Outline

- Risk Mitigation
- Commence Additional Deepwater Operation in the GOM
- Brief Overview of Different Drilling Operations
  - Exploration Drilling
  - Appraisal / Sidetrack / Development Drilling
- Risk Mitigation Tactics
- Recommendations
Definition of Risk

- Hazard: A Source of Danger; a Possibility of Incurring Loss or Misfortune
- A Venture Undertaken without Regard to Possible Loss or Injury
- Expose to a Chance of Loss or Damage
Treatment of Risk

- **Avoidance** - A Decision to Not Become Involved In, or Action to Withdraw from, a Risk Situation
- **Optimization** - A Process to Minimize the Negative and to Maximize the Positive Consequences and their Respective Probabilities of Occurrence
- **Transfer** - Sharing with Another Party the Burden of Loss or the Benefit of Gain, from a Risk, and the Measures to Reduce the Risk
- **Retention** - The Acceptance of the Burden of Loss, or Benefit of Gain, from a Risk
Failure to Manage Risk

- The Risk will Manage Us

- Unintended Consequences
  - Loss of Jobs
  - Loss of Domestic Production
  - Loss of Royalties for Federal, State and Local Governments
  - Loss of Allocation of Resources from Operators

- The Goal Should be to Determine an Appropriate Level of Risk Acceptance and then Design Mitigation and Management Plans, Procedures, and Equipment for the Risk
Deepwater Operations Not Affected by the Moratorium

- Intervention or Relief Wells for Emergency Purposes, Including the Two Relief Wells Related to the Ongoing Deepwater Horizon Incident

- Operations that are Necessary to Sustain Reservoir Pressure from Production Wells

- Workover Operations

- Waterflood, Gas Injections, or Disposal Wells

- Drilling Operations or Other Activities that are Necessary to Safely Close or Abandon a Well, or to Accomplish Well Completion Operations
Varying Risk for Different Deepwater Operations

- **Deepwater Exploration Wells**
  - Well designs are characterized by seismic and other geophysical models
  - Reservoir pressure and hydrocarbon composition are estimated from analogous reservoirs
  - The range of uncertainty is only as good as the model calibration

- **Deepwater Appraisal and Development Wells**
  - Includes sidetracks, development and production wells
  - Well designs are characterized by actual data acquired during exploration drilling
  - Reservoir pressures and hydrocarbon composition are known from sampling
  - Real time drilling data is used to calibrate seismic models, reducing uncertainty
What Have We Learned?

- Do We have Enough Information to Commence Additional Deepwater Operations from:
  - Information learned from testimony and investigation of the Deepwater Horizon events to date
  - Added safety measures required in NTL 2010 - 05 and 06
  - A culture that emphasizes safety 24 hours a day, 7 days a week, 365 days a year
  - Rigorous BOEM rig inspections
  - Third party reviews of well design
  - Internal reviews of Company deepwater operations

- Higher Risk Operations May be Evaluated on a Well-by-Well Basis Pending the Findings of the Presidential Commission
  - Exploration wells to previously un-drilled reservoirs
  - High pressure and high temperature wells
  - Well interventions or well deepening to un-drilled reservoirs
Drilling and Completions Risk Workflow

1. Define project scope, and decide how to manage risk.
2. Identify a list of threats that can jeopardize the delivery of your project objectives.
3. Agree on the likely consequences and probability of occurrence of each risk and derive a risk rating.
4. Plan actions to mitigate.
5. Execute Risk plans. Validate and follow through on actions to safeguard risk.
6. Capture learning’s, and share what happened, what worked, and what went wrong.

Define project scope, and decide how to manage risk
Drilling and Completions Risk Workflow

- What is the Impact?
- What is the Probability?
- Control, Influence, React?

Agree on the likely consequences and probability of occurrence of each risk and derive a risk rating.

Plan actions to mitigate.

Execute Risk plans.
Tools - Lessons Learned - AAR

Validate and follow through on actions to safeguard risk.

Capture learning's, and share what happened, what worked, and what went wrong.

RISK - Management Tools for Mitigation
- “Stop Work” Authority
- Job Risk Analysis (JRAs)
- Standard Operating Procedures (SOPs)
- Pre-Start-Up (PSU) Review
- Permits For Work
  - Hot Work
  - Confined Space Entry
  - Trenching & Excavation
- Lock Out / Tag Out
- Management Of Change (MOCs)
- H2S / LEL Management

Expanded Detail Risk/ Mitigation
Other Risk Mitigation Tactics

- EHS Management Systems
- Drill Well on Paper
- Operator - Contractor EHS and Safety / Design Engineering Partnerships
- International Association of Drilling Contractors (IADC) Safety Case
- Third Party Engineering Review and Certification of Well Design
Time is of the Essence

- Rigs and Service Companies have been Idle for Over Three Months

- GOM Operators are Currently Planning 2011 and 2012 Capital Expenditures
  - The moratorium and changing regulatory environment raise uncertainty in GOM investments
  - Current decisions to re-deploy capital, personnel and equipment are under consideration

- Rigs and Service Companies have Started to Leave the GOM
  - Contractors are actively seeking multi-year contracts for equipment and services

- GOM Production will Continue to Decline as a Result of the Moratorium
  - Deepwater projects can take 3-5 years before first production is realized
Recommendations

- Follow Newly Established Practices Outlined by the BOEM
- Uphold Standard Regulations and Industry Best Practices
- Commence Additional Deepwater Operations to Include:
  - Appraisal, Development and Production wells with known reservoir characteristics
- Evaluation of Higher Risk Operations on a Well-by-Well Basis Pending the Findings of the Presidential Commission