



A View from the Upstream



Focus on the Upstream

Upstream risks we are accustomed to:

- **Geologic**
- **Exploratory**
- **Development**
- **Production**
 - **Timing manageable & within control of producers**
 - **Established permitting parameter**
 - **Definable economics**



Focus on the Upstream

Keys to success: floater technology

- Pipeline technology has kept pace -- but to what depths?
- Risks immediately transferred to known downstream pipeline infrastructure & market participants
- Newer pipeline models (Cameron Highway) addressing market optionality



Impacts on the Upstream

First FPSO - new determinations for producers to quantify

Main Issues:

- **Regulatory**
- **Emergency Response**
- **Manning**
- **Commercial**



Impacts on the Upstream

Regulatory

- **MMS/USCG design review & approval process**
- **Standards & guidelines for operations, manning/ qualifications & emergency response**
- **Oil spill response & financial responsibility**
- **Performance expectations for varying classes of shuttles: ATB's, purpose-built Jones Act shuttles, existing vessels**
- **Guidelines for interaction between FPSO & shuttle**



Impacts on the Upstream

Current Facility Requirements

Will they grow for FPSO/FSO?

Oil Pollution Act of 1990

“Worst Case Scenario” for Oil Discharge

1,000 - 35,000 bbls	\$35 mm
35,000 - 70,000 bbls	\$70 mm
70,000 - 105,000 bbls	\$105 mm
>105,000 bbls	\$150 mm

Certification: *(Insurance not an option)*

Surety Bond

Financials

Letter of Credit



Impacts on the Upstream

- **Oil Spill Response Readiness**
- **Pre-position spill equipment**
 - Dispersant Application Capability
 - Attendant Vessels
 - Planning -- Who's guidelines prevail MMS/USCG?
 - What rules apply if both FPSO & shuttle tanker collide/spill?
 - Financial responsibility -- MMS/USCG
- **Manning**
 - Marine crew vs. industrial
 - During hurricanes
- **Security**



Impacts on the Upstream

Commercial

Gas Solution

- Re-injection without commitment to produce or flaring disallowed
- Shelf infrastructure looking to attract deepwater for continued viability



FPSO

Commercial

- **May address concerns when considering ultra-deep pipeline**
 - Remoteness
 - Topography
 - Flow assurance/reserve recovery
 - Cost of pipeline technology
 - SCR/Risers -- payload, motion, stress requirements
- **Boutique opportunity**
 - Key will be to capture optionality premium
 - For quality of crudes not lending itself to blending
 - Limitations on quality banks -- too much value lost
 - Customize crude to particular market/refiner



FPSO/FSO

They are in our future

- **Technology advances closing the gap**
 - **Cost competitive with other floaters**
 - **Economies of scale for smaller & scattered field developments**
 - **North Sea/world experiences are transferable**
- **Floater advances in the upstream translate to:**
 - **Better**
 - **Faster**
 - **Cheaper**
- **Who will be first?**



FPSO/FSO

They are in our future

- **Overriding Issue: Industry Perception**
- **Existing technology applied in a new theater**
- **Cost growth & schedule slip being addressed**
- **Another floater as a weapon in our arsenal against the deepwater**

