Next Round of Deepwater Challenges

Jim Maher
Frontiers of Engineering
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Brief Tribute to Mohole Project – 50th Anniversary

- CUSS I
- Set Pace for Deepwater Drilling to Present Day
- Drilled in 13,000’ WD in 1961
- Heave compensation
- Dynamically Positioned
“CUSS 1’s drilling has about the same emphasis as Columbus’ first feeble voyage of discovery: on this first touching of a new world the way to discovery lies open”

– John Steinbeck
Changes in the Deepwater Business

• More Comprehensive Safety Standards
  – Additional levels of redundancy may be required

• New Technical Drivers
  – Higher Pressure Regimes
  – More Complex Reservoirs

• Changes in Appraisal
  – Less information available prior to making project decisions
Containment System Overview
Blow-Out Preventers
Surface Drilling Safety Joint
Industry Project
Significant Experience in Shallow Water
New Deepwater Frontier – Deeper and Deeper

Deepwater New Frontier
Is the Salt Winning?
Deepwater Appraisal Sequence (Traditional)

$150-200+ \text{ mm per well} = $600-800 \text{ mm}

$100 \text{ mm flow test}

4-6 years to development decision

9-10 years to first oil
New Fields More Complex – Need to Make Decisions Based on Limited Data
Traditional Appraisal Has Not Been Successful

Reserve vs Production Variance Model
Understanding Reservoirs Prior to Production Is Difficult – Learn Much After Production Data Available
Future of Deepwater

• We need to handle new technical complexity
• Regain trust through safety standards
• Address appraisal challenges and reservoir complexity