Ultra-Deepwater Appraisal Production System (APS)

Converted 6th Gen MODU with 15k Dry Tree Tiebacks – 5 Wells → 40-60 MBOPD

4,000-8,000ft WD 40,000ft Drilling

Providing:

- All Existing Technology Components
- Increased Safety
- Improved Decision Quality
- Improved Well Operations
- Improved Reserves Recovery

with

- Greatly Reduced Costs & Risks
- Profitability at low oil prices

The commercial environment for ultra-DW lower tertiary E&P is in a critical state. Exploration in the play has all but stopped as expensive leases are being relinquished. Operators are struggling to find viable development scenarios for high pressure reservoirs. The cost of holding onto massive Paleogene discoveries is so high and the economic prospects so low in the current environment that **many Operators are looking to sell down or out of the deep water**.

Massive oil finds in the lower tertiary have come with greater reservoir uncertainty -

- Subsalt/Poor reservoir seismic quality
- Thick pay intervals with multiple zones
- Expensive and few appraisal wells

Little production/completion history means -

- Faulting and connectivity unknown
- Reservoir drive mechanisms unknown
- Sand control & completion uncertainty
- Intervention frequency unknown

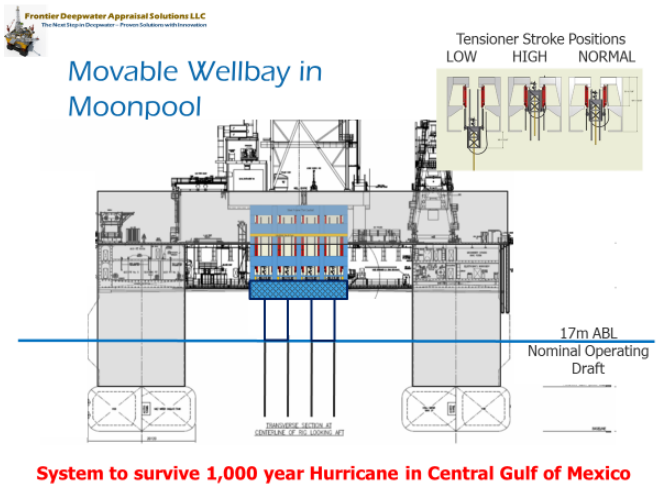
Very high drilling costs drive CAPEX -

- Wells ≥35,000' requiring >250 days
- Many require new 20K MODU (BOP, drilling riser and intervention system) with additional 20K unit as back up

Subsea development with 20k equipment and HIPPS (High Integrity Pressure Protection System) imposes long term large CAPEX and OPEX.

Lack of reservoir and completion performance information means huge, riskier bets.

Frontier Deepwater Appraisal Solutions offers a dry tree option that is commercially viable at prices below $50/bbl.



System to survive 1,000 year Hurricane in Central Gulf of Mexico

U.S. Provisional Patent Application Serial No. 62384626.

The Frontier Deepwater solution is to convert a 6th Gen semisubmersible MODU into a permanently moored production facility capable of drilling, completing, and maintaining surface (dry tree) tieback wells. Conversion includes removal of all subsea drilling equipment (e.g., marine drilling riser and subsea BOP) to **install surface drilling systems and a movable wellbay**. The movable wellbay structure supports tensioners and top-tensioned risers (TTRs), and allows individual well tiebacks to be located beneath the derrick as needed.

The tensioner sets in the movable wellbay structure allow trees to move vertically to accommodate vessel motions and wave and current action on the risers. Distributed buoyancy on the TTRs minimizes the top tension required to maintain proper riser configurations.

Conversion to surface drilling also frees up enough deck space and payload to allow installation of the facilities and export risers needed for production of 40-60,000 bopd.

The APS provides game-changing innovation while the "novelty" is minimized by using fully qualified and proven well drilling and tieback components.

A time of **excess rig supply has created an opportunity for Operators** to greatly reduce both the cost and lead time to first production at economic flow rates and reserves recovery levels from the challenging Paleogene assets. **Long term production data plus the ability to readily access and intervene in wells** allows Operators to understand the reservoirs and the complex completions needed to properly produce them – **greatly reducing the uncertainties and risks for full field development while profiting in a low oil price regime**.

While the APS has been conceived to solve the challenges facing owners of HPHT reservoirs in the US GOM, **the technology can bring great value to ultra-deep water asset holders world-wide… especially, Brazil and West Africa**.

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