

An aerial photograph of a large FPSO (Floating Production Storage and Offloading) vessel at sea. The ship is yellow and white, with a complex structure of pipes and equipment. A helicopter landing pad is visible on the deck. The water is a light blue-grey color.

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**GoM's Top Three Priorities for Best Practices
in FPSO Design, Operation, Safety and
Regulatory Approval**

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ABS**

GOM Status of FPSO's

An aerial photograph of a large FPSO (Floating Production Storage and Offloading) vessel at sea. The vessel is a ship-shaped double hull with a complex deck structure, including a large yellow crane at the front and a green helipad at the rear. The water is dark blue with some whitecaps.

- Record of Decision
 - Base Case:
 - Purpose-built, ship-shaped double hull
 - Internal, Turret Mooring
 - 1 million barrels storage capacity
 - Ten 100,000 bbl storage tanks

FPSO:

A floating offshore installation (FOI) like we now have in the Gulf - *that happens to store and offload oil*



Considerations Affecting the Design of an FPSO

An aerial photograph of a Floating Production Storage and Offloading (FPSO) vessel. The vessel is a large, yellow and white ship with a complex structure of pipes, tanks, and cranes. A prominent feature is a green helipad with a yellow landing circle on the deck. The vessel is positioned in the open ocean, with a clear blue sky and calm water.

- Field requirements
 - Life, environment, reservoir
- Regulatory requirements
- Hull size and form
 - Motions
 - Structural design (strength & fatigue)
- Mooring requirements
 - Turret, spread, compliant
 - Passes, pressures
- Production demands
 - Plant type, size & capacity
 - Oil storage
- Marine installation
- On-site serviceability

GOM Priorities

An aerial photograph of a large offshore supply vessel, likely a T-ESV, sailing on the open sea. The vessel is dark-colored with yellow and white structures on deck. A prominent feature is a green helipad with a yellow landing circle and a white crosshair in the center, located on the deck towards the stern. The vessel has a complex arrangement of pipes, cranes, and other industrial equipment. The background shows a vast expanse of blue water under a clear sky.

1. Regulators

2. Risk

3. Operation

GOM Priorities - Regulatory

- *A key factor will be early involvement and understanding by all parties*
 - USCG
 - MMS
 - Class
 - CVA
 - New and Novel systems - kick off meeting
 - Roles of USCG/MMS
 - USCG/MMS MOU



GOM Priorities - Regulatory

The background of the slide is a faded, high-angle photograph of an offshore oil rig. The rig is a complex structure with various levels, cranes, and a prominent yellow tower. It is situated in the middle of a grey, choppy sea. The overall image has a light, semi-transparent appearance, allowing the text to be clearly visible.

- *Roles and boundaries of the various organizations*
 - USCG
 - Hull, Mooring, Safety features
 - MMS
 - Production Facilities, Hull, Mooring, Risers
 - CVA
 - Hull, Mooring system, Riser
 - Class
 - Hull, Mooring system

GOM Priorities - Risk

- *The FPSO should have an equal or lesser risk profile compared to existing GOM FOIs*
 - Risk = likelihood and consequence
 - Risk metrics:
 - Life safety
 - Environmental
 - Financial
 - MMS /OTRC Risk Study demonstrated that equivalency can be achieved

GOM Priorities - Risk

- *Risk challenges for the GOM FPSO*
 - Life safety
 - no FPSO operating experience in GOM
 - evacuation in advance of hurricanes???
 - Environmental
 - stored oil
 - shuttle tankers vs. pipeline
 - Financial
 - innovative facility - downtime???
 - handling gas

GOM Priorities - Risk

An aerial photograph of a large offshore oil rig, likely a jack-up rig, positioned in the middle of the ocean. The rig is a complex of yellow and white metal structures, including a tall derrick and various platforms. A prominent feature is a green helipad with a yellow landing circle and a white crosshair, located on the deck towards the stern. The water is a deep blue-grey, and the sky is overcast and grey.

- *And, in our changed world, we must also now deal with security risk*

GOM Priorities - Integrity

- *Advanced concepts for integrity management will minimize risk and business interruption*
 - Build-in inspectability and maintenance capabilities up-front
 - Risk Based Inspection - focus inspection resources where they make the most sense
 - Coatings - cargo tanks and ballast tanks
 - State of the art NDE

GOM Priorities - Integrity

- *Much like a ship, the integrity of the FPSO must be planned in advance and maintained throughout the full lifecycle*
 - Need for much greater lifecycle focus than historically with GOM fixed based and FOIs
 - On site for design period (15 plus years)
 - Three key areas:
 - Structure - hull, turret, mooring lines, process deck
 - Marine systems - ballast, cargo, emergency systems
 - Production systems

Case Experience

- Synthetic moorings
- Schedule impact in not teaming designers, fabricators, regulators
- FPSO's worldwide



Pending Point to Ponder



- Non-ship-shaped FPSOs (e.g., storage spars)
- Will we be able to count on the “tanker” and existing FPSO experience for these types of facilities???

Summary

- GOM FPSO priorities
 - Regulators - *early involvement*
 - Risk - *balance risks to that of existing FOI*
 - Integrity - *plan up-front for the lifecycle*

