

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

Cory Weinbel  
General Manager Production  
Facilities

April 26, 2007



# 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



Exploration and Drilling



Oil & Gas Production



Well Operations



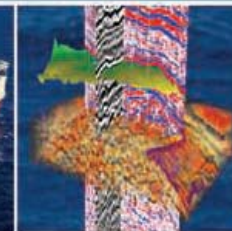
Shelf Contracting



Canyon Robotics



Deepwater Contracting



Subsurface Consulting

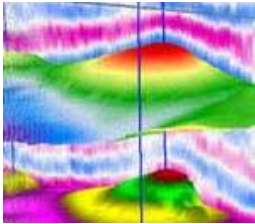


Production Facilities



# 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 ←



*Hurricane Ivan*



*Mars TLP after Hurricane Katrina*

- **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**

DEC 15 2003



**Crystal Ocean**



# Evolution of Phoenix Project

## “Chevron Says Typhoon TLP Suffers Damage During Hurricane Rita”

Chevron Press Release; Monday, September 26, 2005



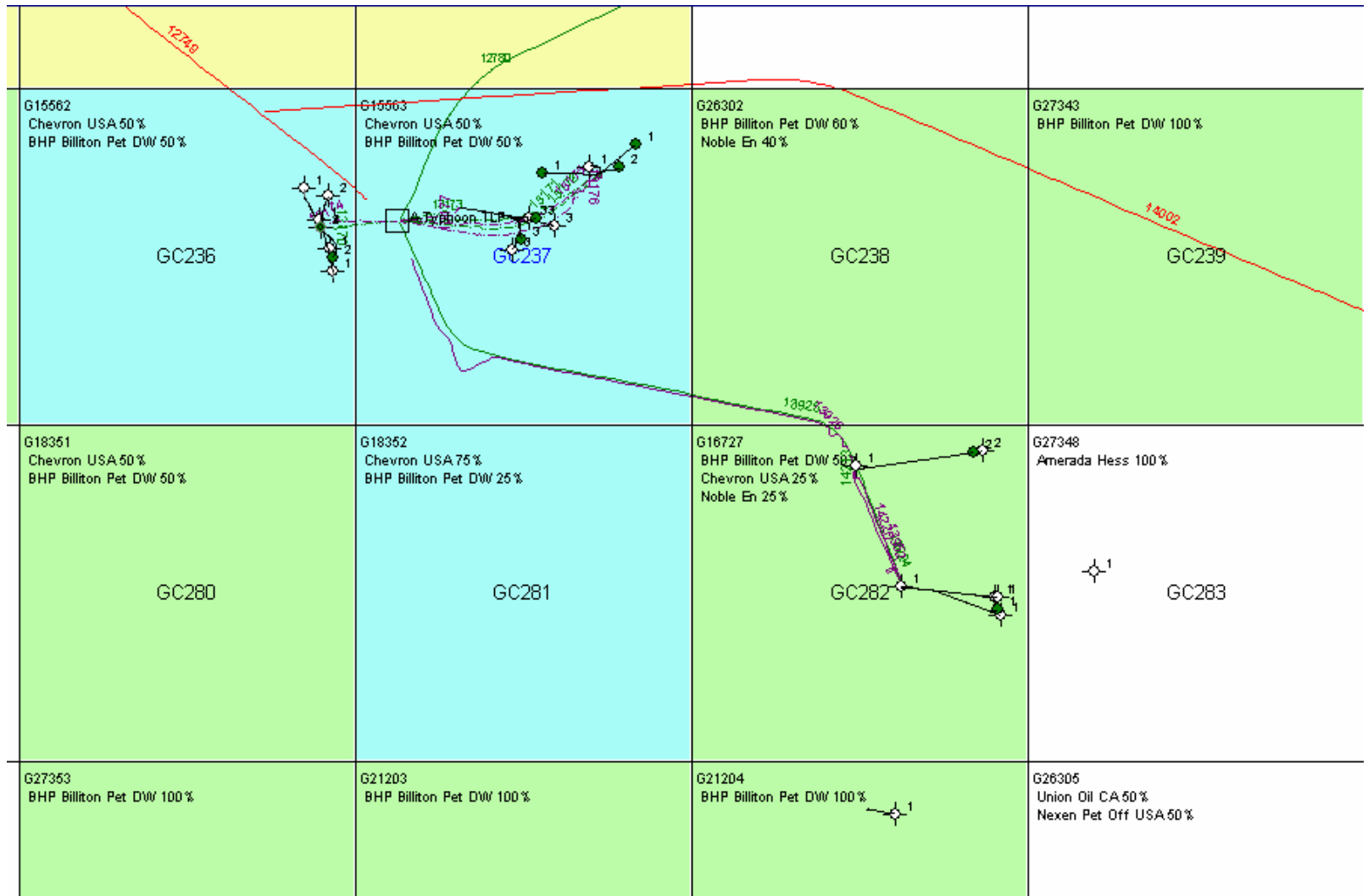
A difficult event for the entire  
Deepwater Community







# Typhoon Pre-Rita Layout





# Essentials for Typhoon Re-Development

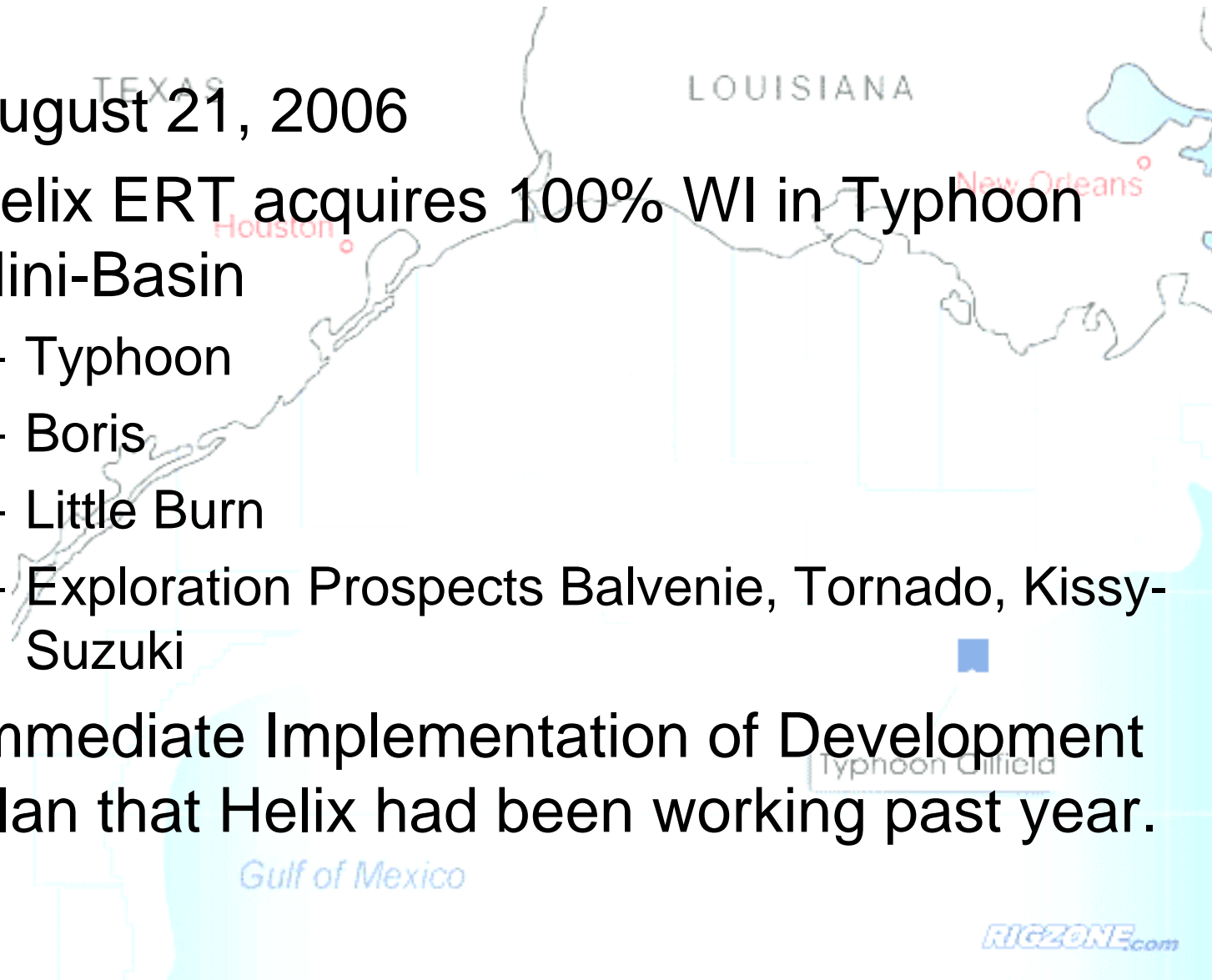
---

- 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)



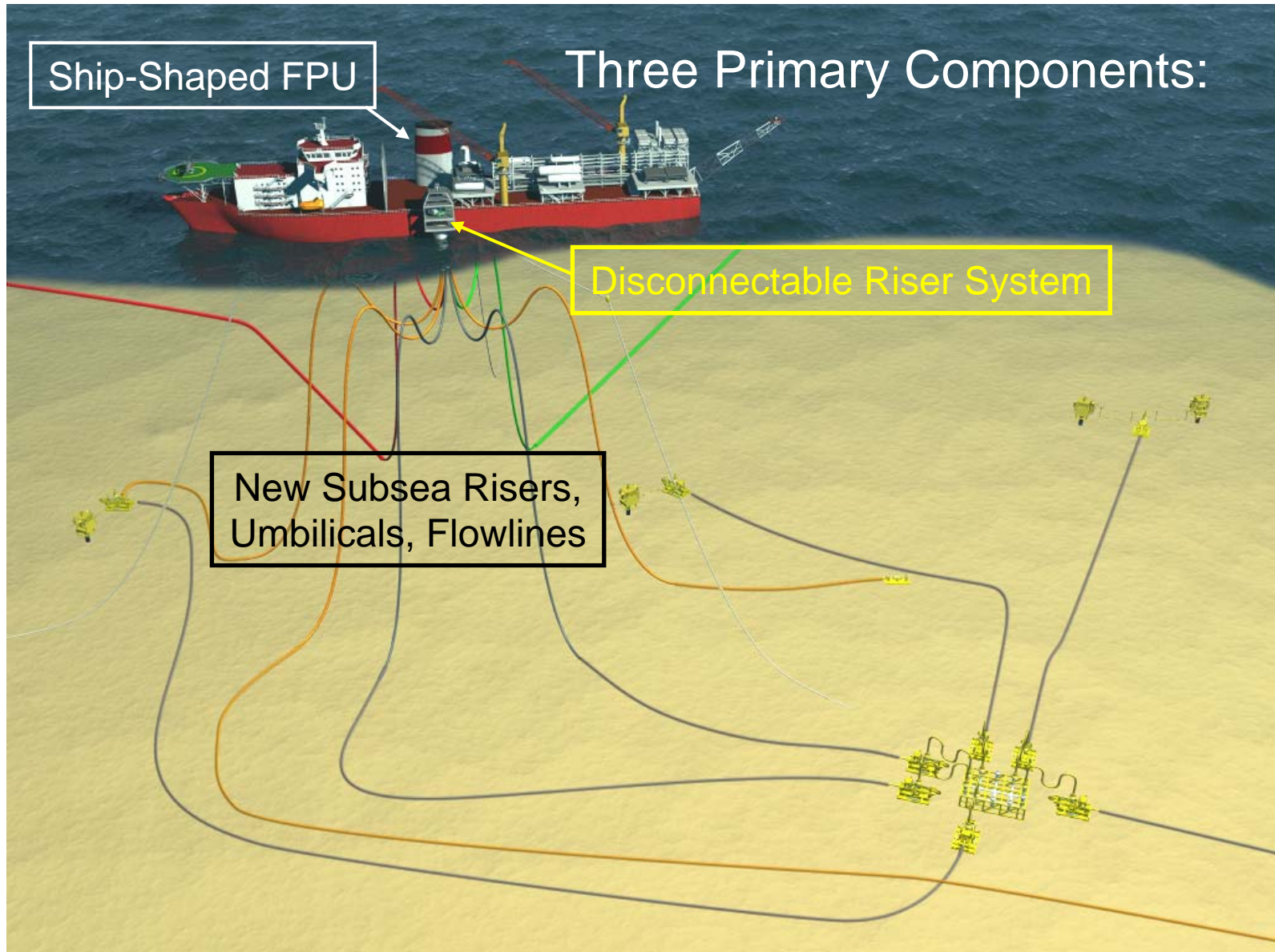
## Helix Acquires Typhoon Field

- 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

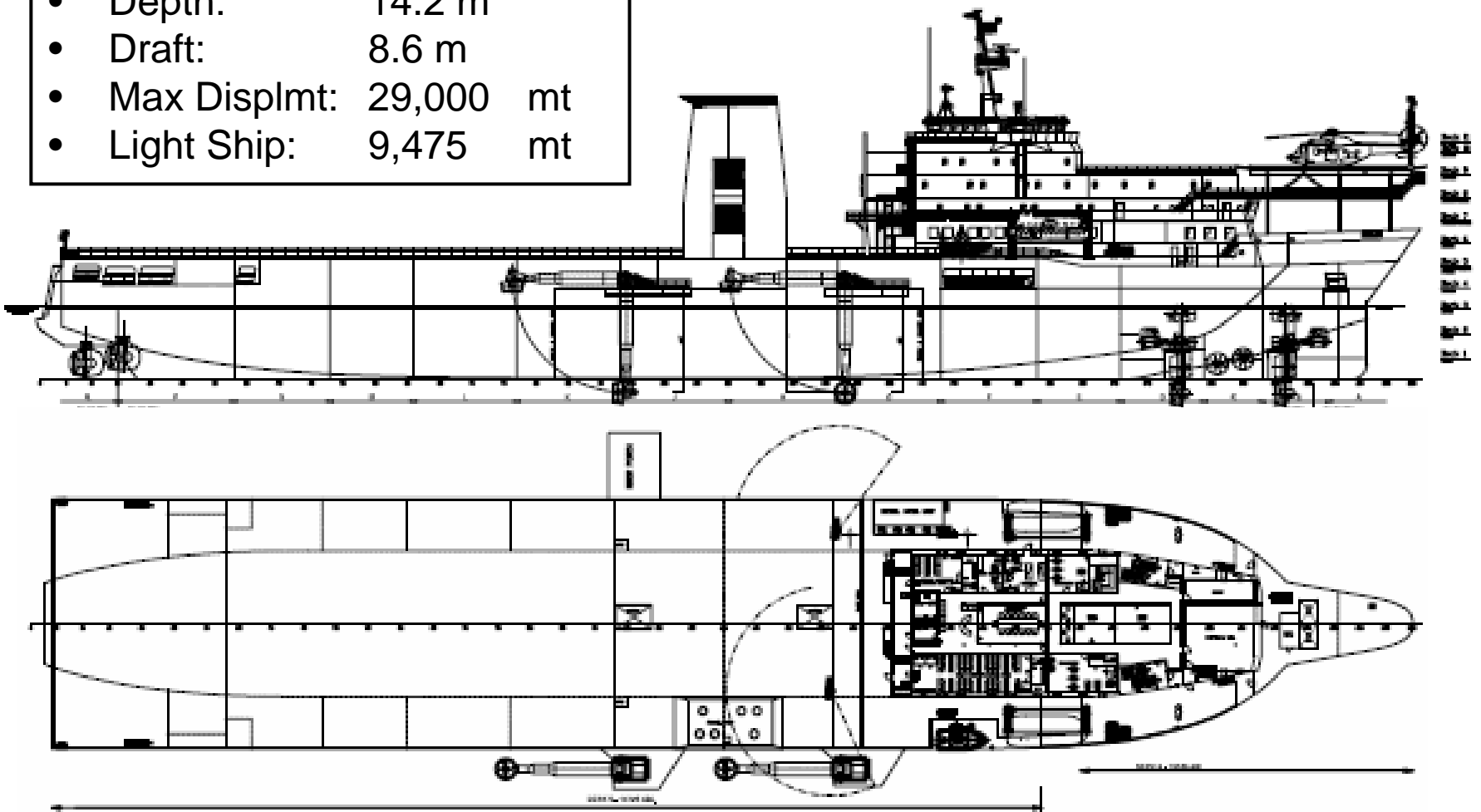




# Helix Producer I – Bare Vessel

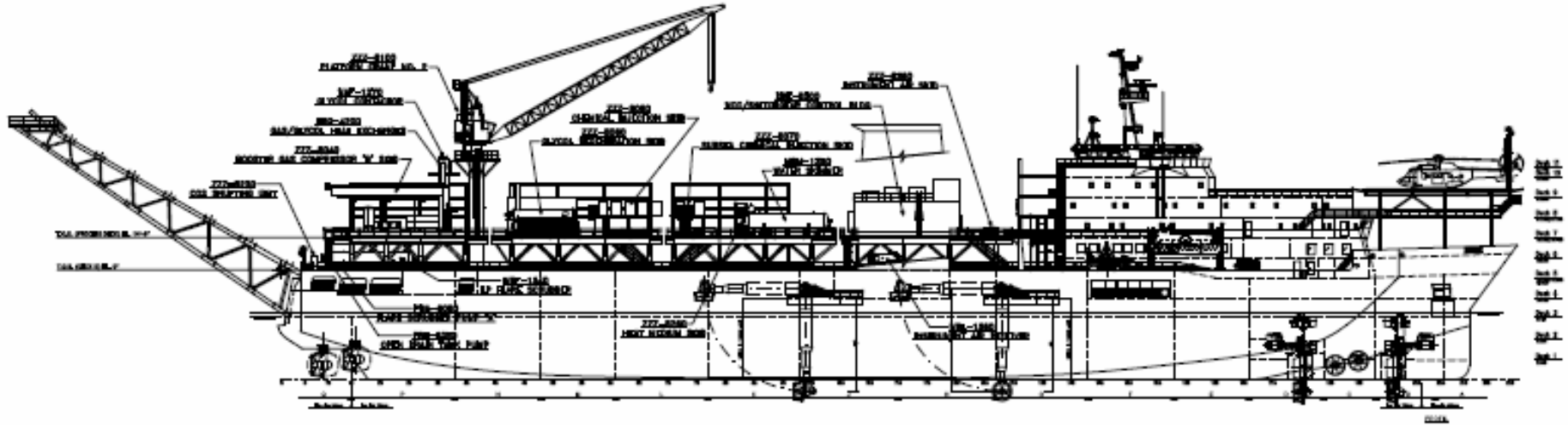
- Length: 161 m
- Breadth: 29 m
- Depth: 14.2 m
- Draft: 8.6 m
- Max Displmt: 29,000 mt
- Light Ship: 9,475 mt

## BARE VESSEL CONVERSION





# Helix Producer I / Topsides Integrated



## General Dimensions

- Length 161 m
- Breadth 29 m
- Depth 14.2 m
- Draft 7 to 8 m

## Power

- 7 Electric Thrusters 12 Mw
- 2 Hyd Thrusters 4,000 hp

## Production Capacities

- Nominal 30,000 BOPD (45,000 w / spares)
- 72 MMSCFD Gas Train
- 50,000 BWPD
- 60,000 BPD total fluids
- ca 4,000 ton Topsides



# 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

---

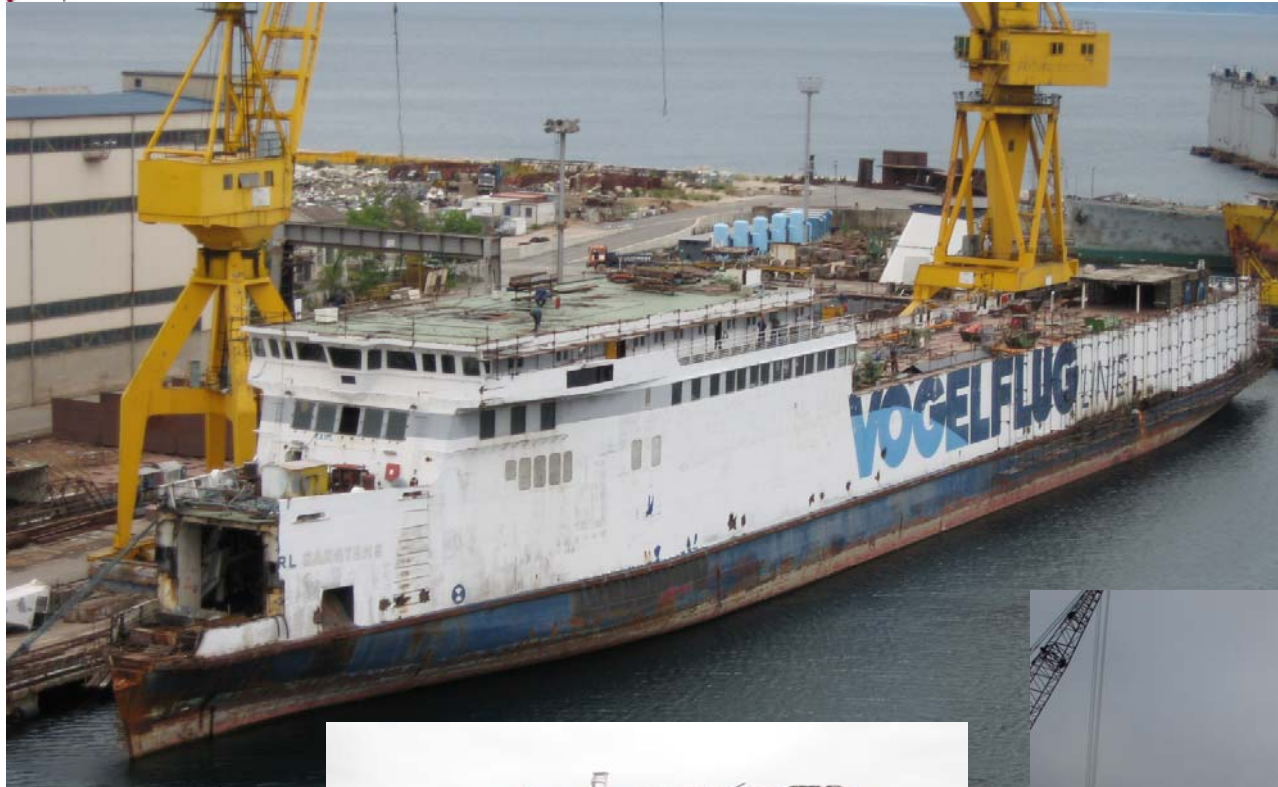
- Ship Conversion Scope
  - Upgrade to DP
  - Add full length sponsons, increase beam from 18 meters to 29 meters
  - Build/integrate new accommodations
  - Addition of foundations for topsides equipment and DTS
- Basic converted ship owned jointly by Helix and Kommandor Rømø of Denmark
- Conversion 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

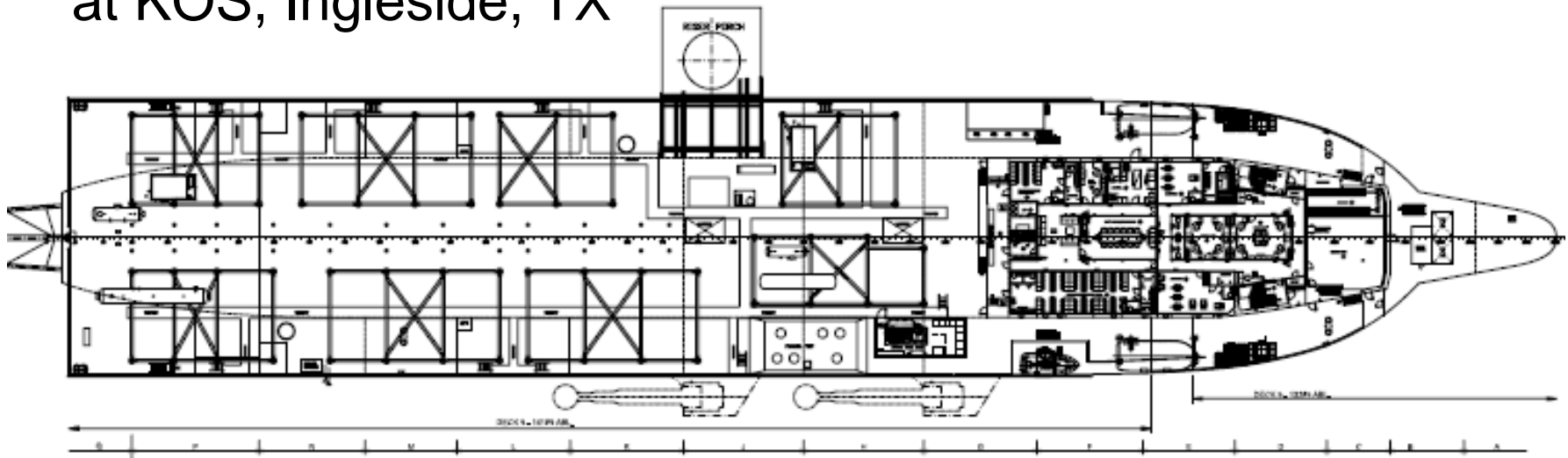
Sponson Additions  
(current—April 2007)





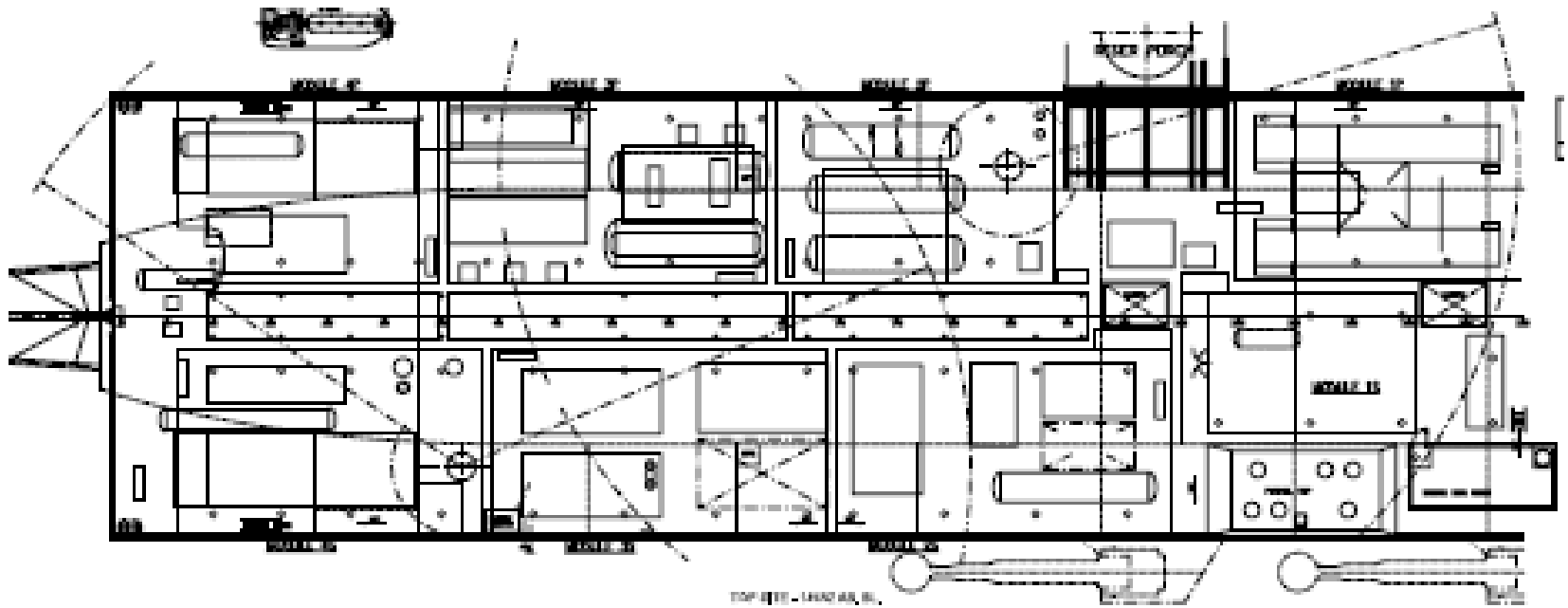
# Helix Producer I - Production System

- 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





# Helix Producer I - Production System





# Disconnectable Transfer System (DTS)

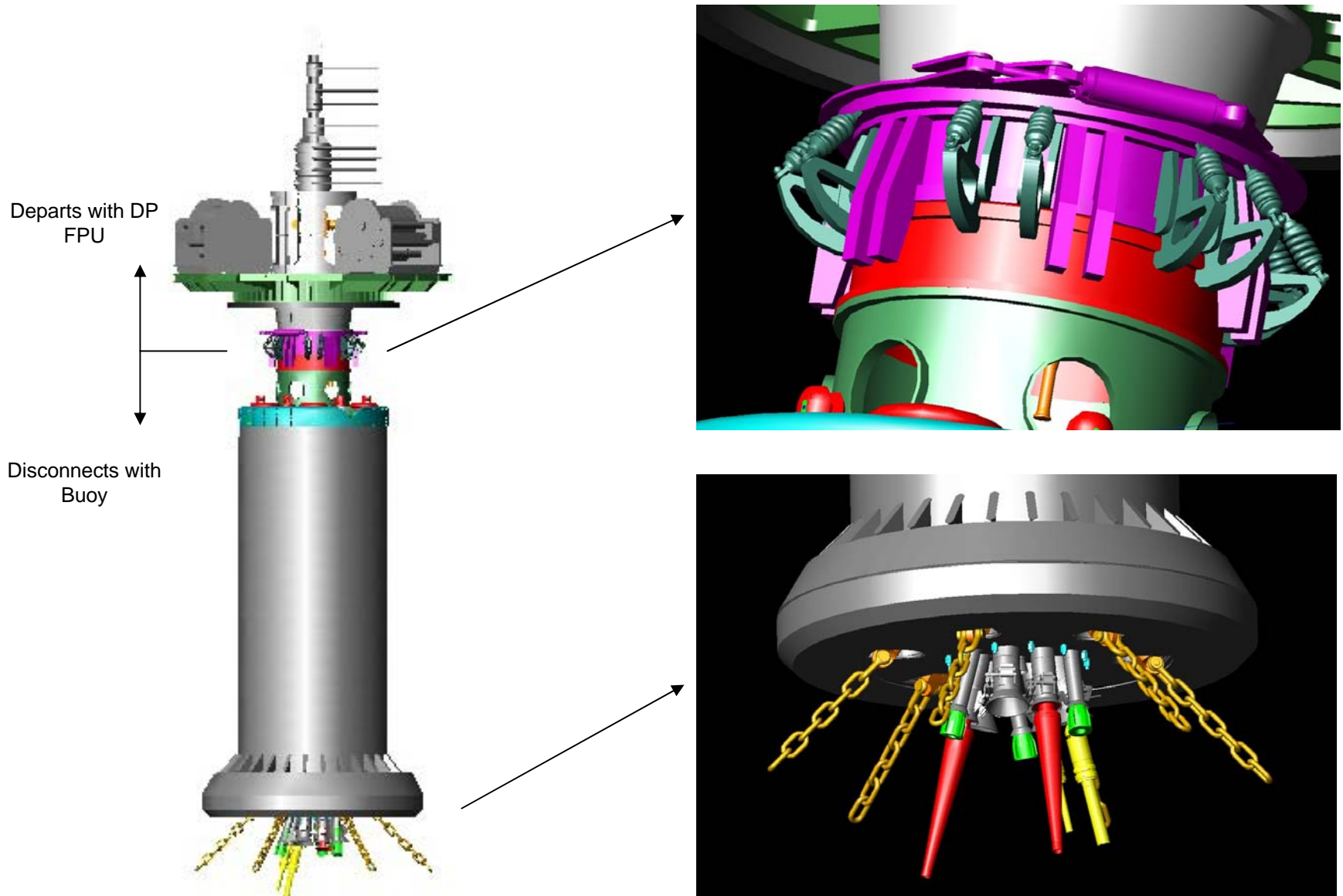
---

- 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





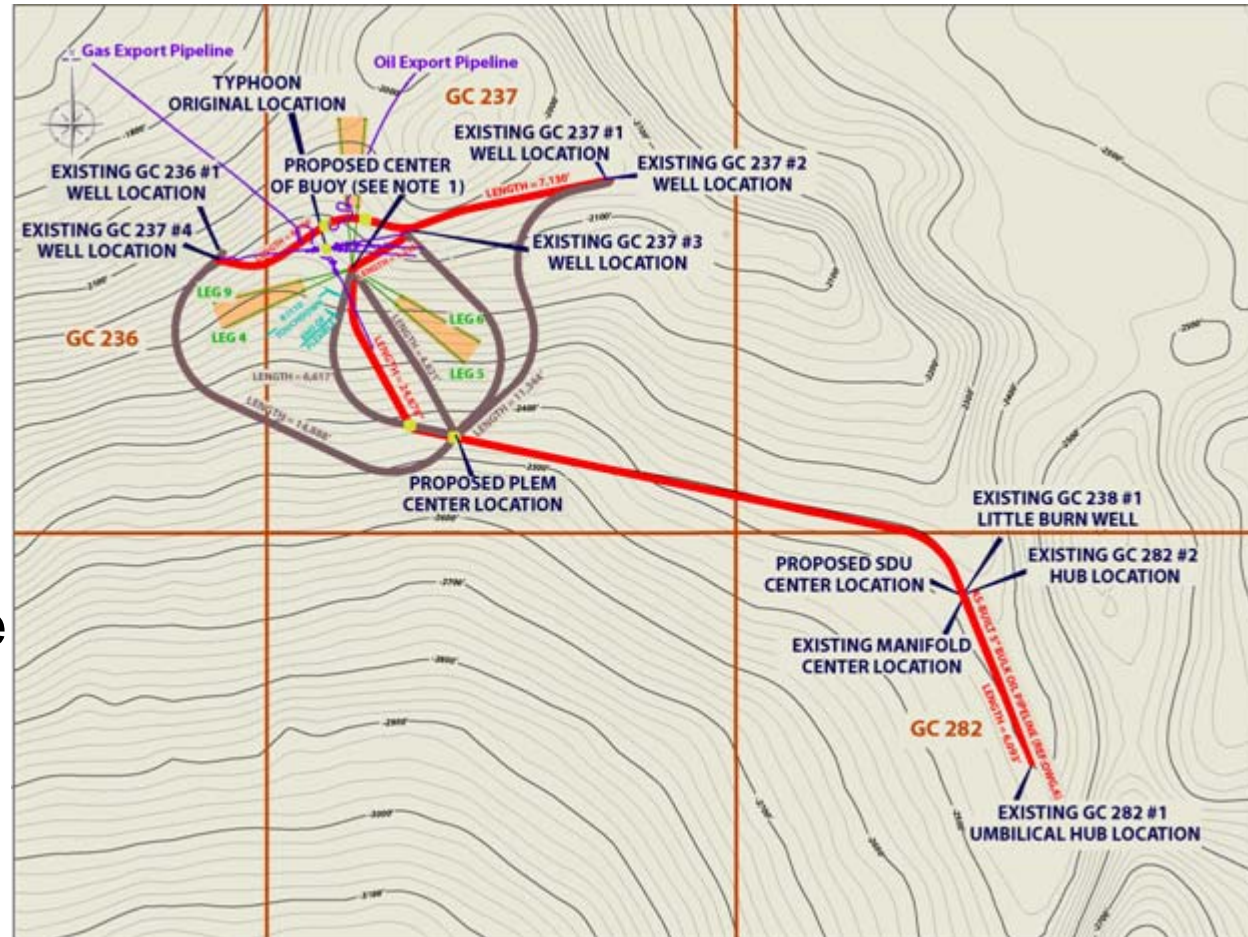
# Disconnectable Transfer System (DTS)





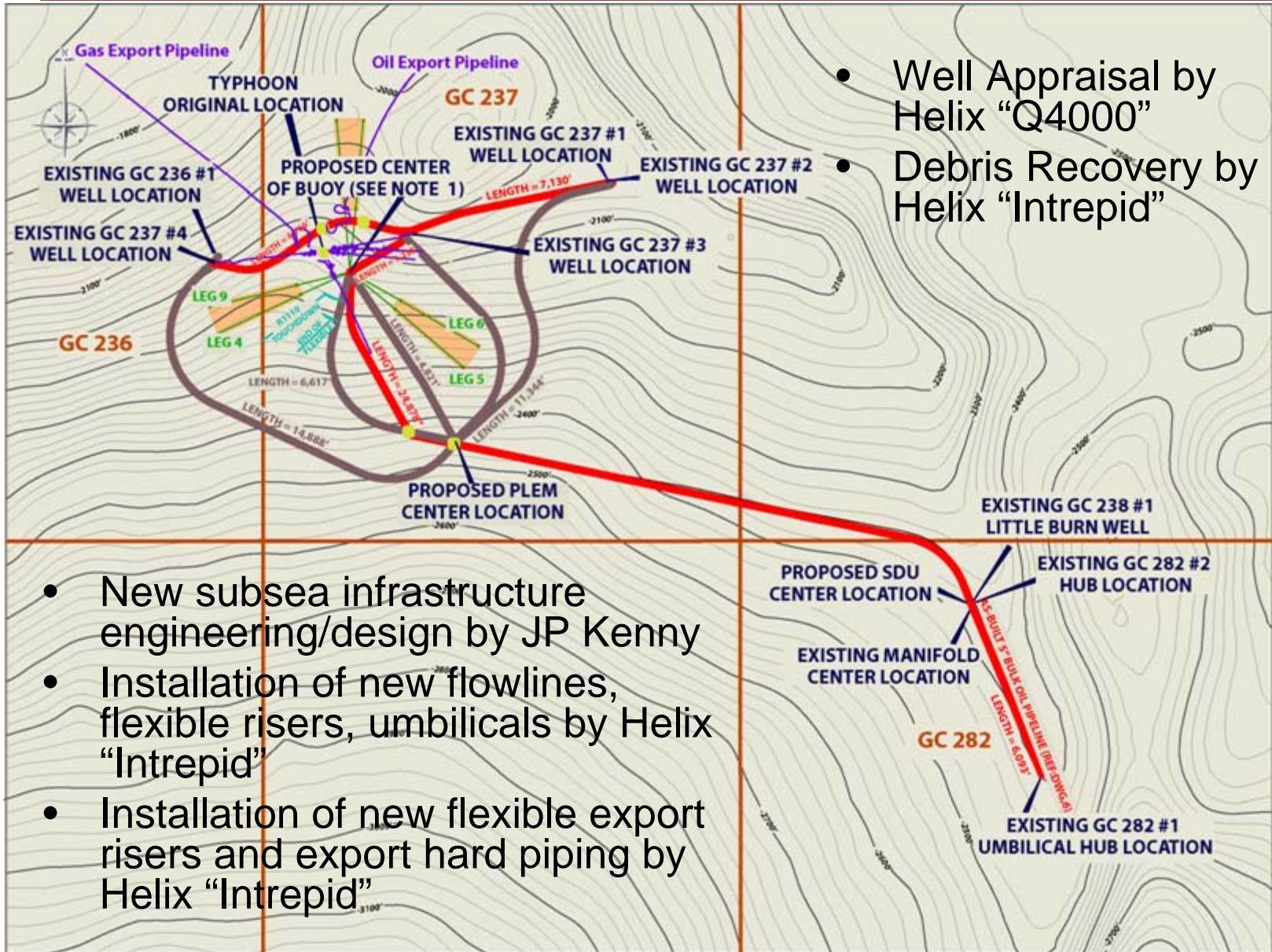
# Phoenix Subsea Development

- 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



- Well Appraisal by Helix “Q4000”
- Debris Recovery by Helix “Intrepid”

- 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”



# 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



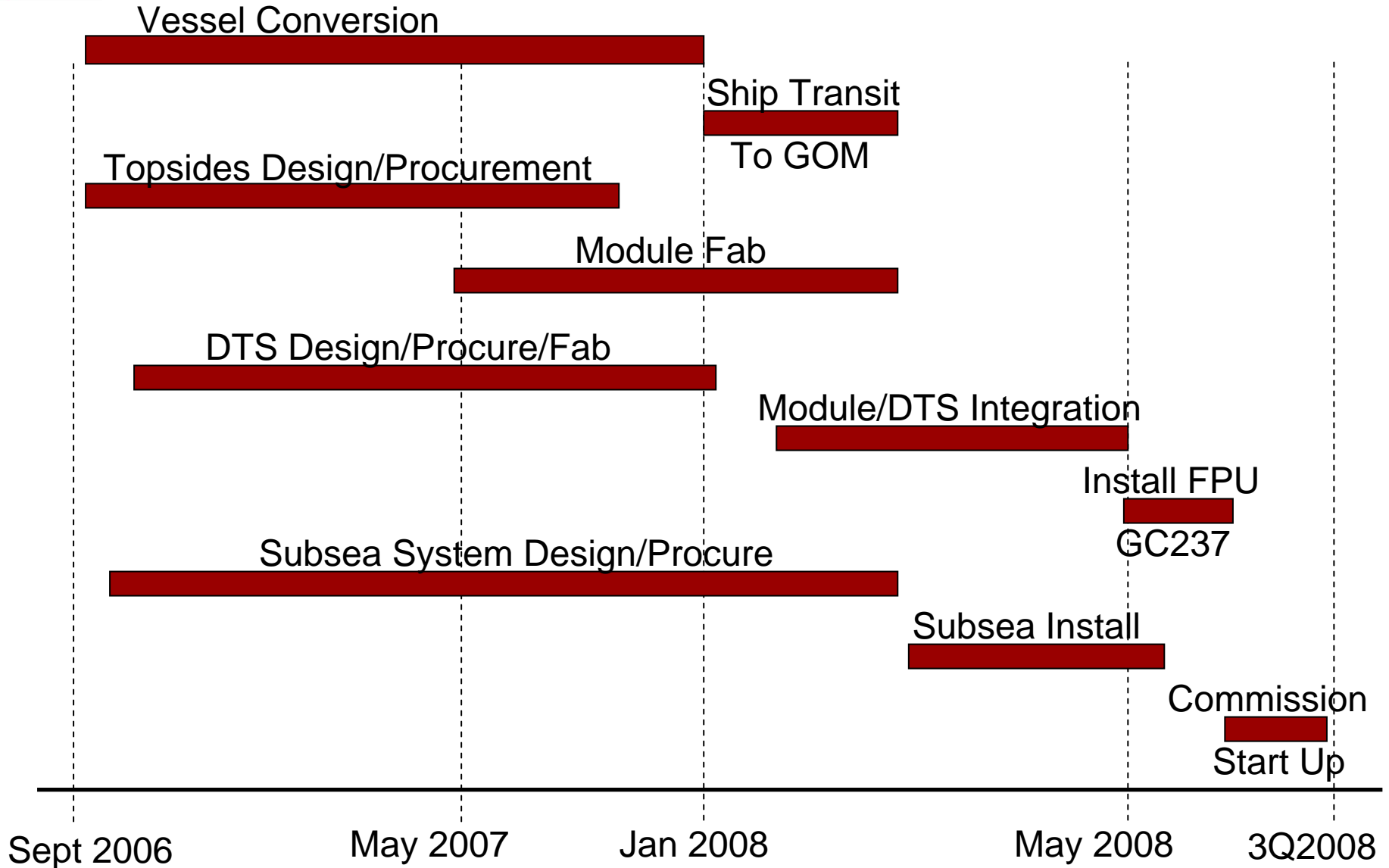
# Helix Development of Phoenix



- 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





# The Phoenix Development - Summary

---

Unique, Innovative  
Re-Development  
Story

1<sup>st</sup> Ship-Shaped  
FPU in GOM

Use of Existing  
Proven Technology

First Production  
Expected 3Q 2008



1<sup>st</sup> Disconnectable Riser  
System in GOM

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



# The Phoenix Development

---

