Effects of Water Depth Workshop

BSEE
Bureau of Safety and Environmental Enforcement

Session #1
Surface Blowout Preventors and High Pressure Drilling Risers

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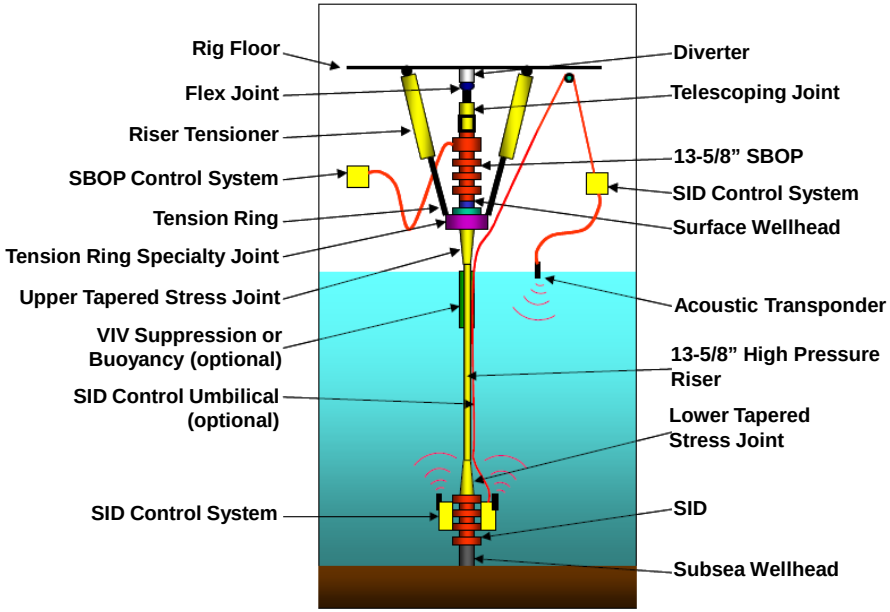
Session #1
SBOPs and High Pressure Risers

- White Paper #1 incomplete:
  - The workshop's breakout session was intended to get delegate's points included in the white paper; answering or addressing three issues prior to paper publication.



- **Is it still worth it (pros and cons)**
- **It's all about the riser**
- **Potpourri (other issues)**

Session #1
SBOPs and High Pressure Risers

- White Paper
  - Provides some background history and motivation for the trend back to the use of surface BOP hardware in floating drilling operations
  - Evolution from SX drilling from MODUs to more modern purpose built vessels like spars and TLPs
  - Trends in hardware development and operations to address vexing technical and economic issues
- There are still a lot of gaps
  - Little uniform guidance on how to design and operate safely from different vessel types – what constitutes safely?
  - Misinterpretation or ambiguity between different operators and operating theaters – not for everywhere

Session #1- SBOPs and High Pressure Risers Issue #1 – Is it still worth it?

- Basically the pro and cons already in the paper were agreed.
- Added that close wellbore spacing below Spars and TLPs (compliant towers?) lend itself to SBOP more than subsea BOP. Also standard smaller casing annular as well goes deeper helps in well clean-up
  - 25 ft spacing to 40 ft spacing depending on GL or GLL
- Is SID a BOP?
  - (no); regulations covering BOPs probably don't fit SID operations well
  - 13-14 months to get any kind of standards
  - Controls is relatively straight forward with current standards once we have established SID requirements (acoustics, ROV ops, to shear or not shear – that is question…)
- SBOP ops are best suited for Spar/TLP, not so much (if any) for MODU and exploration. Mooring and structural survivability plus a host of unknowns
  - Spars/TLPs are more for 100 yr storms than other configurations
- Everyone felt more comfortable with SBOP in shallower water than deepwater, and more benign metocean. But case-by-case may confirm exceptions to the rule

Session #1 – SBOPs and High Pressure Risers

Issue #2 – It's all about the riser

Working Stress Design (WSD)

- 67% yield – operating
- 83% yield – test or extreme load
- 12-1/2% reduction
- 5% ovality

Load Limit State

- 67% normal, 80% test/extreme, 90-100% survival
- 5% reduction
- 1% ovality

Which Design Code? Is there anything specific we can use?
Load Limit State RP 17G, WSD – API 2RD, 16Q,

And the answer is WSD approach using API 2RD.

2RD may need some additional updates to address dual riser case design (80% / 67%) and SN curves for fatigue

Should categorize as "piping" as opposed to simple casing OCTG

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Session #1 – SBOPs and High Pressure Risers

Issue #3 – Other issues

- Dual barrier is king – dual riser preferred, but SID can be considered
  - Still on the fence whether SID is a barrier or simply a belt-suspenders emergency device…
- SBOP rams – currently 3 rams + 1 annular; going to 4 rams (dual blind/shear)
  - Can't go crazy here as deck height/clearance on rigs is limited
  - Use SID when surface blind/shear inoperative – so SID may have 1-2 blind/shear…
  - No need for special circulation of kick
- MASP for riser and SBOP the same, SID may be slightly higher for high mud weight applications – but definitely no lower rating…
- Rigid lockdown for wellhead recommended (eng. judgment)
- Fatigue instrumentation – still learning, collecting metocean data and comparing to design models current for determining remaining life – other instrumentation is nice and show our conservative design and may lead to relaxation of requirements in future
- fuzzy discussion on personnel and more simulation and legacy documentation after big crew change a must
- Capping stacks may be smaller than for subsea, and deal with dual bore connections