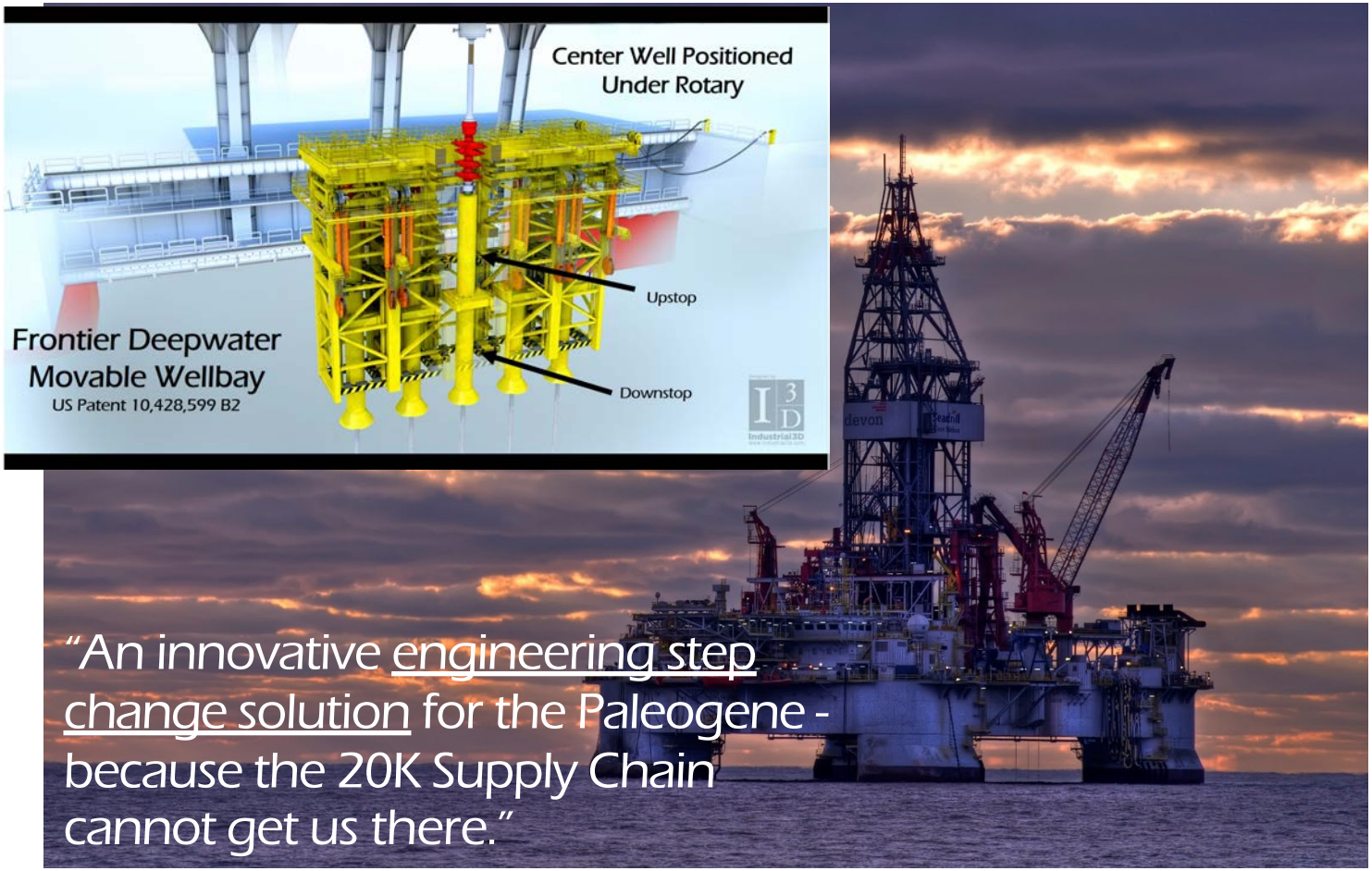
Frontier Deepwater Appraisal Solutions LLC
The Next Step in Deepwater – Proven Solutions with Innovation

How to Profitably Exploit GoM's Lower Tertiary

STONES Field CASE STUDY



Providing:

- Increased Safety
- Improved Decision Quality
- Improved Well Operations
- Improved Reserves Recovery

with

- Existing Technology Components, and
- Greatly Reduced Costs and Risks

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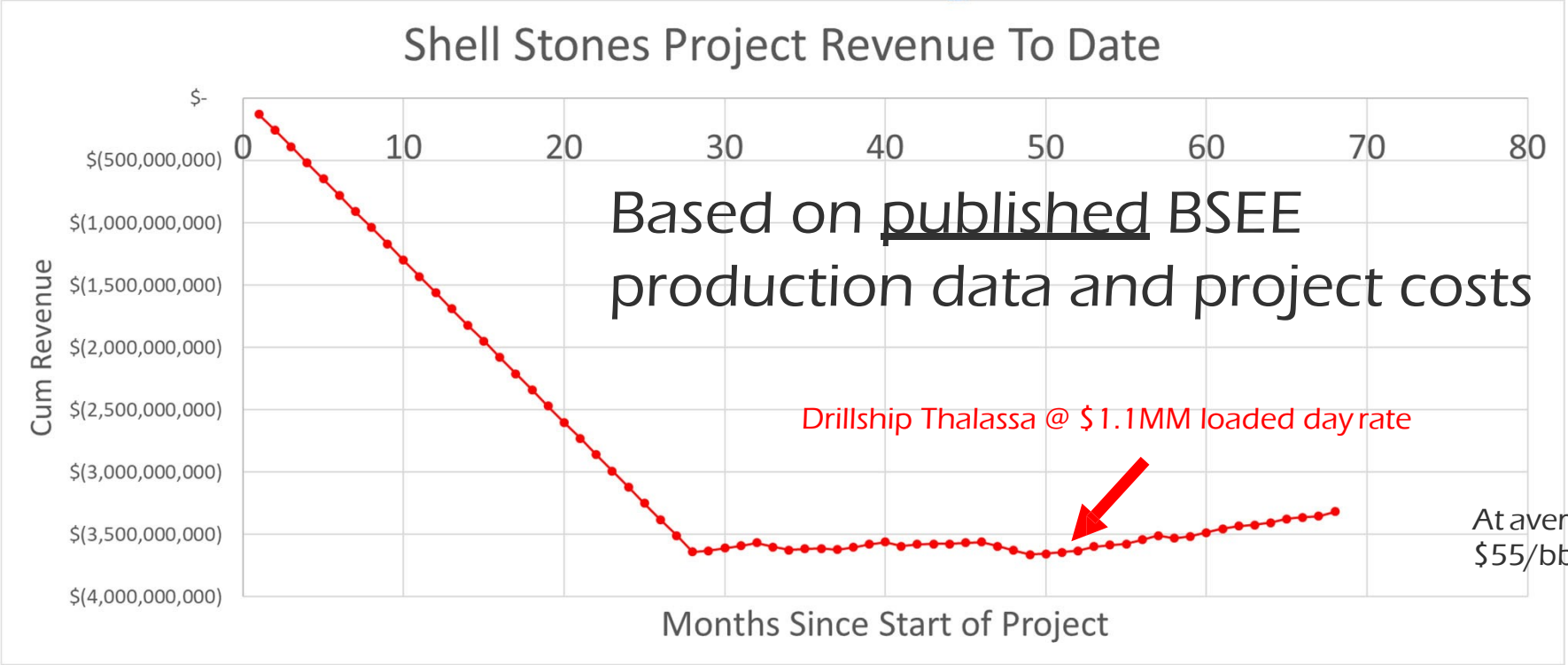
Frontier Deepwater's Wellhead Platform Creates Value for ultra-DW Fields

- Problem: The STONES field is losing billions of dollars

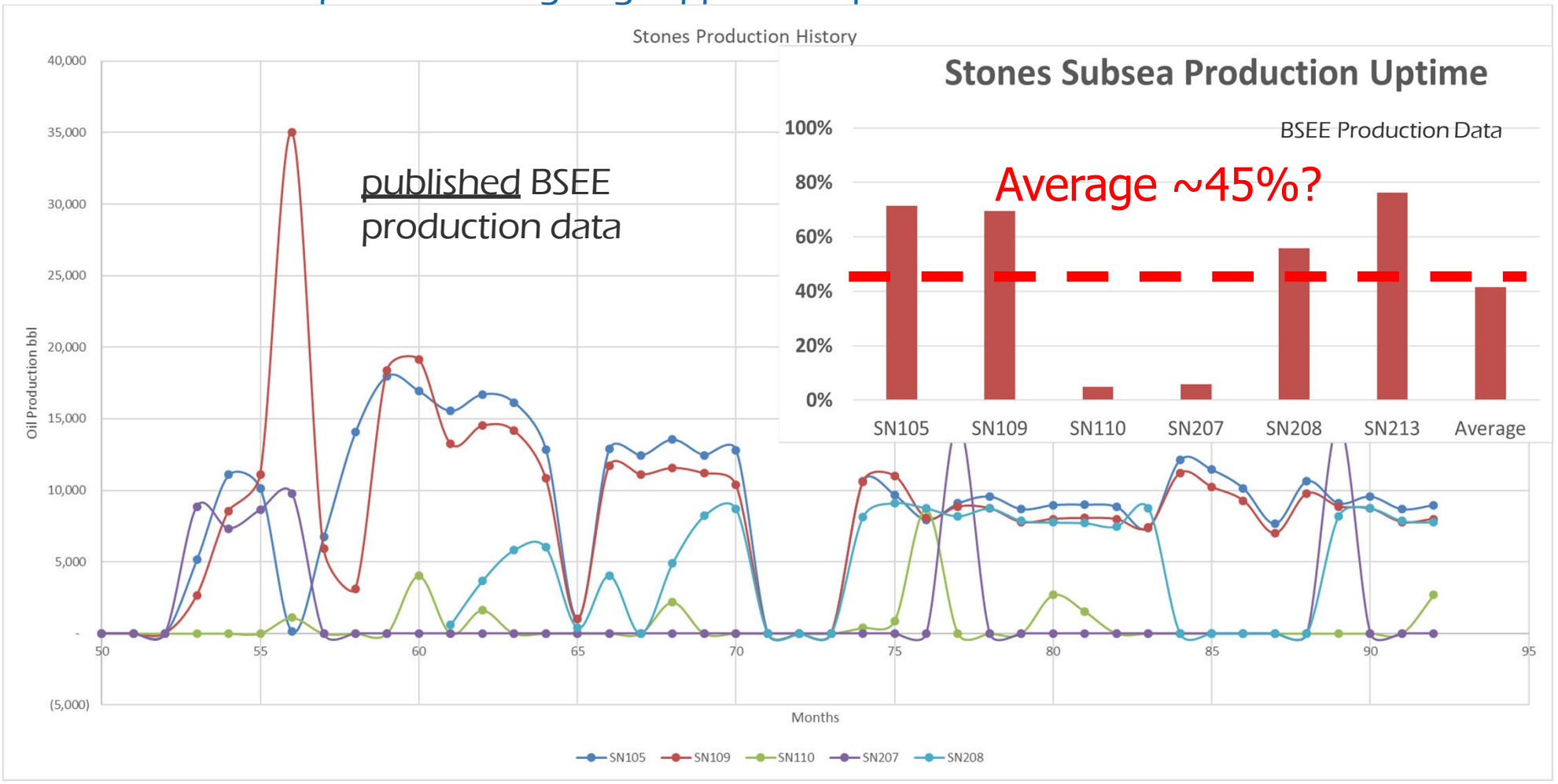


- STONES field was brought onstream in 2016…11 years after discovery in 2005
  - Reserves are estimated at ~2bn boe estimated over 8 blocks
  - Phase 1 was sanctioned in 2013 when oil & gas prices were very high
  - SHELL has invested billions into STONES including 15 subsea wellbores plus sidetracks

Stones Subsea Infrastructure Performing Poorly

STONES' subsea well production and uptime is disappointing

- Well completions are performing poorly
- Large number of sidetracks and interventions costly @ $1.1MM per day
- Subsea system uptime appears poor
- DP Drillship Thalassa ongoing support cost prohibitive



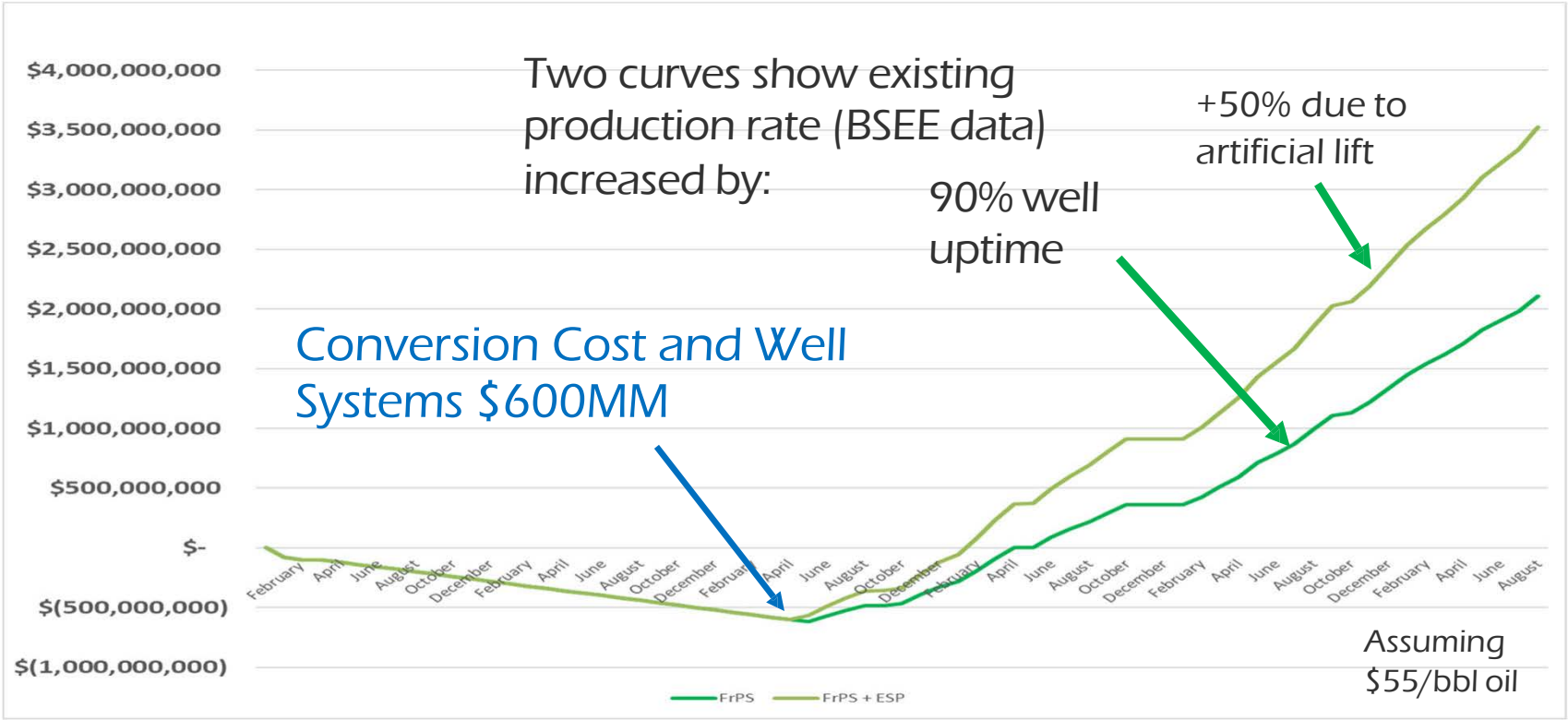
Frontier's PROPOSAL for the STONES Field

Time to Change the Game

Shell GameChanger

Solution: Install Frontier FrPS Wellhead Platform(s)

- Convert 6th generation semisub MODU with 5-slot movable wellbay
  - Direct drilling/completion and vertical access for simplified well construction & completions
  - Direct access to downhole ESP's and/or seabed lift systems
- Sending produced fluids to FPSO limits topsides kit on the Wellhead Platform
- Use existing wellheads and wellbores to tieback dual barrier dry tree risers



Bringing Real Value to STONES - RESULTS summary

- Installing 1st converted FrPS Wellhead Platform as STONES Phase 1+ with production flowing to Turritella will stop the "bleeding" in ~3yrs
- Phase 1+ proves concept viability for full field development at<$50/bbl
- The Phase 1+ investment turns the field profitable within 5yrs of operation
- The Phase 1+ investment provides a positive NPV within 8yrs of sanction – even if production is limited to 50,000bopd
  - Downhole lift of fluids may increase output and profitability...
    IF the FPSO can be de-bottlenecked

Artificial Lift & direct access increase ultimate recovery

As is, STONES will always have negative NPV

SUBSEA

~45% uptime

But,

DRY TREE

90% uptime

STONES could be a $bn NPV winner with Dry Trees & ESPs

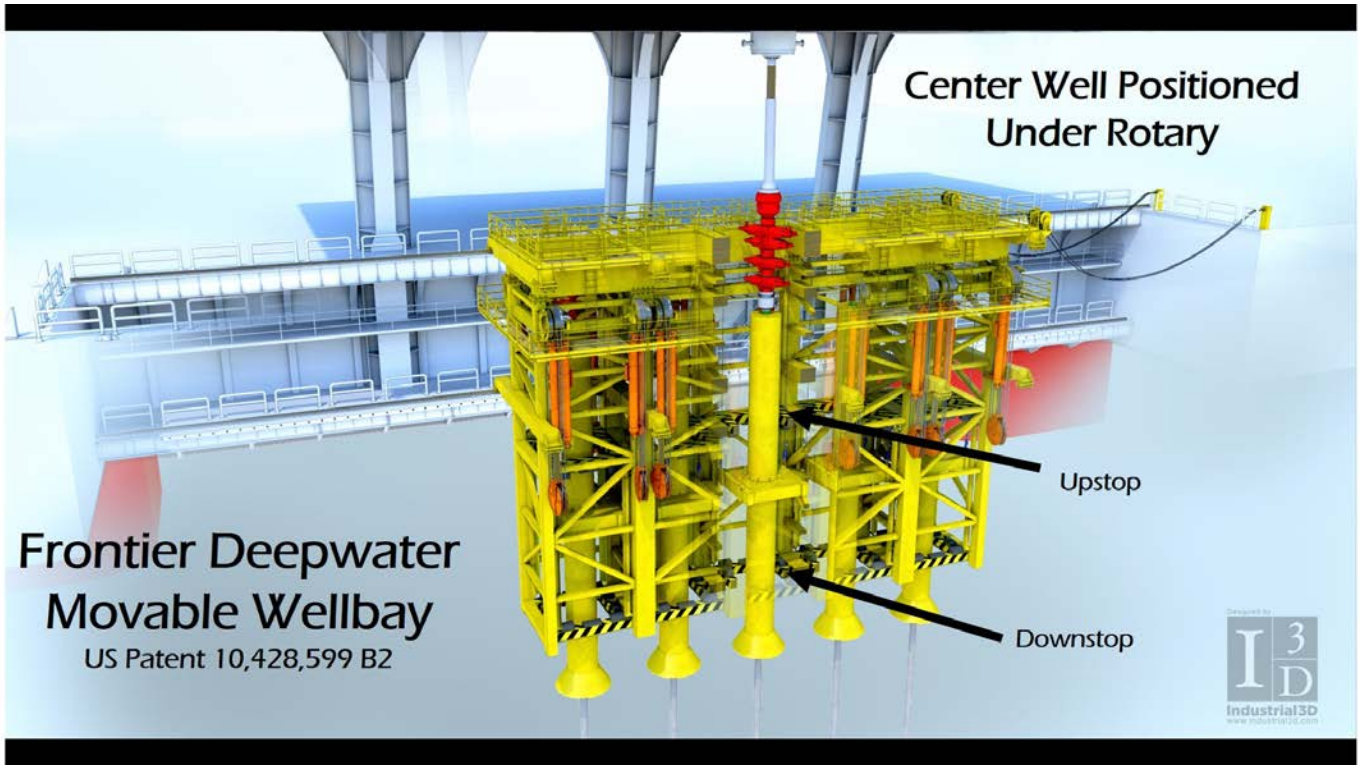
DRY TREES

+ Artificial Lift

Let's Change the Game and Win!

Next Steps (with Shell and their preferred Contractors*)

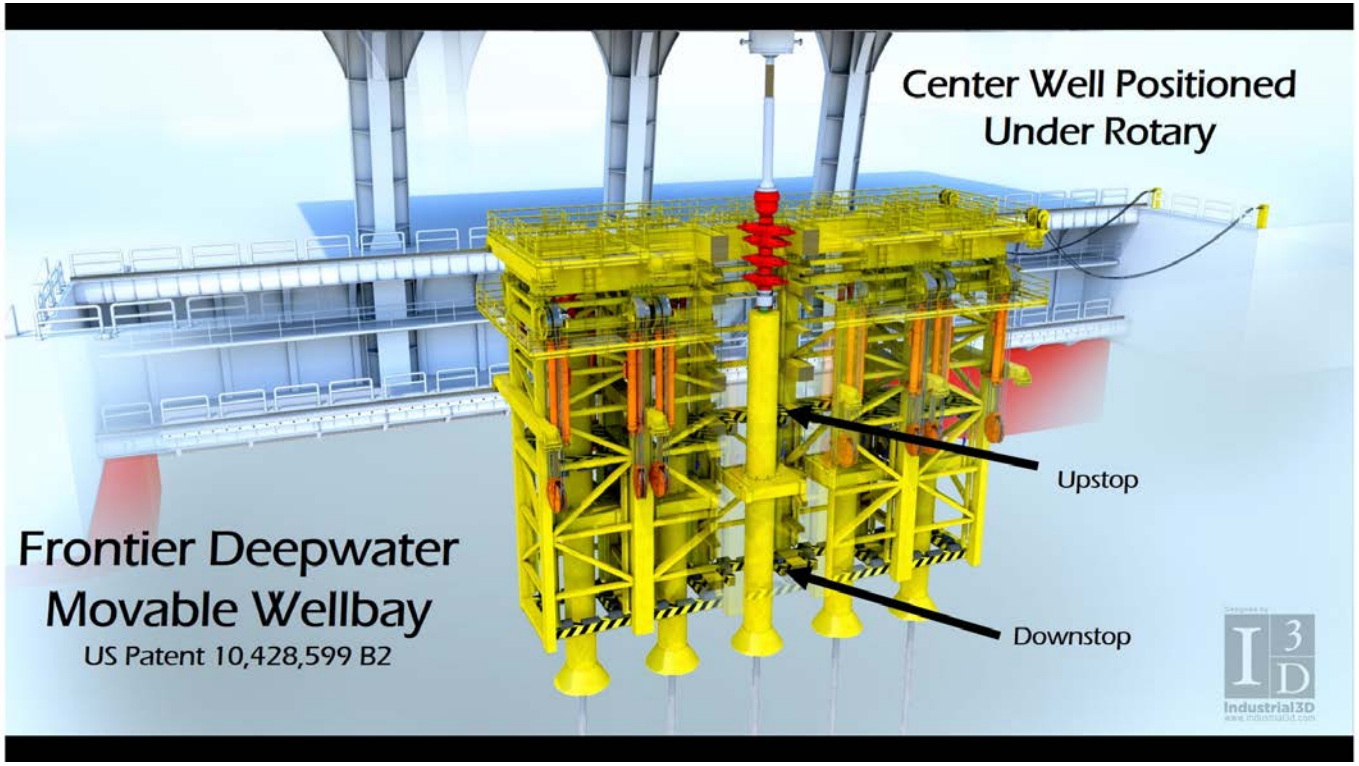
- 6th Gen MODU Conversion Study
- Stones Movable Wellbay Preliminary Design
- Dual Barrier Top Tension Riser System Design
- FPSO Transfer Line Design and Flow Assurance



* Frontier has proposals from Dril-Quip, Schlumberger and Transocean

KEY REFERENCE SLIDES

MOVABLE WELLBAY for STONES



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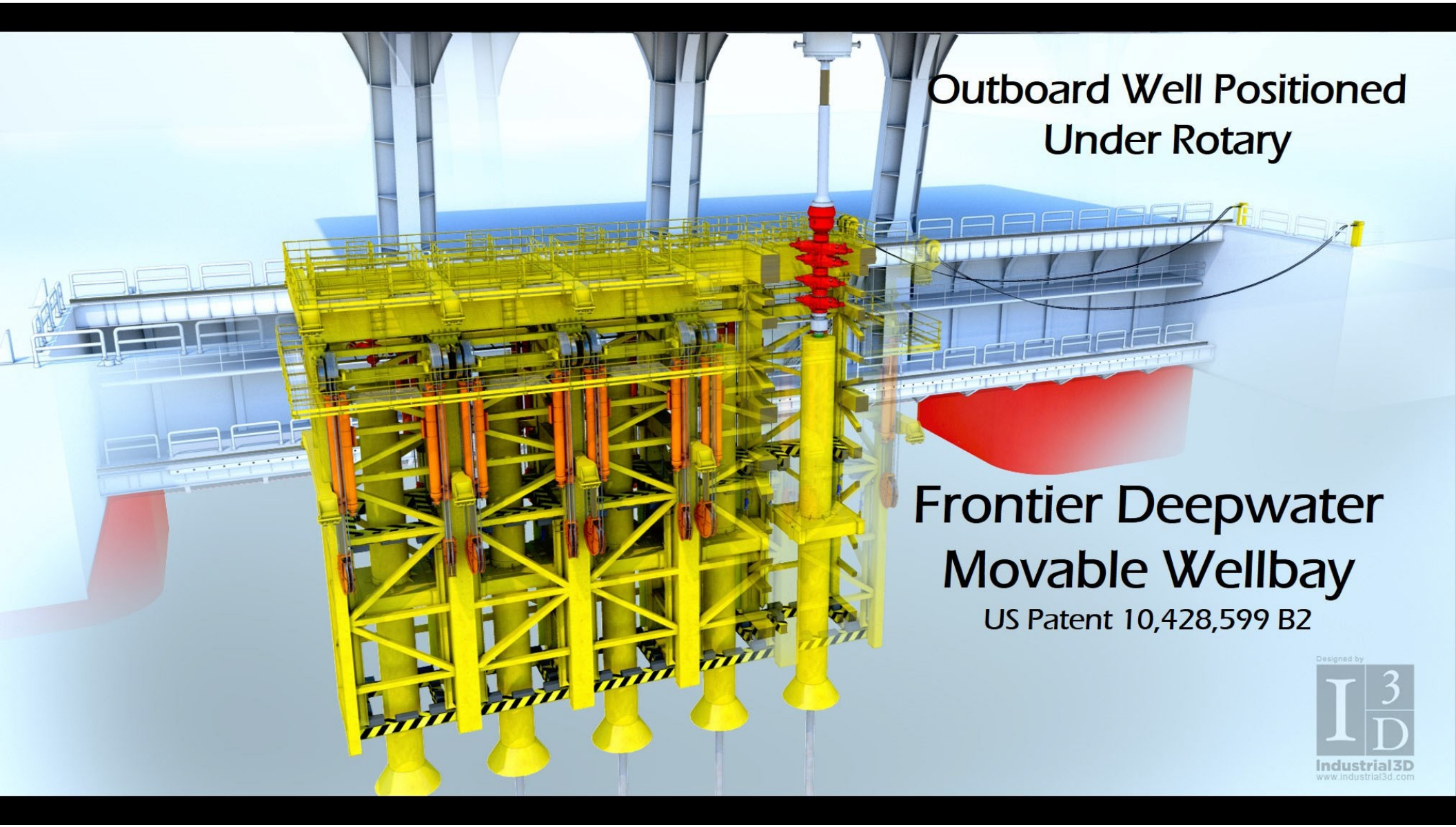
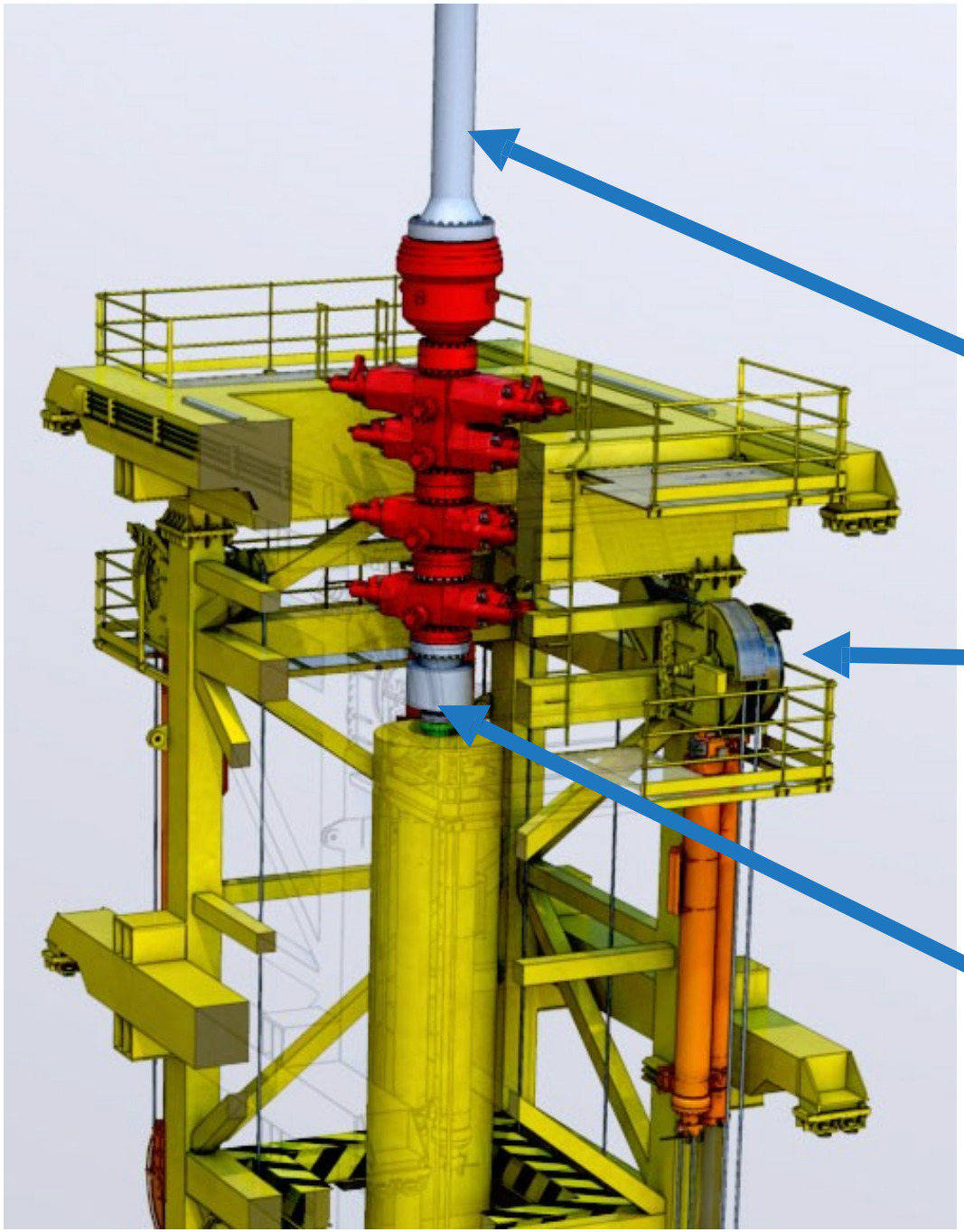
Frontier Movable Wellbay





Frontier Deepwater Movable Wellbay

US Patent 10,428,599 B2

Telescopic joint connected during 100 year winter storm, then removed when platform is abandoned for Hurricanes.

Riser Tensioner (1 of 4 per slot)

Surface Wellhead landed on Tension Joint. Riser is centralized inside tension joint.

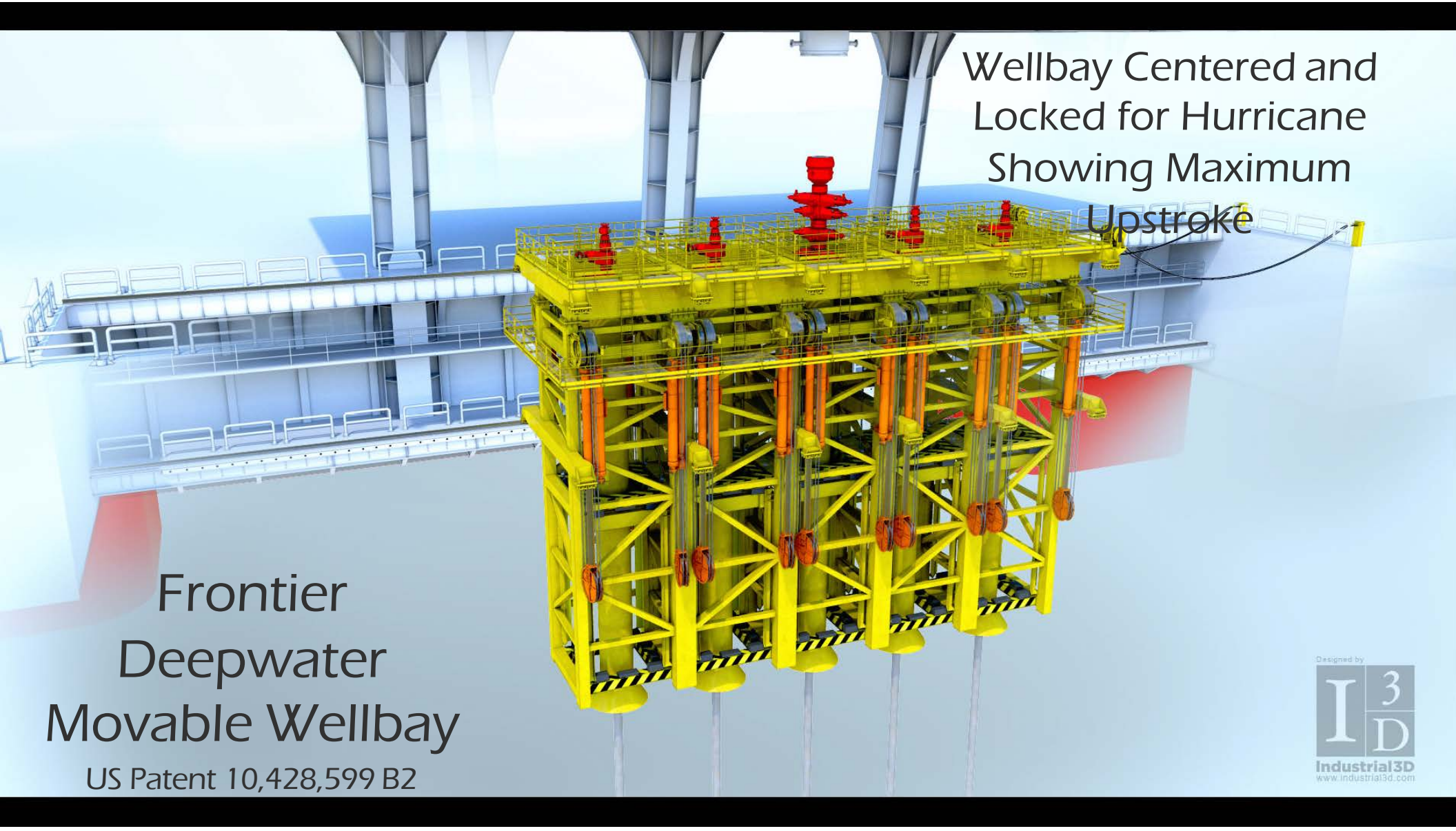
Frontier Deepwater Movable Wellbay

US Patent 10,428,599 B2

"Tension Ring" showing wireline riser tensioner connections

UHMW Wear Strips with very low coefficient of friction allowing the tension ring to slide up and down inside the frame.

Soft and Hard Rubber Pads to Allow the Tension Ring to land out on the up and down stop with minimum impact loads



Well Systems – proven technology

OMAE2010-20904

Drilling Riser

	Outer Riser	
OD	21	in
Wall Thickness	0.8	in
ID	19.4	in
Cross Sectional Area	50.8	in2
Weight per Foot	181.4	lbs/ft
Material	Q-125	
Buoyancy OD	54	in
Buoyancy Length per Joint	60	ft
Number of Buoyed Joints	80	

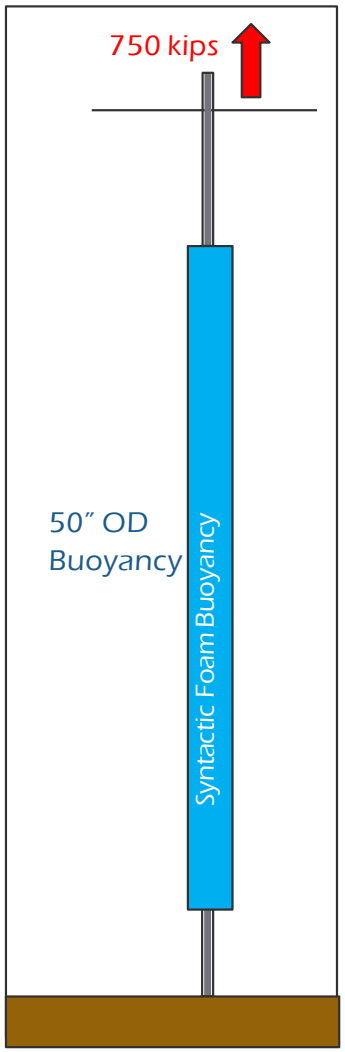
Production Riser

	Outer Riser	Inner Riser	
OD	16	11.75	in
Wall Thickness	0.75	0.65	in
ID	14.5	10.45	in
Cross Sectional Area	35.9	22.7	in2
Weight per Foot	128.4	81.0	lbs/ft
Material	Q-125	Q-125	
Buoyancy OD	50		in
Buoyancy Length per Joint	60		ft
Number of Buoyed Joints	80		

DESIGN AND QUALIFICATION OF FATIGUE RESISTANT HEAVY WALL THREADED & COUPLED PREMIUM CONNECTORS FOR DRILLING AND PRODUCTION RISER APPLICATIONS IN DEEPWATER HPHT DRY TREE SYSTEMS

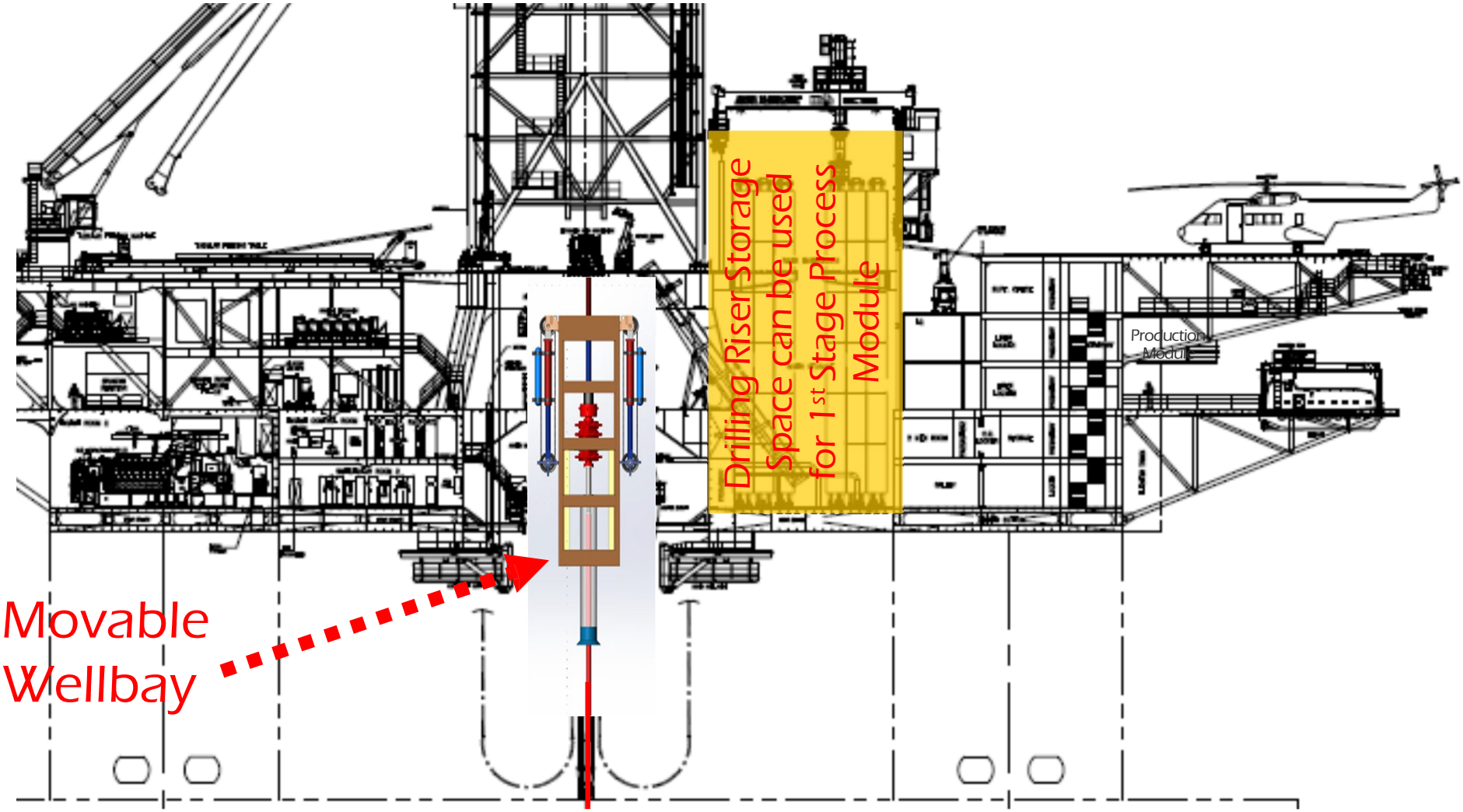
Céline Sches
V&M Tubes
Aulnoye-Aymeries, France

Roy Shilling
BP America
Houston, Texas, USA



Shipyard Modifications Required

6th Gen MODU Wellhead Platform



Production sent to FPSO for processing

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Movable Wellbay S.afety Advantages

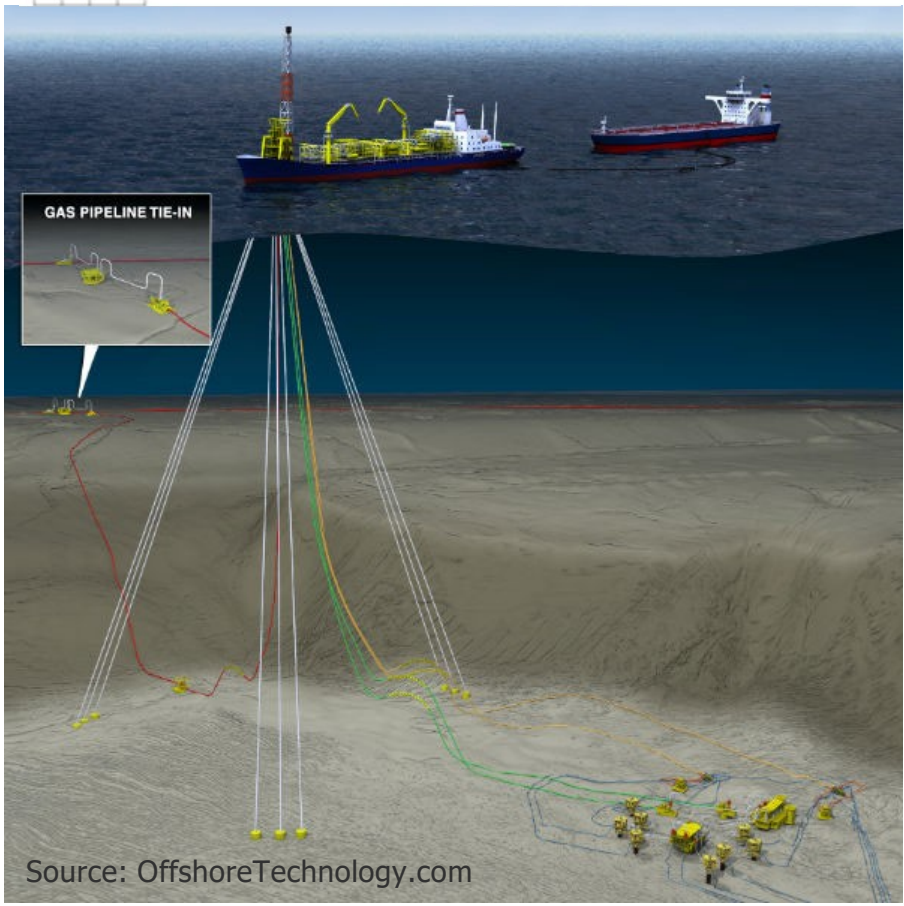
Fully rated dual barrier well systems with surface BOP

- Improved safety
- Proven technology with much lower costs
- Direct hydraulic controls provide reliable surface system for BOP and dry trees
- Equipment easily inspected and maintained
- Well control more reliable
  - Can bullhead with full pressure at the surface
  - Eliminates the Macondo analog
- Better performance downhole ESP implementation
- Historically documented 15 – 25% more oil recovered with dry trees
- Fewer vessel and manhours offshore reducing HSE exposure

STONES CASE STUDY BASIS

CONCEPT PREMISE – Use existing facilities as much as practical

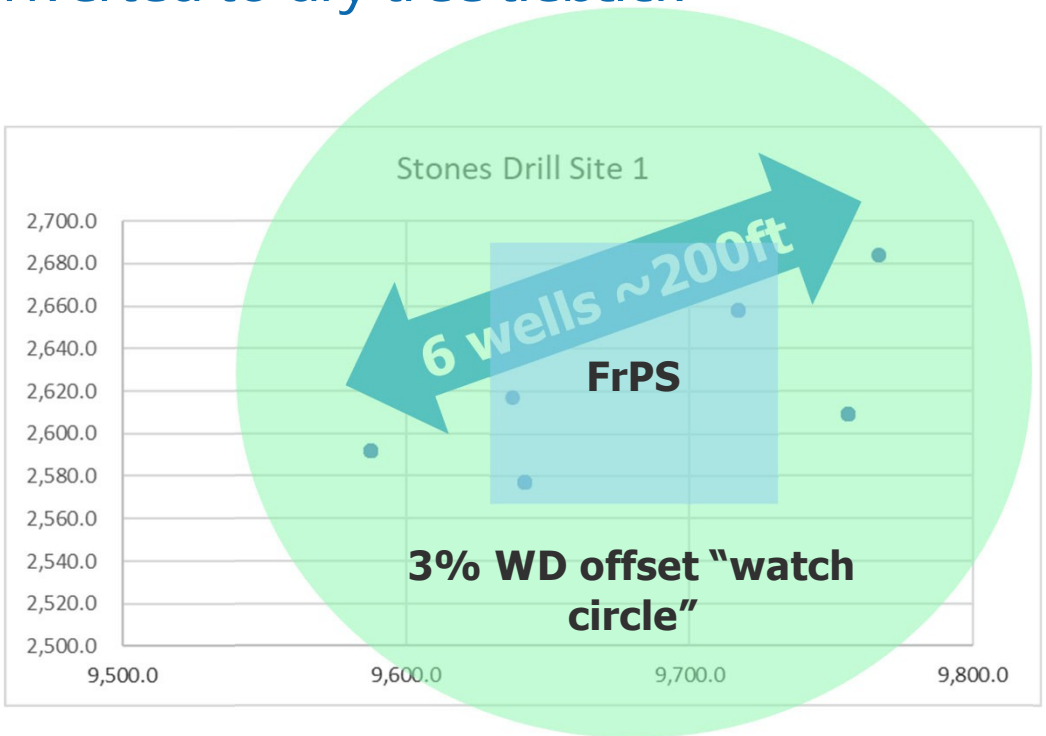
- Convert/install 1st FrPS Wellhead Platform with movable wellbay providing direct surface drilling/completion capability, but minimal topsides production kit over an existing well clusters
- Send produced fluids to Turritella FPSO for processing/export of 50,000bopd + gas
  - Use existing wellheads as much as possible
    - Add new wells when needed to replace non-performing wells
- Create and install additional FrPS Wellhead Platforms in stages as needed
  - NOTE - New wells for dry tree completion can be drilled while MODUs are being converted into FrPS



Source: OffshoreTechnology.com

Wellhead Platform can service six (6) STONES wells

- The graph below shows that a 3% "watch circle" in 9500ft WD makes 6 wells directly accessible from the permanently moored FrPS
- One slot of the 5-slot movable wellbay can be dedicated to servicing any well that is not converted to dry tree tieback



STONES well positions per BSEE coordinates data