



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

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Petrobras

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National Oil Equipment Manufacturers And Delegates Society
Houston, Texas
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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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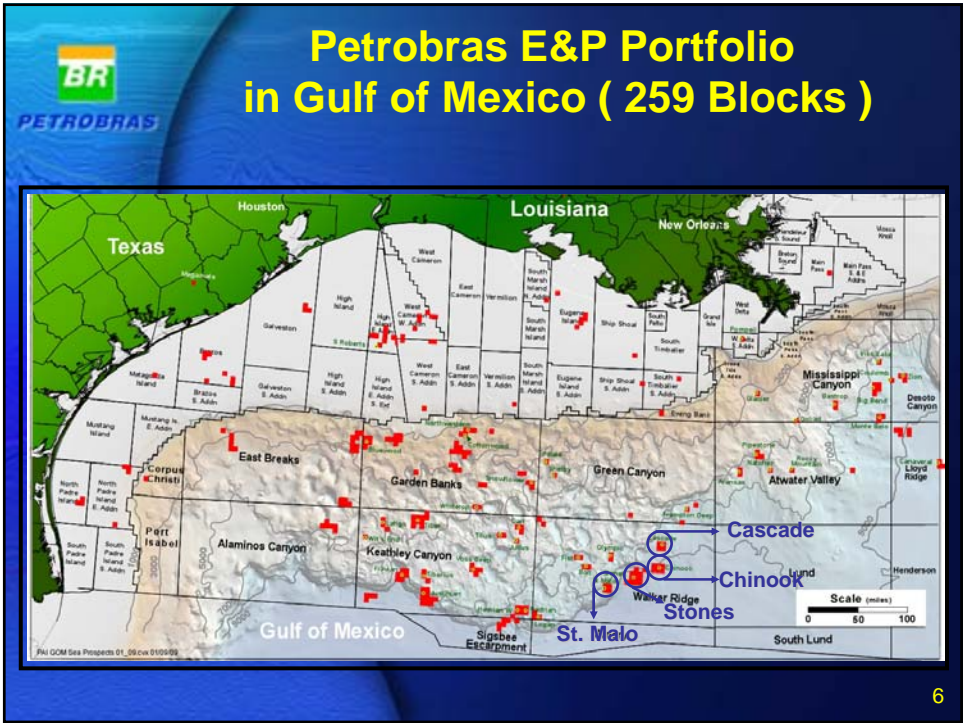
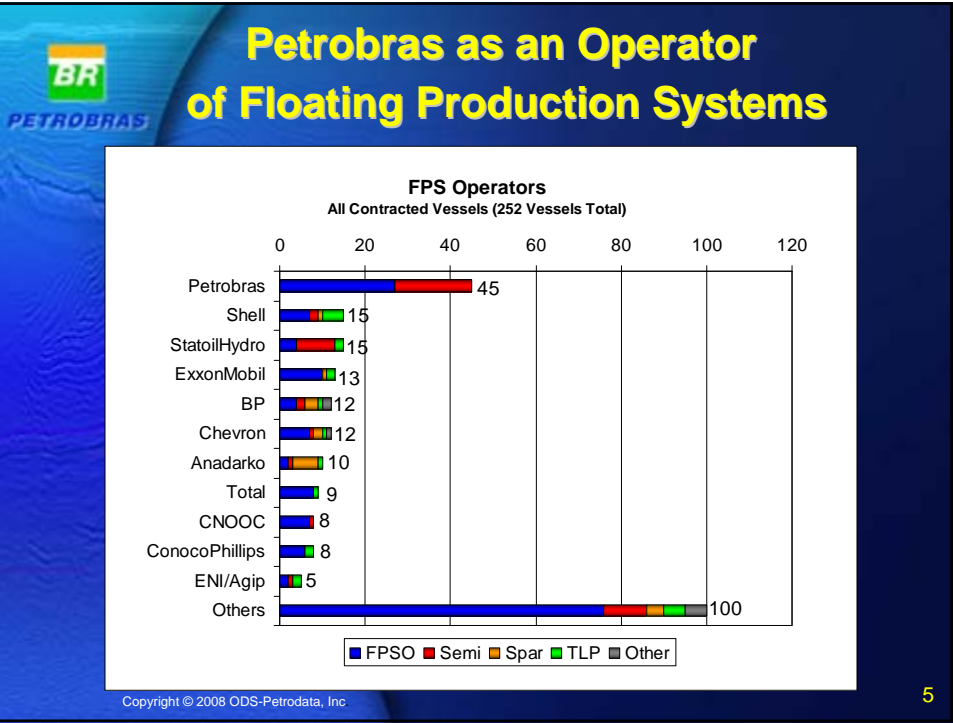
Petrobras Summary

- Proven Reserves (SPE): 15 bi boe
- Employees: 69,000
- O&G Production: 2.3 million boe/day
- Refining Throughput: 2.2 million boe/day



SOURCE: PETROBRAS

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Cascade and Chinook Lease Holders

Lease Holders

The Cascade Field

- Petrobras – 50%
- Devon – 50%

(Blocks WR205, 206,249 &250)

Lease Holders

The Chinook Field

- Petrobras – 66.67%
- Total – 33.33%

(Blocks WR 425,426,469&470)

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Cascade and Chinook Field History

Year	Cascade	Chinook
2002	Discovery Well	
2003		Discovery Well
2004		
2005	2 Appraisal Wells	
2006		
2007		
2008	Spud Develop. Well	

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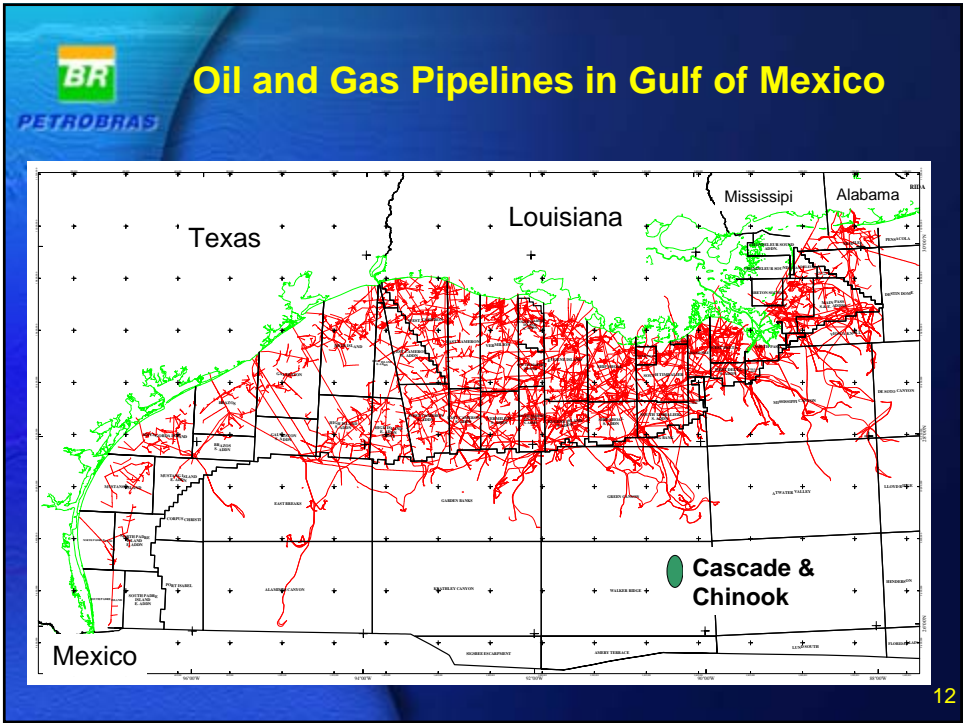
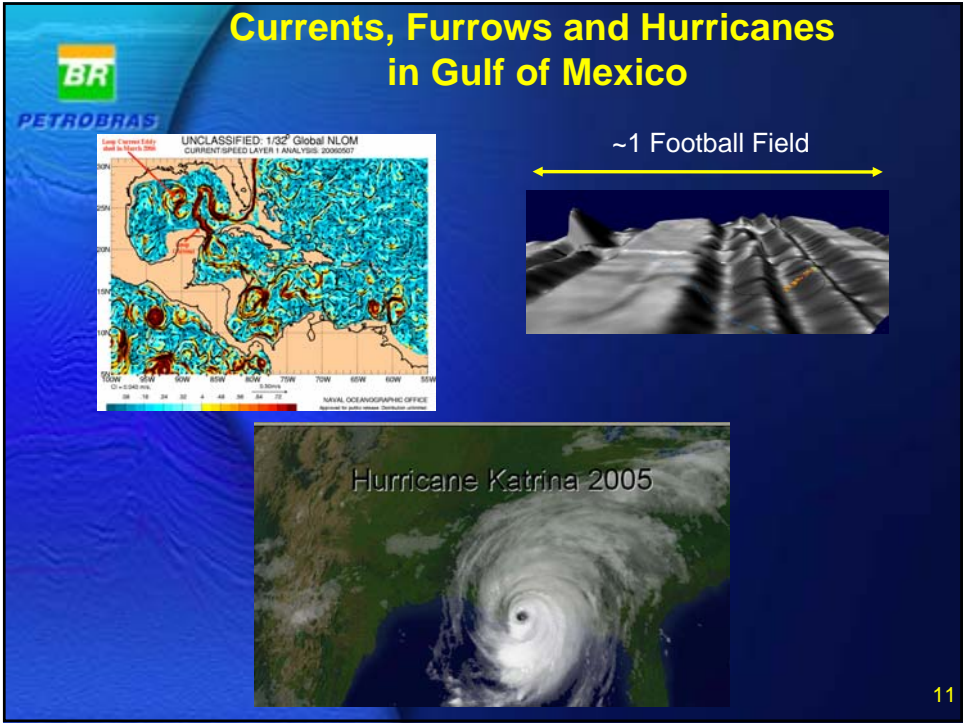
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Regulatory Compliance

<u>MMS</u>	<u>USCG</u>
<ul style="list-style-type: none"> Exploration Plan Application for permit to Drill Conservation Information Document Downhole Commingling D.W.O.P. D.O.C.D. Pipeline Application / ROW & LT Riser Verification (CVA – Risers) Structural verification (Structural CVA) Production Safety System Surface Commingling & Measurement Well Control & Production Training In-Service Inspection Plans Oil Spill Response NPDES Departure Requests MMS Inspections incl. Pre-Production Inspection 	<ul style="list-style-type: none"> Certificate of Compliance (COC) Foreign Flag Issues & Equivalencies Design Document & Plan Review Manning & Licensing Security / Safety Zone Lightering Procedure Oil Spill Management Emergency Evacuation Plan / Vessel Response Plan In-Service inspection plan USCG Inspections During Construction & Installation Pre-COI / COC Inspection


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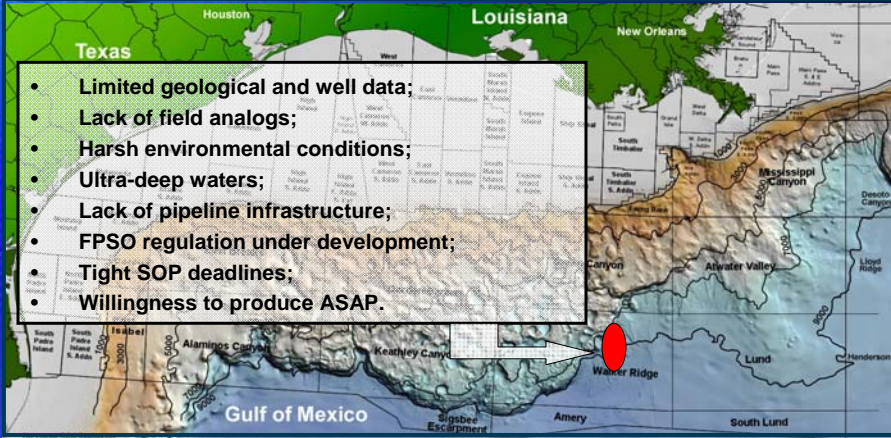
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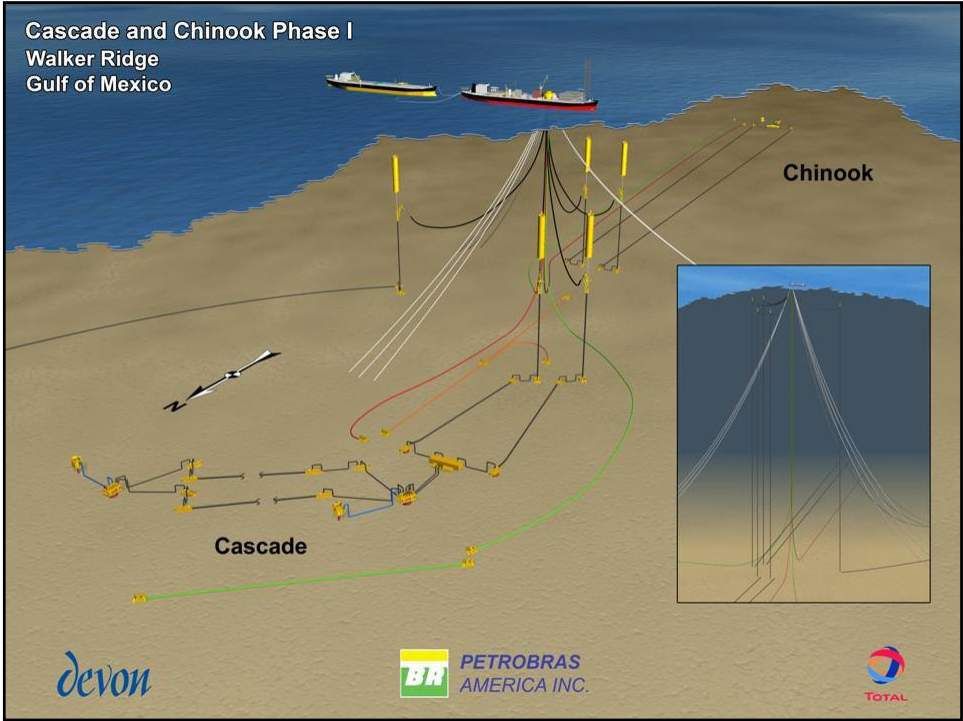
Cascade and Chinook We Were Here in Aug 2006



- 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.


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Cascade and Chinook Phase I
Walker Ridge
Gulf of Mexico



Chinook

Cascade



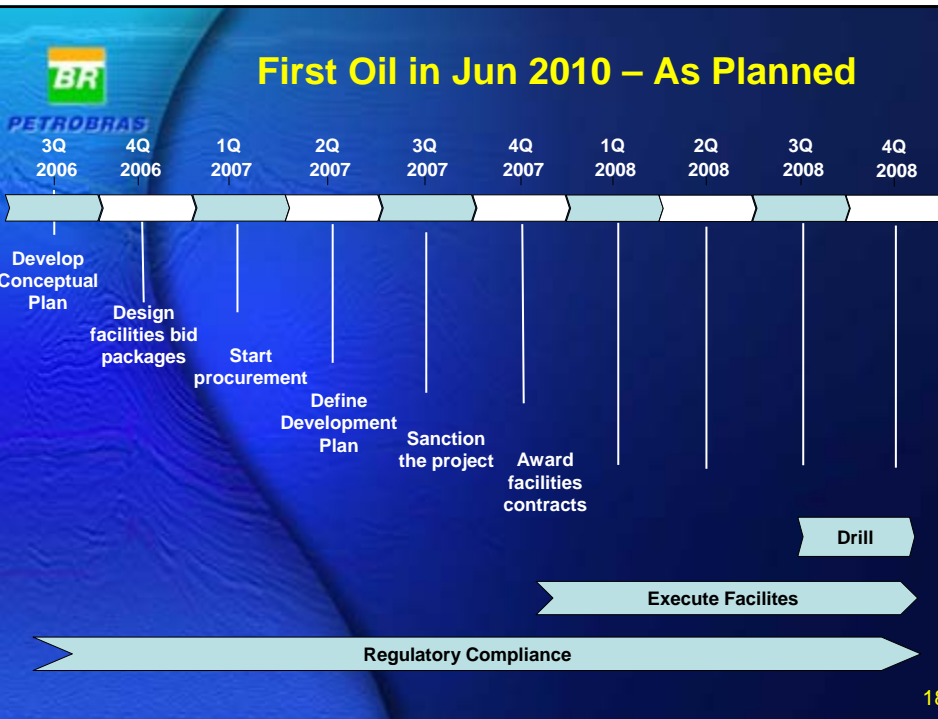


Phase 1 - Objectives

The Objective of Cascade and Chinook Phase 1 is to obtain data and information about the reservoirs and the well productivity in order to optimize the future phases focusing on the following aspects:

- Number and type of wells;
- Completion design;
- Production System Type and Capacity;
- Subsea Layout and Boosting System;
- Secondary Recovery Potential.

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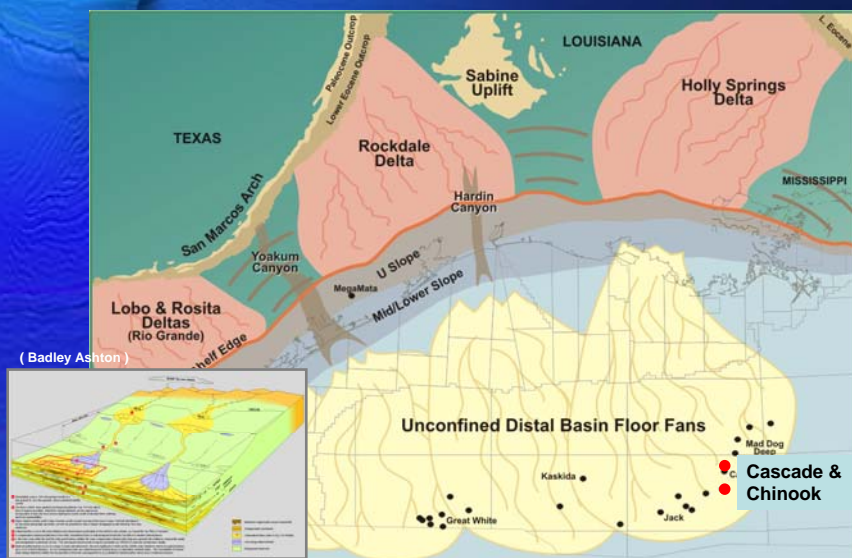
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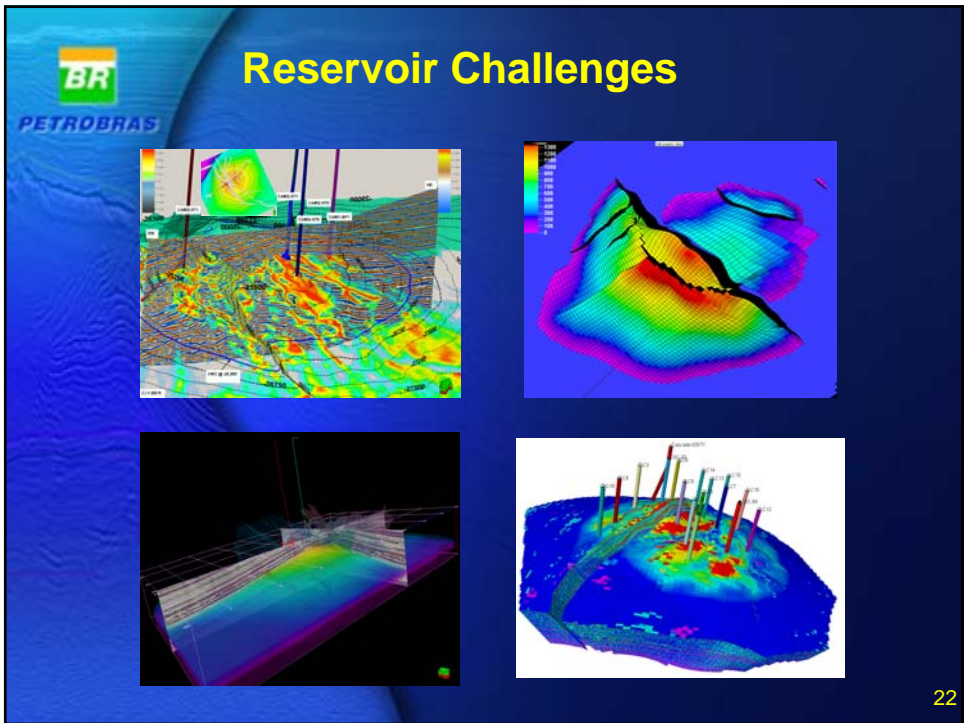
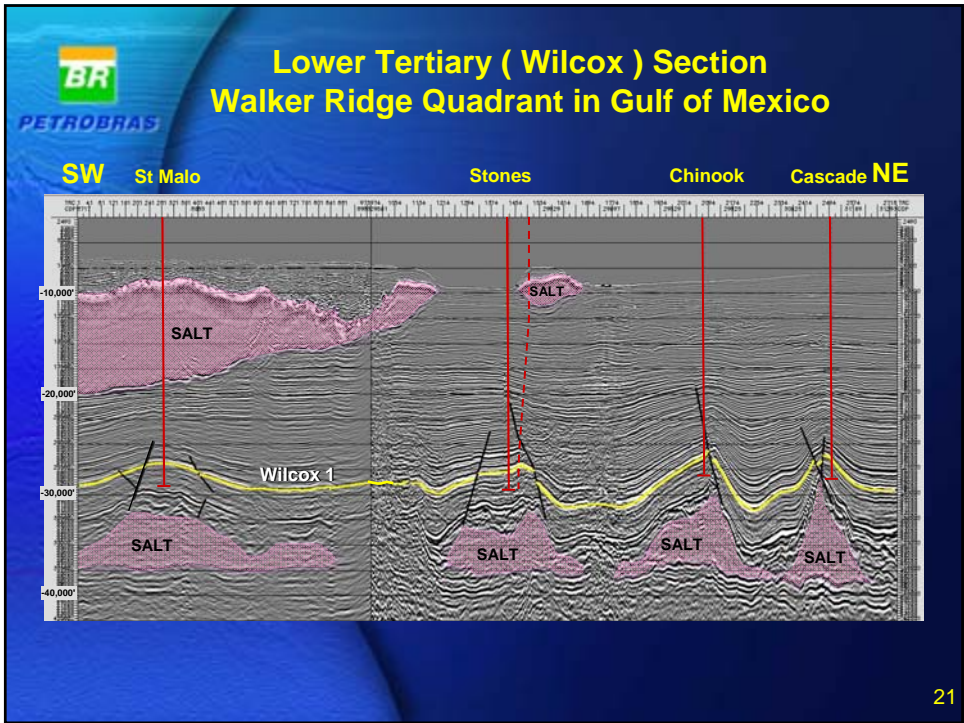
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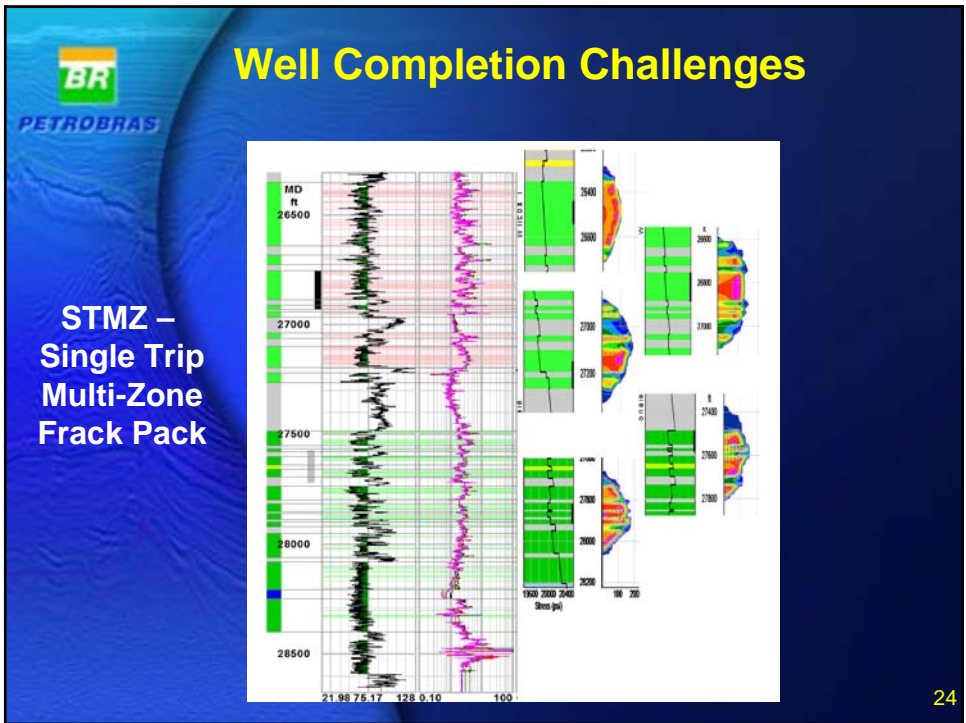
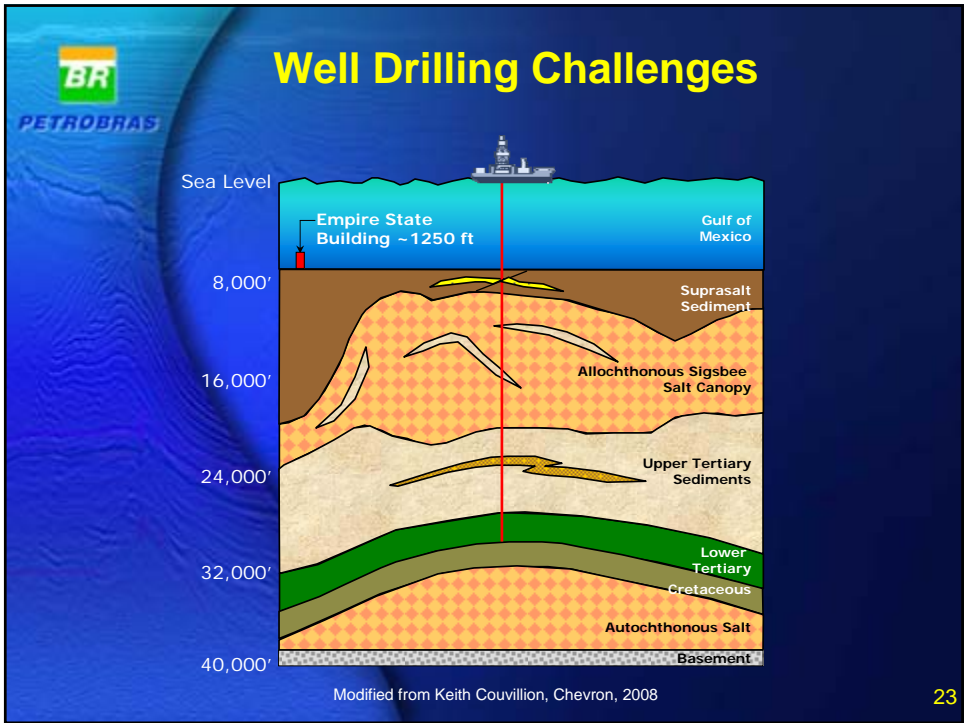


Lower Tertiary in GoM Depositional Environment



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Cascade and Chinook Rigs

2008



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

2008



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

2009



PetroRig 1 - 10,000 ft WD
(Under Construction
– Singapore)
Larsen Oil & Gas

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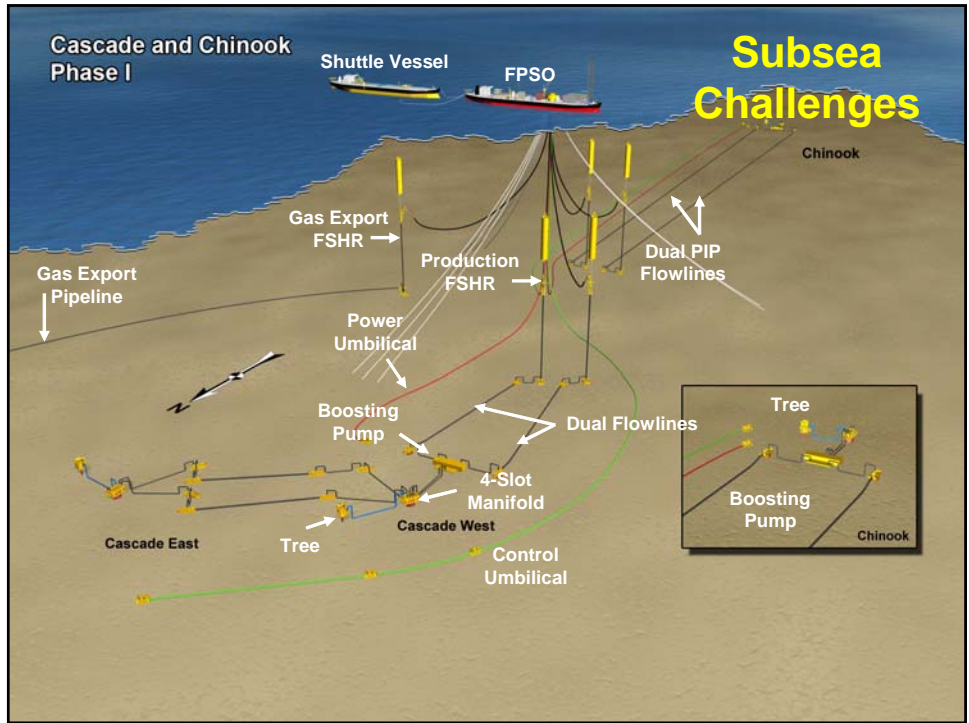
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Free Standing Hybrid Risers

CASCADE/CHINOOK FSHR SYSTEM



PETROBRAS

Instalation Vessels

Technip Deep Blue



Heerema Balder



Subsea 7 Seven Seas



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PETROBRAS

FPSO Challenges



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FPSO BW Pioneer Main Particulars

Oil Storage	500,000 bbl
Liquid Production	80,000 bpd
Gas Production	16 MMcf/d
Water Production	16,000 bpd
Test Separator	10,000 bpd
Oil Gravity	18 to 26 API
Gas Export Pressure	172 barg

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FPSO Conversion in Singapore



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Oil Export from FPSO to Shore Thru Veteran Class Shuttle Tankers

Overseas Houston



Overseas Los Angeles



Overseas Long Beach



Overseas New York

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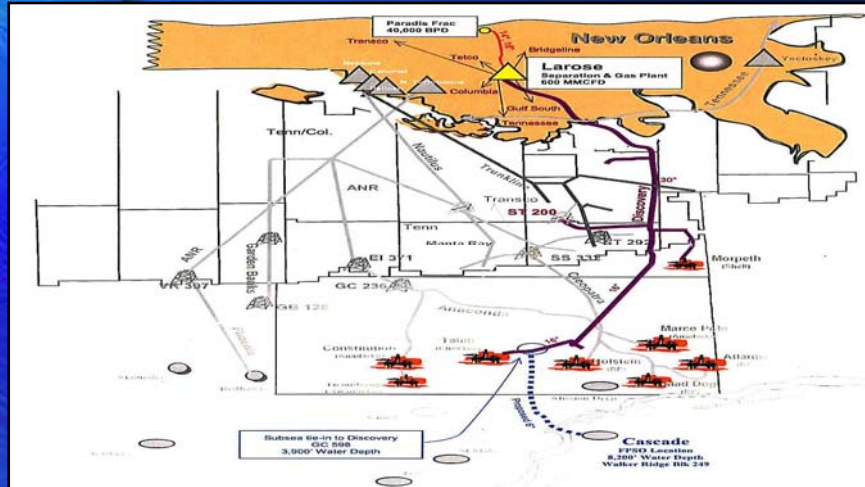


OSG's Shuttle Tanker Main Particulars

- Tank Capacity: 330,000bbl
- Classed by ABS
- Jones Act Compliant – Flag USA
- BLS (Bow Loading System)
- Retrievable Hose & Hawser
- Bow Thrusters
- Speed: 14.6 knots

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Gas Export Discovery Pipeline System



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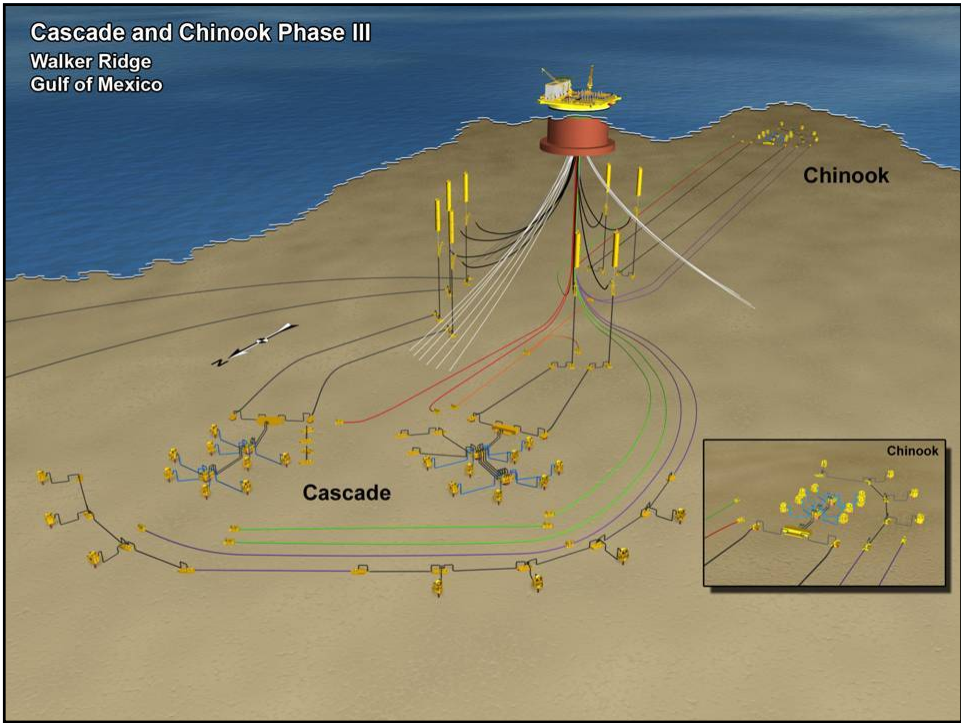
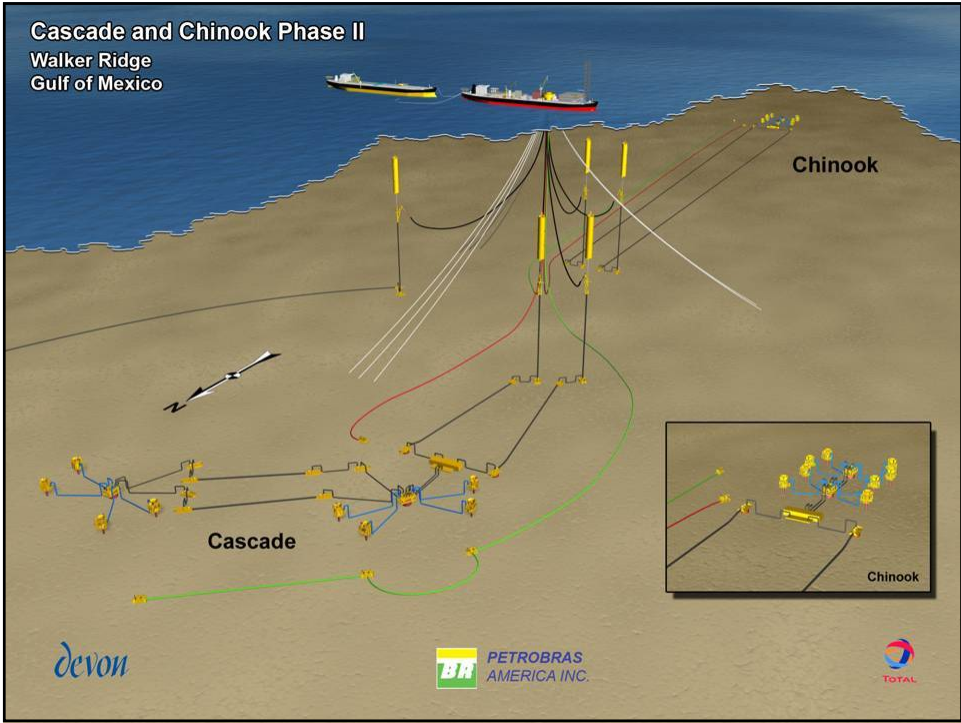
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Final Message

- The Cascade and Chinook project will pave the way for future ultra-deep water Lower Tertiary fields in the US GoM.

Path Forward !!





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