion from Train Ferry to DP Offshore Vessel—started in June 2006, completion planned for December 2007

• Conversion from train ferry to DP Offshore Vessel has been done several times before (see K3000 photo).

K3000 owned by Subsea7
Helix Producer I - Ship Conversion

Demolition
Helix Producer I - Ship Conversion

New Accommodations
Helix Producer I - Ship Conversion

Sponson Additions
(before—August 2006)
Helix Producer I - Ship Conversion

Sponson Additions
(current—April 2007)
Helix Producer I - Production System

- OFD Completing Design
  - 30,000 BOPD, 50,000 BWPD, 72 MMSCFD Compression
  - 8 Modules
  - Two Cranes
  - Flare Stack

- Modules to be fabricated May 2007 to March 2008
- Modules to be integrated onto ship starting March 2008 at KOS, Ingleside, TX
Connectable Transfer System (DTS)

- Flexible Engineered Solutions – FES (UK)
  - Four 6” Flexible Risers (Two future available)
  - Two E/H Umbilicals (One future available)
  - ~ 200 mT Buoy (net buoyancy)
  - Two Production Swivels
  - Two Export Swivels

- FES History
  - Production Swivel & Buoy supplier on Crystal Ocean & Crystal Sea FPSO’s
  - Various Turret Buoy / Production Swivel systems worldwide
  - Connector, swivel & specialty valves DNV & ABS Certified
Disconnectable Transfer System (DTS)

- Departs with DP FPU
- Disconnects with Buoy
Phoenix Subsea Development

- 8 existing wells
- Expect initial production from 6 wells
- Two core production areas on 4 blocks
- Initial Debris removal
- Re-Useable infrastructure
- New Infrastructure to be installed
- Provisions made to tie-back exploration prospects if successful
Phoenix Subsea Development

- New subsea infrastructure engineering/design by JP Kenny
- Installation of new flowlines, flexible risers, umbilicals by Helix “Intrepid”
- Installation of new flexible export risers and export hard piping by Helix “Intrepid”
- Well Appraisal by Helix “Q4000”
- Debris Recovery by Helix “Intrepid”
Flag State, Classing and Regulatory

• Bahamas Flag Vessel
• Vessel to be classed by Lloyds Register
• Class Notation: FOI-FL
• USCG oversight in accordance with SOLAS and MODU safety rules
• MMS review and acceptance
  – Debris Recovery/flowline abandonment
  – New Subsea infrastructure
  – Riser System CVA
  – Floating Production Unit
Helix Development of Phoenix

- Well Intervention
- Debris Removal
- Ship-Shaped FPU
  - Planning
  - Procurement
  - Project Mgmt
  - Installation
  - Marine Operation
- Subsea Infrastructure
  - Planning
  - Procurement
  - Installation
- Field Operatorship
- Drilling/Comp. (future)
Phoenix Development Project Timeline

- Vessel Conversion
- Topsides Design/Procurement
- Module Fab
- DTS Design/Procure/Fab
- Module/DTS Integration
- Ship Transit To GOM
- Subsea System Design/Procure
- Subsea Install
- Install FPU GC237
- Commission
- Start Up
- Sept 2006
- May 2007
- Jan 2008
- May 2008
- 3Q2008
The Phoenix Development - Summary

Unique, Innovative Re-Development Story

1st Ship-Shaped FPU in GOM

Use of Existing Proven Technology

First Production Expected 3Q 2008

1st Disconnectable Riser System in GOM

Utilization of Unique Skill Sets and Assets—One-of-a-kind Toolbox
The Phoenix Development