

Economic Issues for FPSOs in the Gulf of Mexico: What's Different?

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Economic Issues for FPSOs in GoM?

- 40,000 foot view
- Issues presented are intended to stimulate discussion
- Issues and opinions are those of the authors
- Thanks for the graphics!
 - ◆ MMS OCS Report 2002-021: “ Deepwater Gulf of Mexico 2002: America’s Expanding Frontier”; 2002
 - ◆ Shell E&P Company web site; 2002:
<http://www.shellus.com/sepco/where/offshore/index.html>
 - ◆ Conoco Shipping web site; 2002:
http://www.conoco.com/pa/special/gom_discoveries.asp
 - ◆ Bluewater Offshore web site; 2002:
http://www.bluewater-offshore.com/fpso_fso_operations.html

So Where Are We at Now?

- Subsea wells technically doable to 7,500 feet; with 10,000 feet possible!
- FPSOs are technically doable!
- Shuttle vessels are technically doable!
- Gas export pipelines are technically doable!
- Regulatory framework is in place (for the most part)
- Environmental Issues have been Addressed

So Why are there No FPSOs in the GoM?

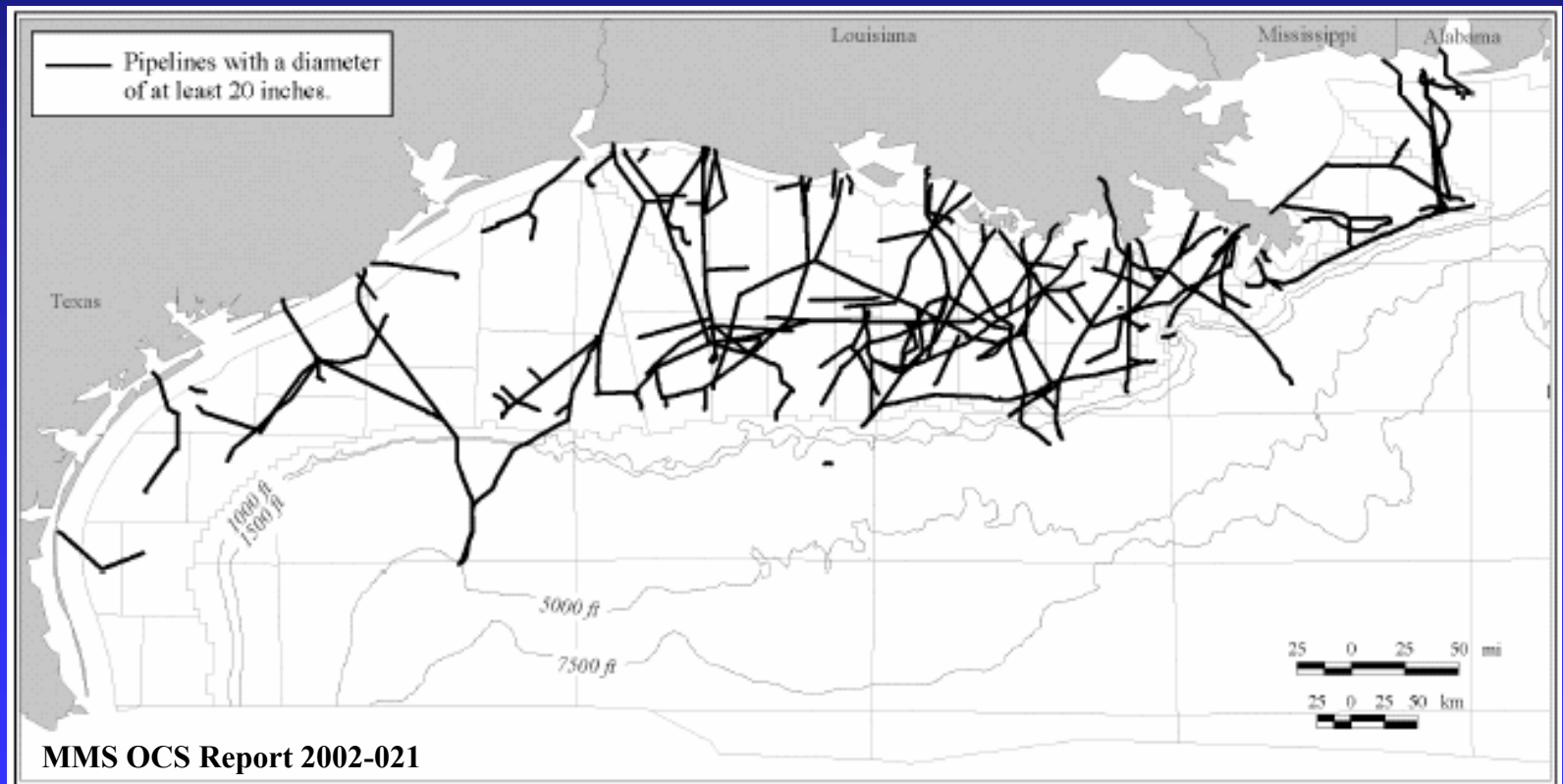
- **ECONOMICS!**
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What are the Economic Issues?

- Good Pipeline Infrastructure in place to 3000 foot water depth
- CZMA Issues for Eastern GOM
- Deepwater Subsea Well Systems are Expensive
- No cheap FPSOs
- Shuttle Vessels must meet U.S. Jones Act requirements
- No “Creaming”
- Produced Gas Disposition

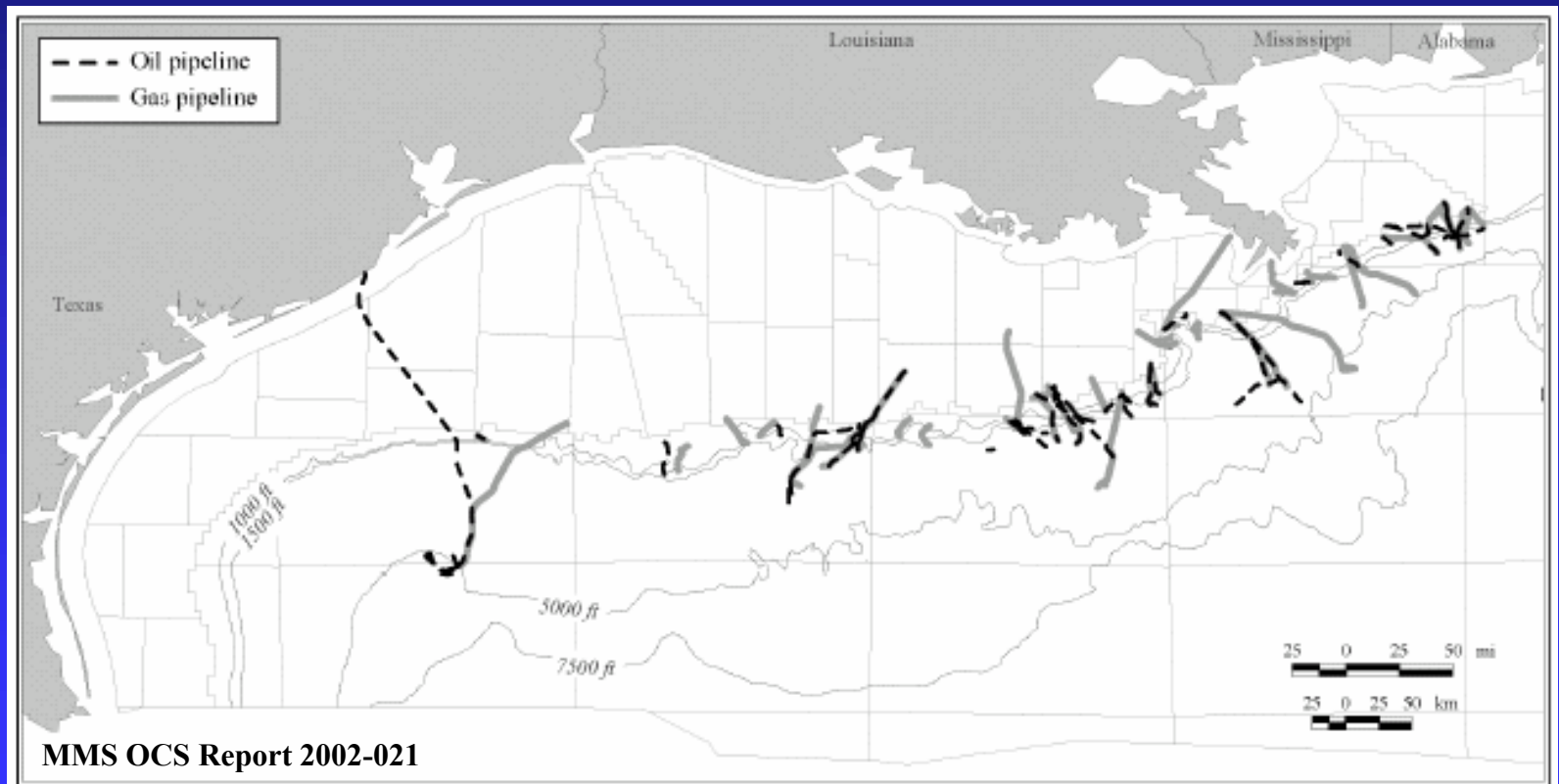
Good Pipeline Infrastructure in place to 3000 foot water depth

- Oil and Gas Pipelines with Diameter of at least 20 inches



Good Pipeline Infrastructure in place to 3000 foot water depth (cont'd)

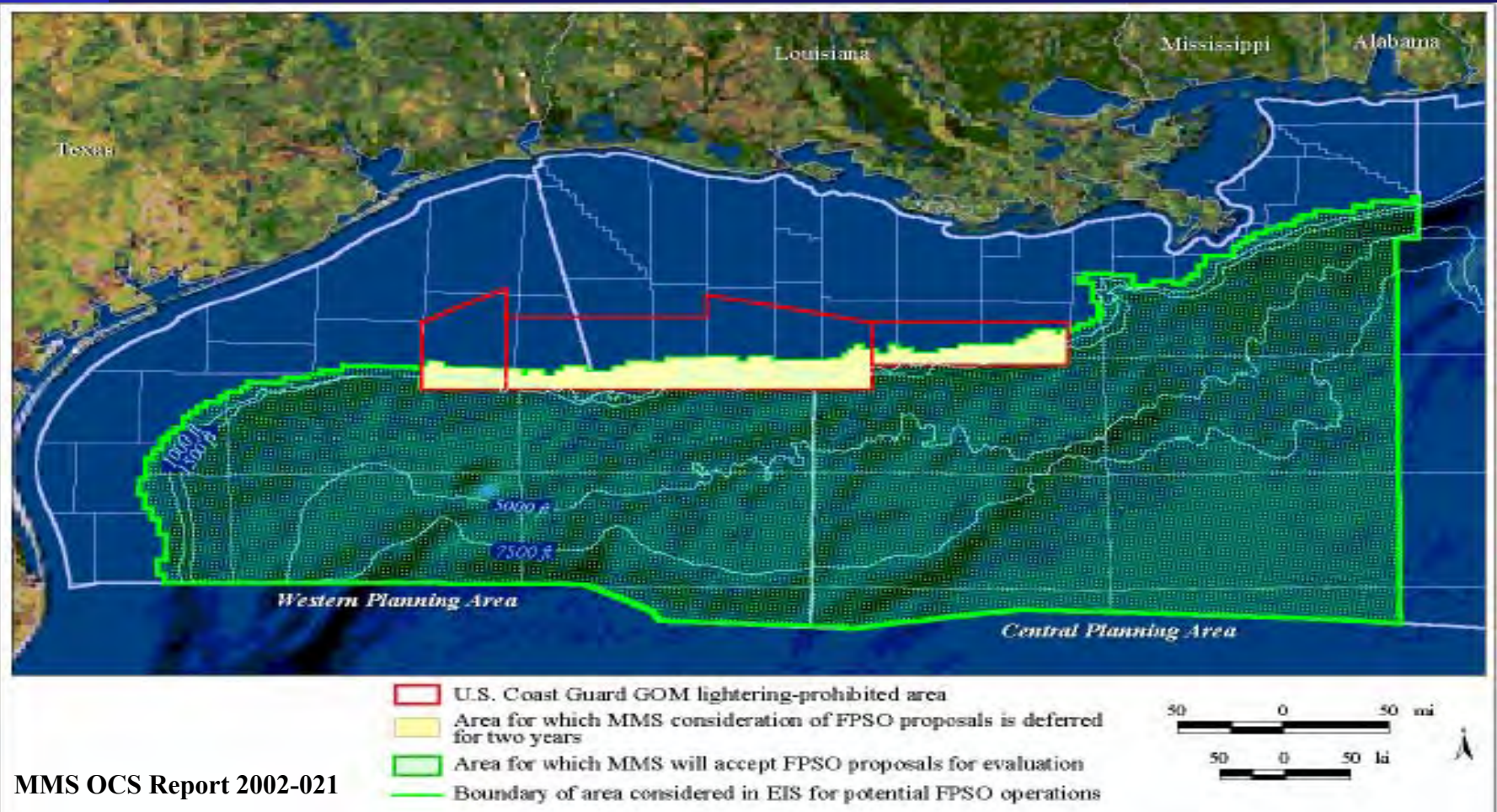
- Deepwater Oil & Gas Pipelines in GoM



CZMA Issues for Eastern GOM

- MMS EIS does NOT Cover Eastern GOM (Lease Sales 181, etc.)
- Florida would likely have CZMA Issues regarding FPSO Developments in Eastern GOM
- Florida may have CZMA Issues with FPSO Developments for Eastern side of Central Planning Area.

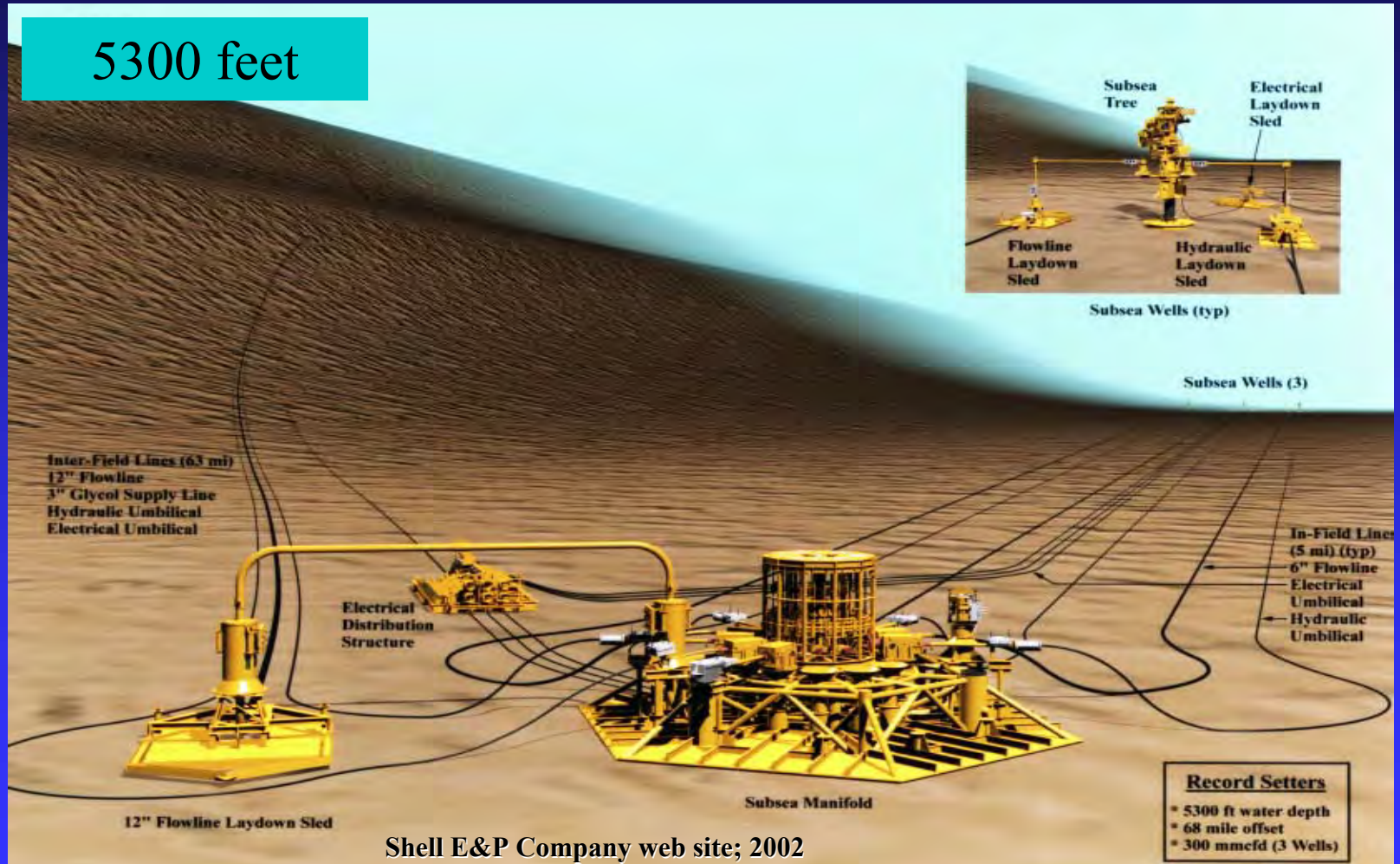
CZMA Issues for Eastern GOM (cont'd)



MMS OCS Report 2002-021

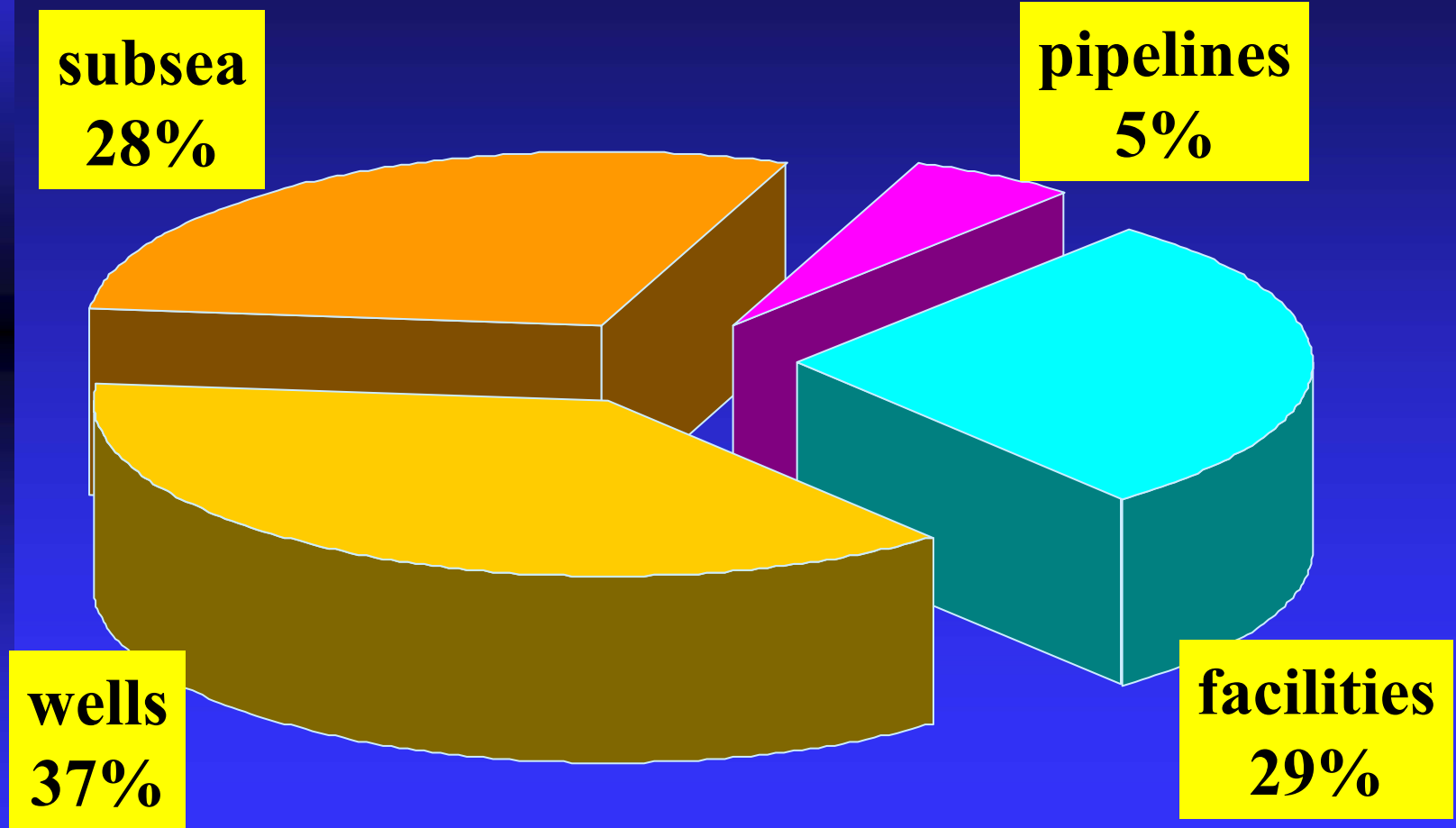
Deepwater Subsea Well Systems are Expensive

5300 feet



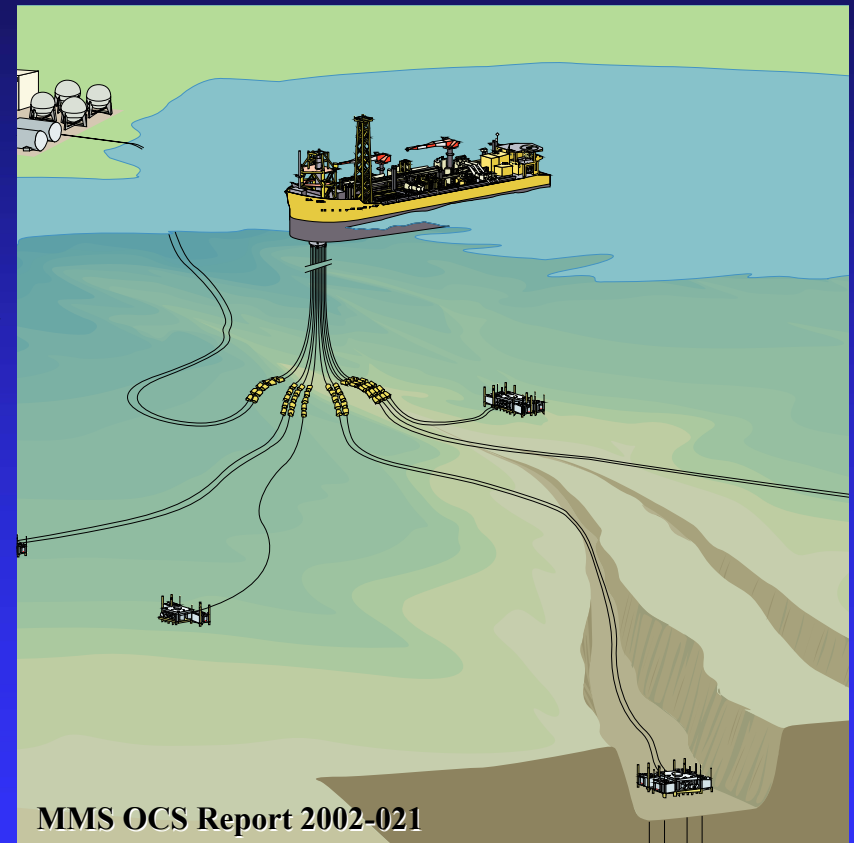
Shell E&P Company web site; 2002

Typical Deepwater Costs



Deepwater Subsea Well Systems are Expensive (cont'd)

- Drilling Costs High
- Redundancy Needed: Minimize Intervention
- Flow Assurance
- Water Column: Installation & Motion
- High Abandonment Costs



No cheap FPSOs

- GoM FPSOs Must meet 33 CFR 157
 - ◆ Double Hull and Bottom
 - ◆ Crude Oil Washing
 - ◆ Inert Gas
- Can be Foreign Flag
- But ... MMS and USCG probably will not allow entry of older FPSOs

Bluewater Offshore web site; 2002



Shuttle Vessels must meet U.S. Jones Act requirements

- U.S. Built
- U.S. Ownership
- U.S. Crewed
- USCG Certificated

- Availability of U.S. Shipyards is an Issue



Conoco Shipping web site; 2002

No “Creaming”

- MMS Requires Conservation of Resources
- Will Not Allow Abandonment After taking the “Easy to Get” Oil
- MMS Requires Full Economic Recovery
- MMS Definition of “Economic” may be Different than Operators Definition
- High Relocation Costs

Produced Gas Disposition

- No Operational Flaring in GoM!
- MMS (at present) would require plan for produced gas development
- Produced Gas may be Reinjecte
 - ◆ But ... Firm Plan to Produce Gas to Market
 - ◆ And ... Ability to Follow Through Regardless of Economics
 - ◆ High Compression Pressures could Cause Increased Risks

Produced Gas Disposition (cont'd)

- Offshore Liquefaction or Compression possible, but currently probably not economic
 - ◆ Must meet USCG Requirements
 - ◆ Gas / Liquids Shuttle Vessel would also Need to meet Jones Act Requirements
 - ◆ Probably would require EIS
- Imported LNG may hold Down Market Value

Produced Gas Disposition (cont'd)

- Integrated and Independent Oil & Gas Companies may come to Different Development System Conclusion!
 - ◆ May Depend on Interest in Oil Pipeline or Shuttle Vessel ownership
 - ◆ Value of Providing Fixed Deepwater Pipeline Infrastructure

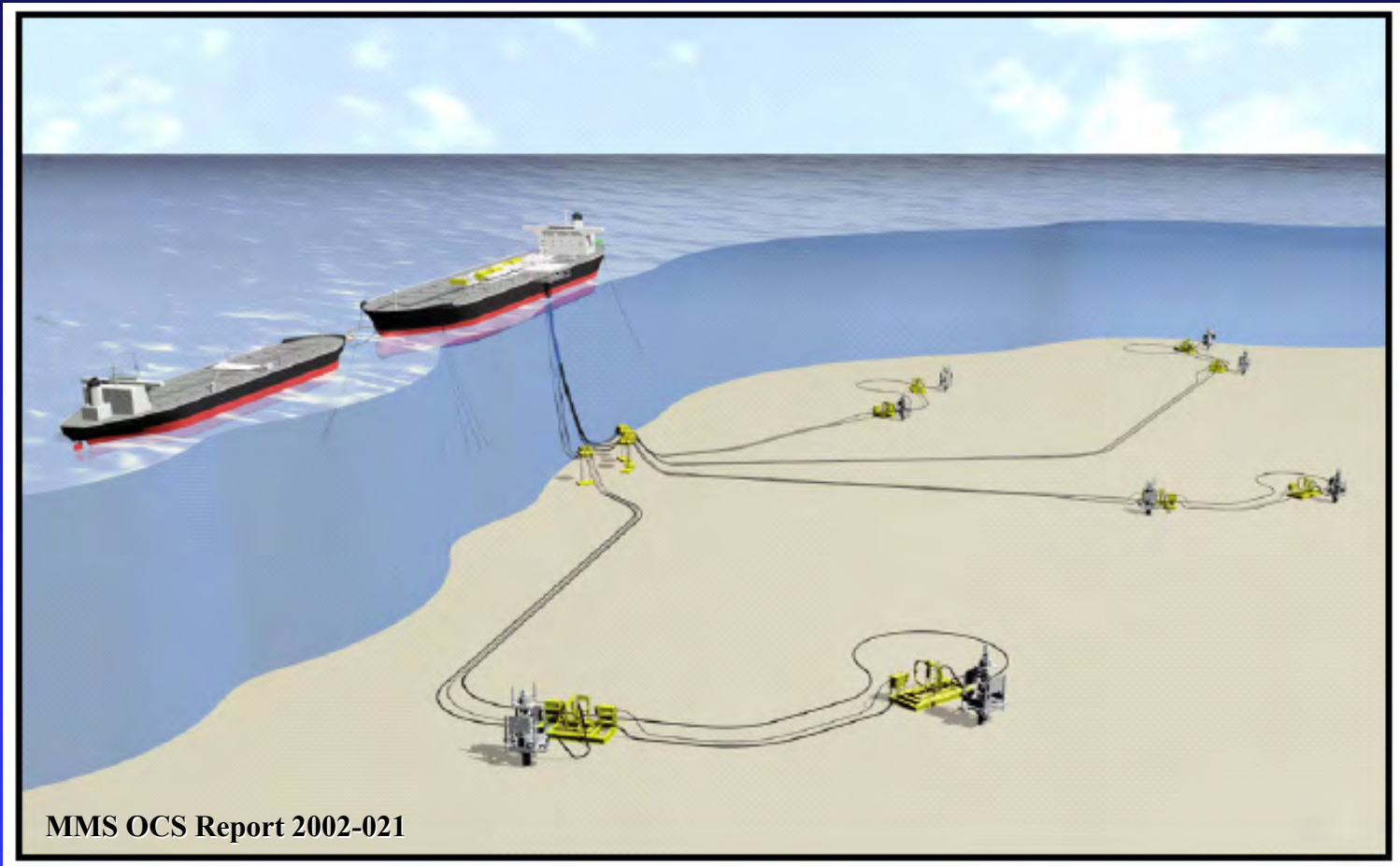
What's Going to Drive Implementation

- The Right GoM Discovery: Location and Reserves
- Reservoir Uncertainty: Risk Mitigation
- Operator Specific Decision Criteria, e.g., Financial or Value-Chain Focus
- Crude Type and Access to Refinery Markets

Other Enablers

- MMS Acceptance of Long Term Produced Gas Injection
- Economic Gas Liquefaction / Compressed Gas Options
- Project Synergy: Creation of Mature Shuttle Tanker Fleet

Questions???



MMS OCS Report 2002-021