OCS Advisory Offshore Workshop

The Development of Cascade and Chinook Fields in Ultra Deep Waters of the Gulf of Mexico

César Palagi
Walker Ridge Asset Manager
Petrobras America Inc.
January 20th, 2010
Agenda

1 - Introduction

2 - Cascade and Chinook Framework
   - Ownership and Well History
   - GoM Environment and Regulation

3 - Cascade and Chinook – Phase 1
   - Overview and Timeline
   - Reservoir and Wells
   - Subsea, FPSO and Export System

4 - Path Forward
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4 - Path Forward
Petrobras Summary

- Proven Reserves (SPE): 15 bi boe
- O&G Production: 2.6 million boe/day
- Employees: 74,000
- Refining Throughput: 2.1 million boe/day

Employees: 74,000

Refining Throughput: 2.1 million boe/day
Petrobras as an Operator of Floating Production Systems

**FPS Operators**

All Contracted Vessels (252 Vessels Total)

- Petrobras: 45 FPSOs
- Shell: 15 FPSOs
- StatoilHydro: 15 FPSOs
- ExxonMobil: 13 FPSOs
- BP: 12 FPSOs
- Chevron: 12 FPSOs
- Anadarko: 10 FPSOs
- Total: 9 FPSOs
- CNOOC: 8 FPSOs
- ConocoPhillips: 8 FPSOs
- ENI/Agip: 5 FPSOs
- Others: 100 FPSOs

*Note: FPSO, Semi, Spar, TLP, Other*
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Petrobras E&P Portfolio in Gulf of Mexico
<table>
<thead>
<tr>
<th>Year</th>
<th>Cascade</th>
<th>Chinook</th>
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<tbody>
<tr>
<td>2002</td>
<td>1 Discovery Well</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td></td>
<td>1 Discovery Well</td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>2 Appraisal Wells</td>
<td></td>
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<tr>
<td>2006</td>
<td>Petrobras took Operatorship</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td></td>
<td></td>
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<tr>
<td>2008</td>
<td></td>
<td></td>
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<tr>
<td>2009</td>
<td>2 Wells</td>
<td></td>
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</tbody>
</table>
Cascade and Chinook Lease Holders

The Cascade Field
• Petrobras - 50%
• Devon - 50%
(Blocks WR205, 206, 249 & 250)

The Chinook Field
• Petrobras - 66.67%
• Total - 33.33%
(Blocks WR 425, 426, 469 & 470)
Lower Tertiary in GoM Depositional Environment

( Badley Ashton )

Currents, Furrows and Hurricanes in Gulf of Mexico

~1 Football Field

Hurricane Katrina 2005
# Regulatory Compliance

<table>
<thead>
<tr>
<th>MMS</th>
<th>USCG</th>
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<tbody>
<tr>
<td>Exploration Plan</td>
<td>Certificate of Compliance (COC)</td>
</tr>
<tr>
<td>Application for permit to Drill</td>
<td>Foreign Flag Issues &amp; Equivalencies</td>
</tr>
<tr>
<td>Conservation Information Document</td>
<td>Design Document &amp; Plan Review</td>
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<tr>
<td>Downhole Commingling</td>
<td>Manning &amp; Licensing</td>
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<tr>
<td>D.W.O.P.</td>
<td>Security / Safety Zone</td>
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<tr>
<td>D.O.C.D.</td>
<td>Lightering Procedure</td>
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<tr>
<td>Pipeline Application / ROW &amp; LT</td>
<td>Oil Spill Management</td>
</tr>
<tr>
<td>Riser Verification (CVA – Risers)</td>
<td>Emergency Evacuation Plan / Vessel Response Plan</td>
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<tr>
<td>Structural verification (Structural CVA)</td>
<td>In-Service inspection plan</td>
</tr>
<tr>
<td>Production Safety System</td>
<td>USCG Inspections During Construction &amp; Installation</td>
</tr>
<tr>
<td>Surface Commingling &amp; Measurement</td>
<td>Pre-COI / COC Inspection</td>
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<tr>
<td>Well Control &amp; Production Training</td>
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<tr>
<td>In-Service Inspection Plans</td>
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<tr>
<td>Oil Spill Response</td>
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<td>NPDES</td>
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<td>Departure Requests</td>
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<tr>
<td>MMS Inspections incl. Pre-Production Inspection</td>
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Cascade and Chinook
We Were Here in Aug/2006

- Limited geological and well data;
- Lack of field analogs;
- Harsh environmental conditions;
- Ultra-deep waters;
- Lack of pipeline infrastructure;
- FPSO regulation under development;
- Tight SOP deadlines;
- Willingness to produce ASAP.
Reservoir Challenges

Seismic Vessels
Cascade and Chinook Rigs 1/2

Ocean Endeavor - 10,000 ft WD
( Under Contract to Devon Energy )
Diamond Offshore Drilling

West Sirius - 10,000 ft WD
( Under Contract to Devon Energy )
Seadrill Limited

2008
Cascade and Chinook Rigs 2/2

2009/2010

Discover Deep Seas
10,000 ft WD
(Under Contract to Chevron)
Transocean Ltd.

2010

Ocean Courage
10,000 ft WD
(New Built)
Diamond Offshore Drilling
Subsea Risers and Equipment

Tree & Manifolds: Houston

Riser Can: Finland

Technip Deep Blue
Pipe-in-pipe Installation

Pipe-in-pipe: Mexico and Alabama

Heerema Balder
Umbilical Construction and Installation

Umbilical: Alabama

Subsea 7 Seven Seas
FPSO and Shuttle Challenges
FPSO Construction in Singapore

Module Lift onto FPSO

Aboard the FPSO at Keppel Shipyards, Singapore
Shuttle Tanker Construction in Philadelphia

Shuttle: Philadelphia

Shuttle Launching
FPSO & Shuttle vs. Non-storage FPU & Oil Pipeline

**FPSO & Shuttle Advantages:**
- No need for pipeline infrastructure.
- Can be redeployed elsewhere.
- Last out and first in operations during storms.

**TLP/SS/SPAR & Oil Pipeline Advantages:**
- Friendlier to subsea risers.
- Allow DVA rigs and/or dry X-tree.
- Well defined industry and regulation in GoM.
Gas Export
Discovery Pipeline System
Cascade and Chinook Project
Worldwide Construction Sites

Equipment and Services from over 20 Countries
Nationalities of the Walker Ridge Team
21 Countries

One Project...
... 21 Nations
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Final Message

• The Cascade and Chinook project will pave the way for future ultra-deep water Lower Tertiary fields in the US GoM.
The Development of Cascade and Chinook Fields in Ultra Deep Waters of the Gulf of Mexico

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