A Review of Deepwater Operations

at the

Deepwater Operations Forum

Galveston, TX.

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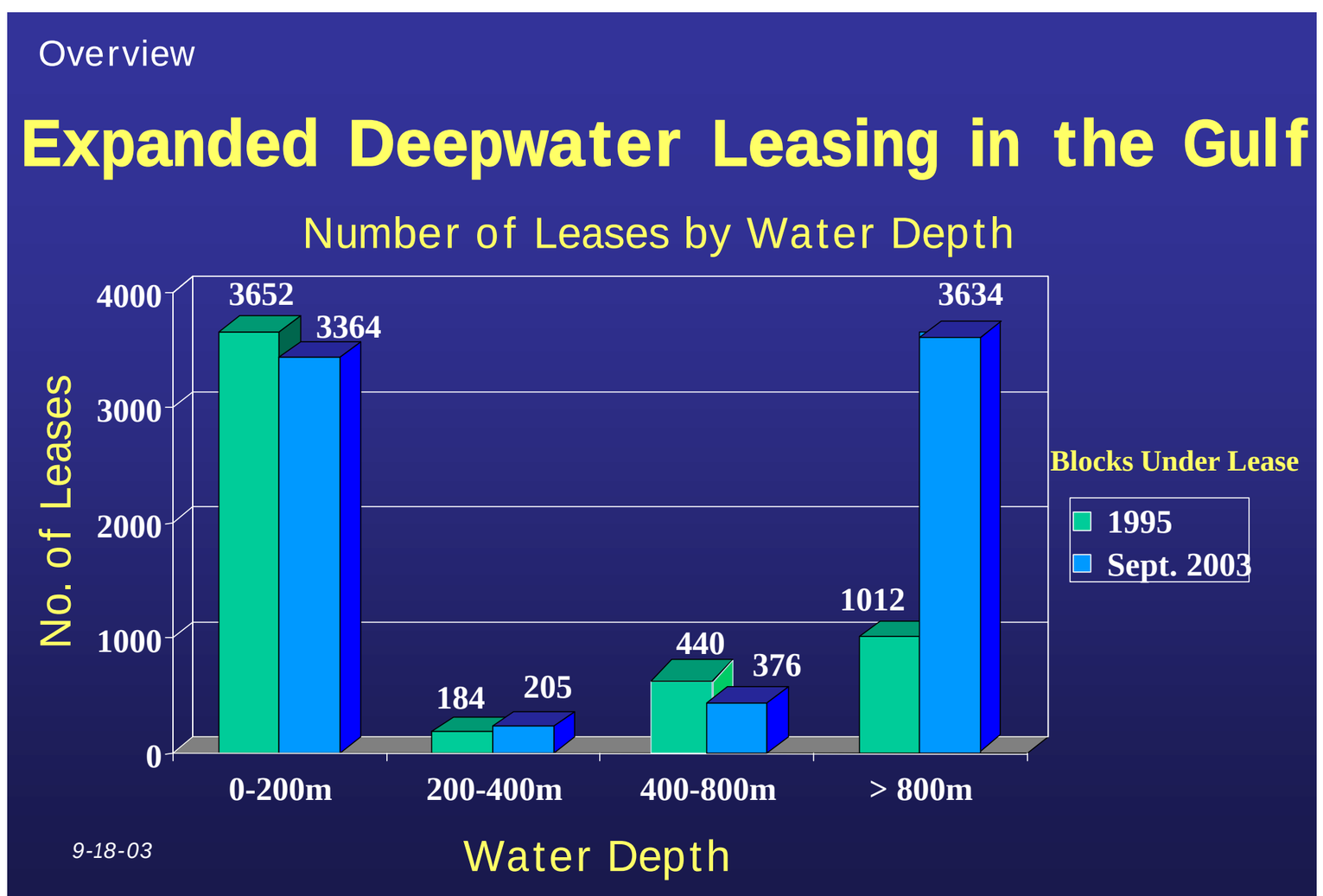
Minerals Management Service
September 30, 2003

- This Year Marks the 50th Anniversary of the OCS Lands Act. We have come a long way. We have seen oil production in the Gulf rise 70% in 8 years
- Now have gas production from the Canyon Express project in 7,000 ft. of water.
- The Gulf of Mexico, even after 50 Years, Remains a Vibrant and Changing Hydrocarbon Basin.
- October is also Energy Awareness Month

Focus Today

- Overview of deepwater activities in the Gulf of Mexico.
- Some specific operational concerns.

Expanded Deepwater Leasing in the Gulf



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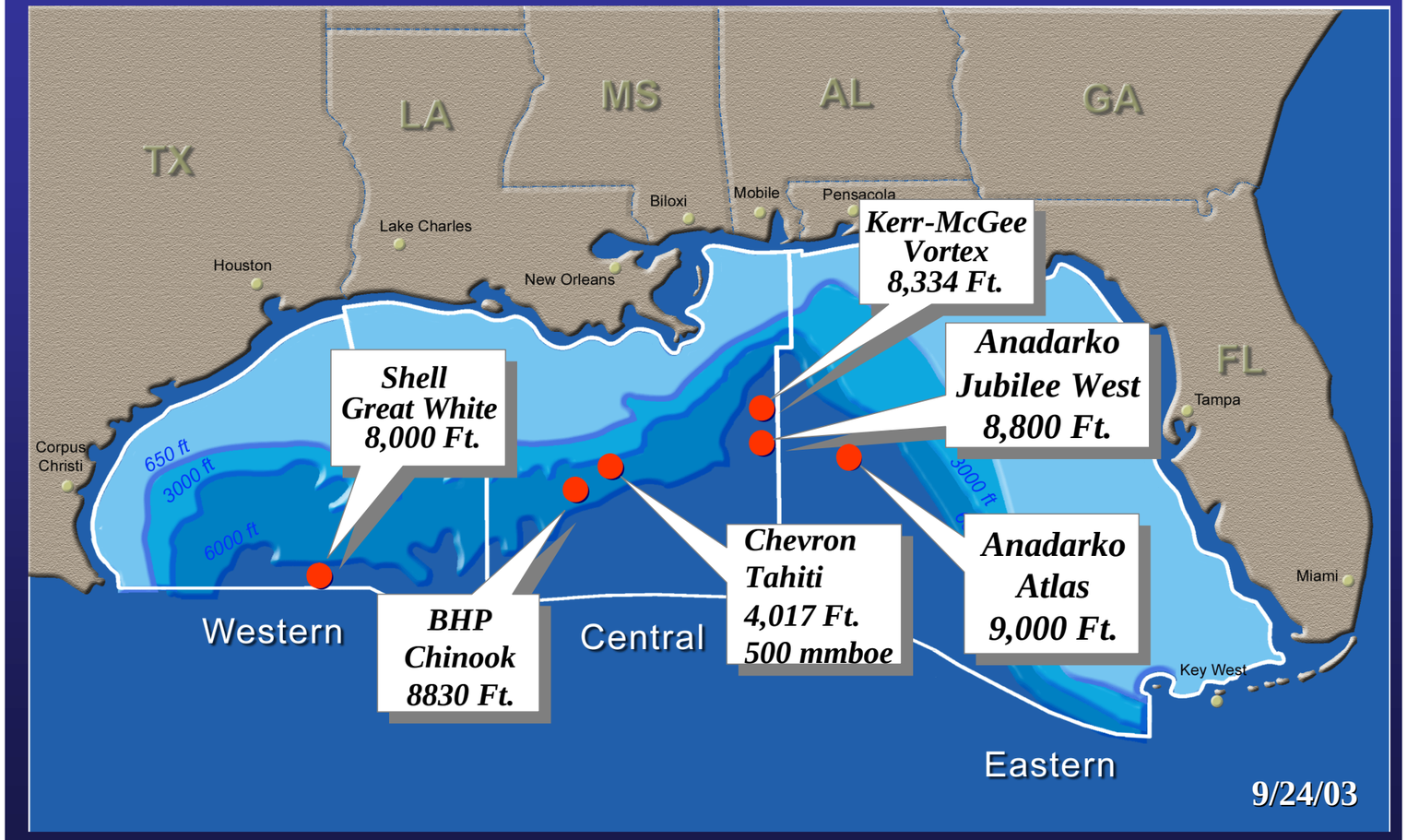
Overview

Gulf of Mexico Significant New Discoveries



Gulf Deepwater Discoveries - 2002

Prospect	Operator	Area/Block	Water Depth'
Vortex	BHP Billiton Petroleum (GOM) Inc.	AT261	8,334
Cascade	BHP Billiton Petroleum (GOM) Inc.	WR206	8,143
Great White	Shell Offshore, Inc.	AC857	8,009
Shenzi	BHP Billiton Petroleum (GOM) Inc.	GC654	4,394
Tahiti	Chevron USA Inc.	GC640	4,017
West Navajo	Kerr-McGee Oil & Gas Corp.	EB689	3,905
Slammer	Samedan Oil Corp.	MC849	3,599
Quatrain	Murphy Exploration & Production	GC382	3,328
Deimos	Shell Offshore, Inc.	MC806	3,003
-----	LLOG Exploration Offshore Inc.	GB205	1,330
-----	Mariner Energy Inc.	MC066	1,144
-----	Anadarko Petroleum Corp.	MC401	1,134

Gulf Deepwater Discoveries - 2003

Prospect	Operator	Area/Block	Water Depth'
Atlas	Anadarko	LL 50	9000
Chinook	BHP Billiton	WR 469	8830
Jubilee West	Anadarko	AT 349	8800
Constitution	Kerr-McGee	GC 680	5000
Champlain	Unocal	AT 63	4418
Harrier	Pioneer Nat. Res.	EB 759	4200
Hornet	Kerr-McGee	GC 379	3850
Perseus	Marathon	VK 830	3376
Lorien	ConocoPhillips	GC 199	2177
Goose	Spinnaker Expl.	MC 751	1600

Deepwater Development in the Gulf of Mexico

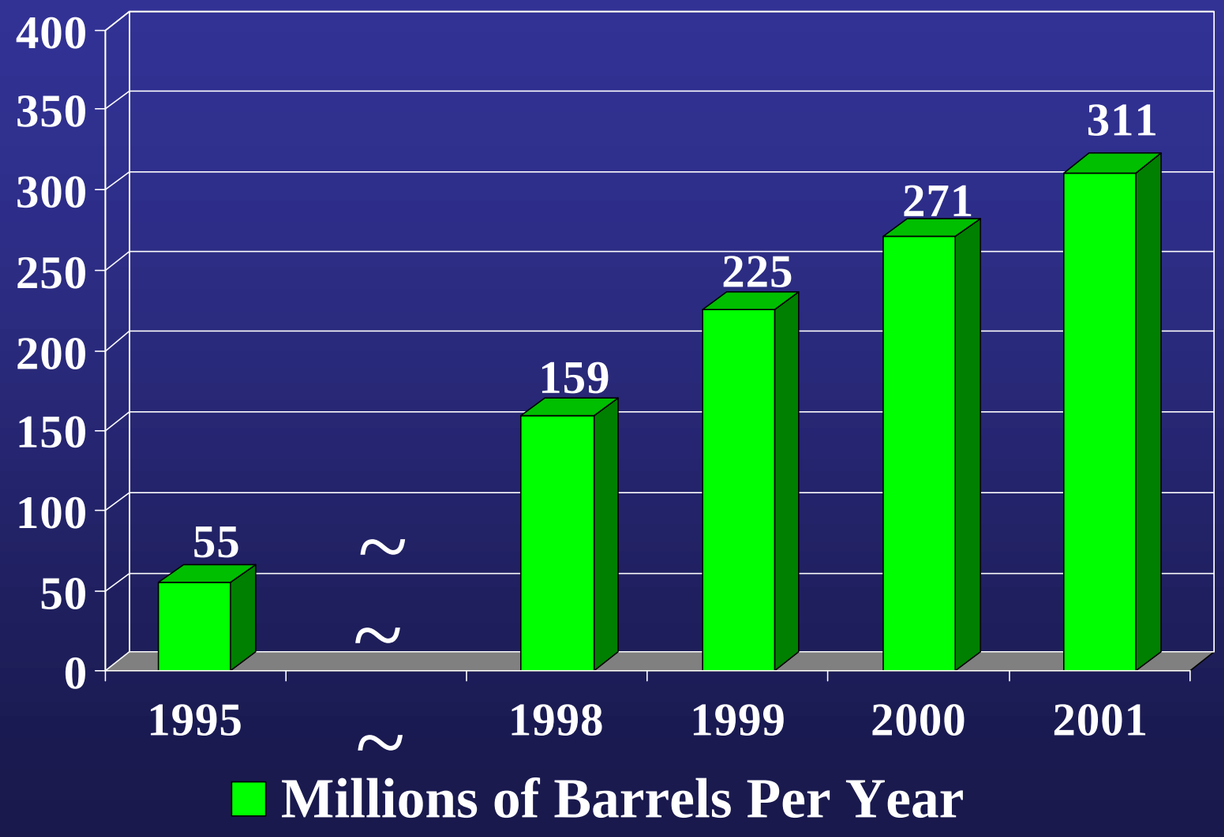
- About 81 projects will be on production by the end of 2003.
- Another 15 projects in 2004.
- Big and costly TLP projects are the exception.
- Mini-TLP's, Subsea tie backs, and Spars are the lower cost alternatives.
- Eight Spar type projects are in production.

2004 Projected Deepwater Production Starts

2004 Production Starts Using Spars

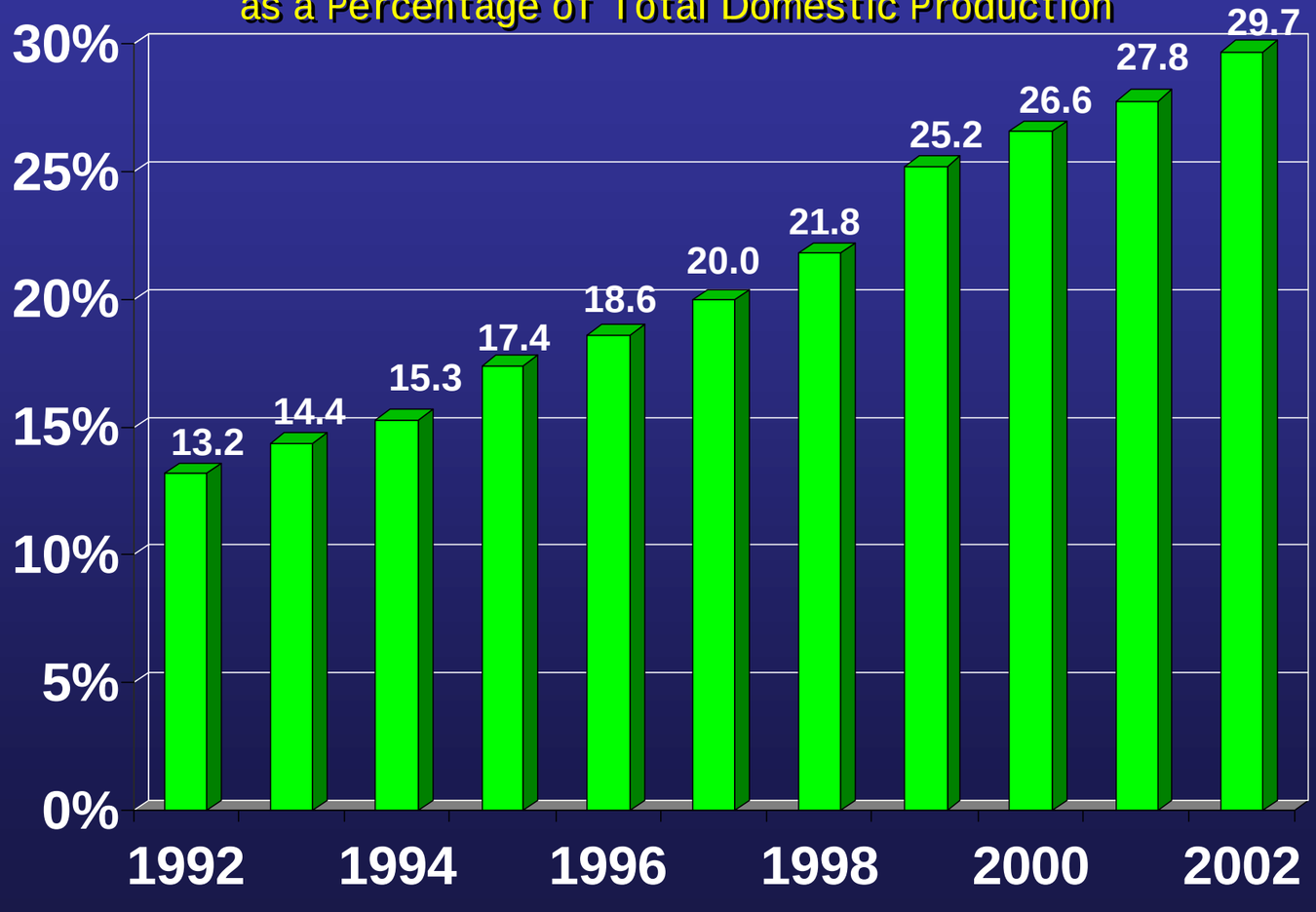
Mad Dog	4,951 ft.	Truss
Red Hawk	5,300 ft.	Cell
Gunnison	3,100 ft.	Truss
Front Runner	3,500 ft.	Truss
Holstein	4,300 ft.	Truss
Devil's Tower	5,610 ft.	Truss

Gulf of Mexico Deepwater Oil Production



OCS Oil Production

as a Percentage of Total Domestic Production



Overview


2003 Exploration in Eastern Gulf of Mexico
Pensacola
Tallahassee
Tampa
Florida
Sale
181
Area
Eastern
Planning
Area

Overview

2003 Exploration in Eastern Gulf of Mexico

Potential OCS Projects
Other Energy Supply

Environmental Review In Deepwater

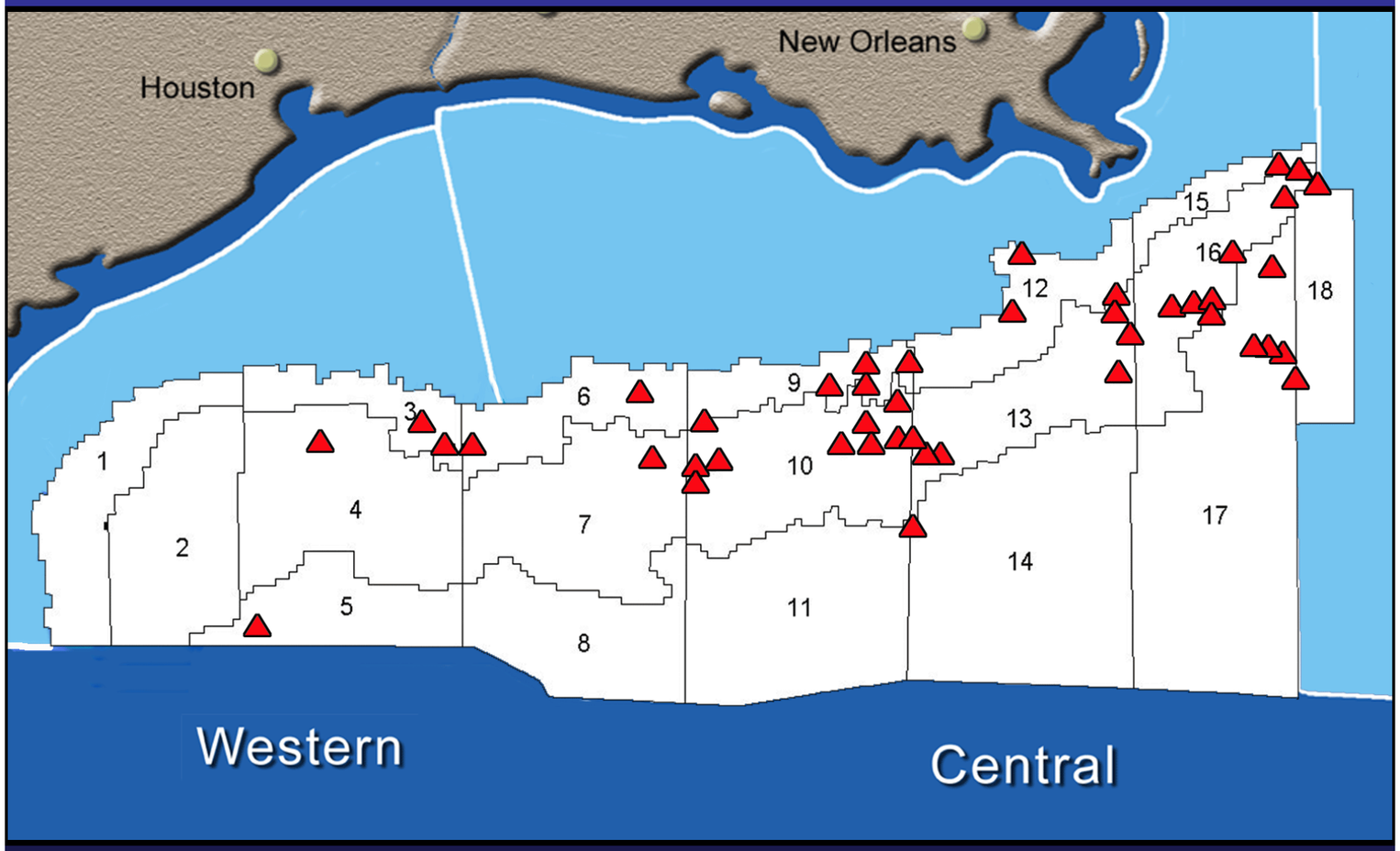
- MMS continues DW studies
  - major physio – oceanography
  - Also joint effort with Mexico
  - New starts in 2004
- 18 Grids in DW – Major EA in each

  www.gomr.mms.gov/homepg/regulate/environ/strategy/strategy.
- Rov Survey requirements

  NTL 2003 – G03

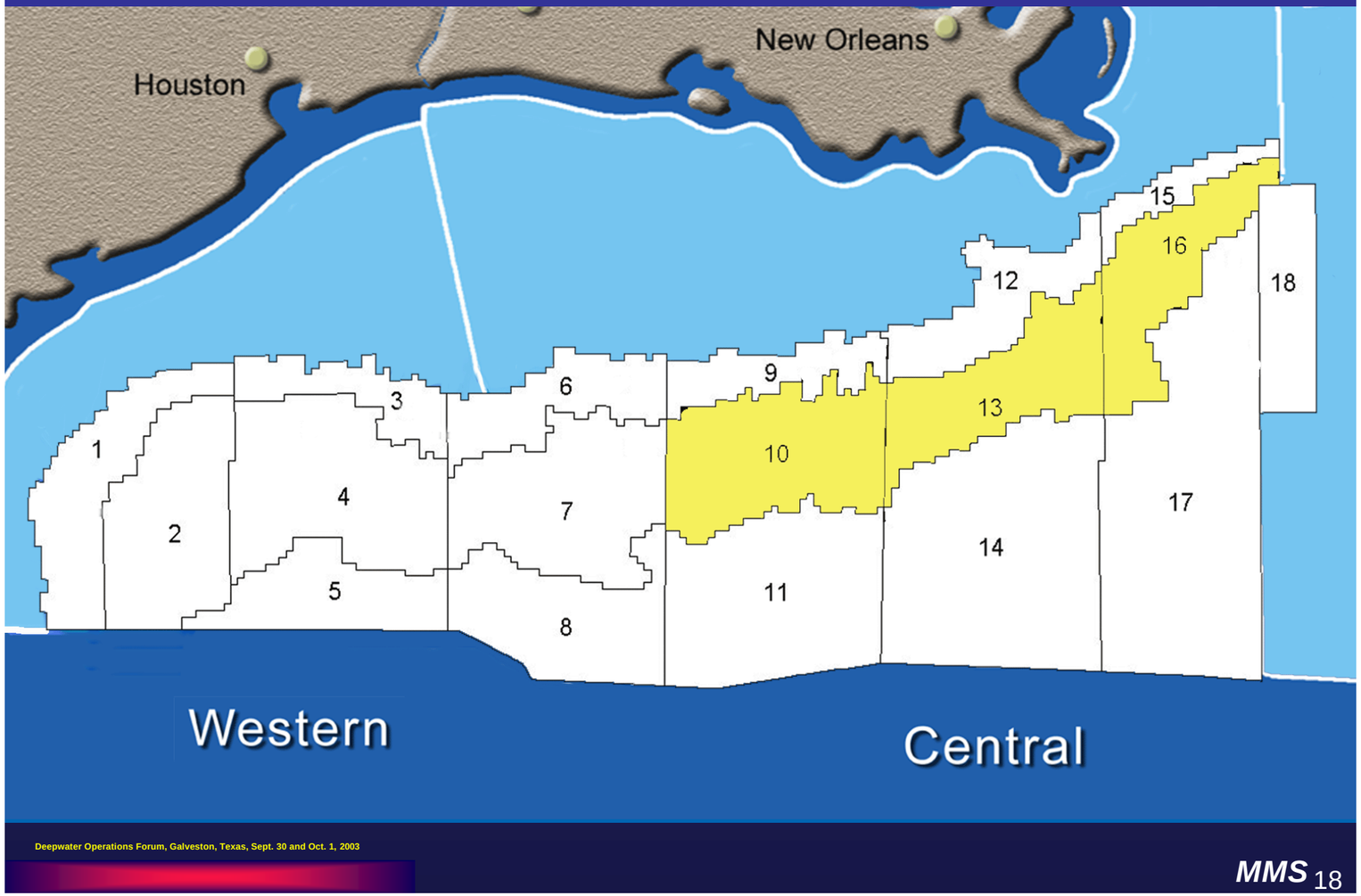
Overview

Areas with ROV Surveys



Overview

Completed ROV Coverage



Operational Concerns

MMS New Research In FY 2003

- Large scale polyester rope JIP
- Composite tendons
- Composite production riser – comparative risk assessment

2004 MMS Technology Study Requests

Those focused on deepwater:

1. Risk analysis of subsea vs. surface processing-handling produced water.
2. Assess subsea system maintenance and intervention-including criteria for decision to shut in.
3. Risk analysis / assessment of DW subsea gas lifting – including effects of induced thermal stress on risers.

2004 MMS Technology Study Request

4. Assess composite repair methods-for risers, structural members and FPSO's.
5. Assess reliability of large diameter steel compliant risers in ultra–deepwater.
   – fatigue, corrosion and wear.
6. Assess technology for automatic controlling and testing systems for mainline valves on subsea pipelines.

from 8/13/03 MMS Request for white papers for research proposals

MMS Concerns in Deepwater Production Systems Reliability

- MMS has seen numerous failures of subsea control systems
  - Most had a redundant control backup or were a low increased risk to personnel or environment.
  - the cost of repairs appears to be the main reasons for not repairing (may have TA well and pull tree, run new umbilicals)
- Operators should examine design and reliability of the systems , include more redundancy or expect to incur the high cost of maintenance or repair
- There should be more concern for design life and fitness for purpose of these components

Operational Problems Noted in Subsea Production - 1

- Gemini – Failed completion (waive downhole valve test due to sand production)
- Pompano – Corrosion inhibitor leak in umbilical (Replaced)
- Pompano – Leaking downhole valve beyond API 14 B allowance (departure)
- Mensa – Hydraulic leak (umbilical connections) HP Hydraulic line had to be isolated - use intensifier on LP to hold SCSSV open.
- Mensa – Lost of power cable during installation enough power to supply 3 PODs but not 4. When A-4 was brought on line, power was disconnected to A-2 (requiring casing pressure monitoring departure)
- Mensa – Glycol leak

Operational Problems Noted in Subsea Production - 2

- King – Electrical umbilicals (2) shorted (replaced)
- Pluto – Hydrate plug (Remediated)
- Tahoe – Hydraulic leak (WASP Intervention) (Sealtite)
- Tahoe – POD failure (Replaced)
- Cameden Hills – Leak test failure of USV (used Alt. USV)
- Kings Peak – Communications failure with POD (ROV intervention) POD good (electrical/fiber optic infield jumper bypass utilized)

Loop Currents as a Deepwater Problem

Recent events:

- 3 RISER/CHOKELINE FAILURES
- 3 DRIFT-OFFS
- RISER CLASHING AND FATIGUE
- PRODUCTION DELAYS

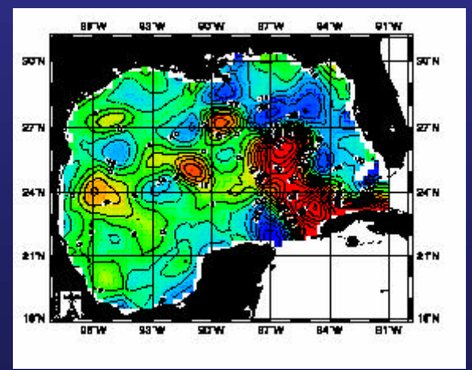
Impact on Industry From Loop Currents

- Design, Operational and Scheduling changes
- Additional inspections of risers and platforms and additional monitoring equipment
- Down time
- Delay in first oil
- Loss of production
- Additional capital expenditures and operating costs

New Requirements in Current Measurement

New NTL is being considered:

- Current Data is needed to improve computer models and predict impact on equipment
- Gathered onboard by current monitoring systems
- Full current profiling required for new production facilities
- May be required for MODUs
- Information will be submitted to MMS and distributed to industry
- Early stage of drafting --- November?



INDUSTRY CUT BACKS

Fact: High Commodity Prices Continue

Fact: Downsizing and Consolidation Continue

Concern: Are Profit Margins Driving This Trend

Concern: Is Industry Losing Needed Expertise

Bottom Line: Safety and Environmental Protection Cannot Be Compromised