Subsea Well Intervention

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Subsea Well Intervention

- Well Intervention Units – any non-rig BOP subsea operation that uses riser or riserless technology to conduct well work.

- Two types:
  - Intervention Riser System (IRS)
  - Subsea Intervention Lubricator (SIL)

Subsea Well Intervention

- Intervention Riser System (IRS)
  - This type of intervention unit has a surface BOP with a subsea emergency disconnect package (EDP) on top of the tree/wellhead connected via a riser.
  - The EDP is a system of valves or rams that will shear and seal the wellbore in case of a well control issue or drive/drift off of the vessel.
- Subsea Intervention Lubricator (SIL)
  - This type of intervention unit contains a workover package and wireline lubricator located on top the subsea tree/wellhead.
  - The workover package is a system of valves or rams utilized for well control purposes, but the package will shear and seal the wellbore in case of a well control issue or drive/drift off of the vessel.

Subsea Intervention Units

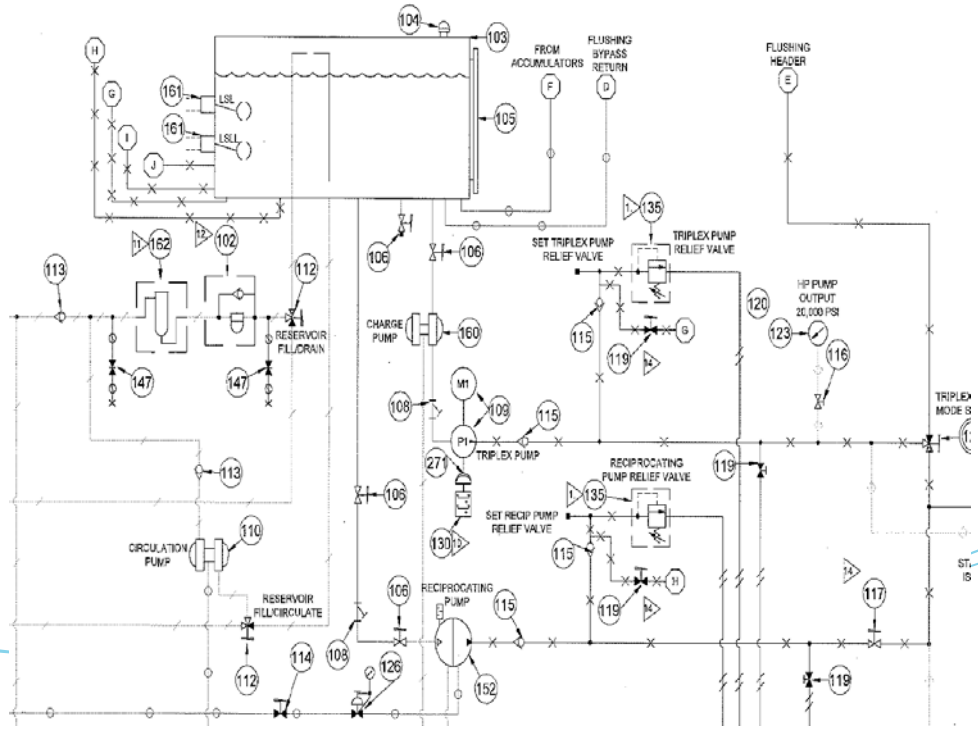
BSEE Requirements for Subsea Intervention Units

- Subsea Intervention Units are in retrospect considered BOPs per 250.1706(e).
- These units are being reviewed in accordance with the subsea BOP regulations as much as possible.
- The following documentations are currently being requested and reviewed by BSEE:
  - Control system drawings
  - Stump Test Procedures
  - On-Bottom Procedures
  - Third Party Shearing Verification
  - Third Party Compatibility

Control System Drawings

- BSEE is requesting the following drawings:
  - HPU Hydraulic Drawings
  - Intervention Unit Hydraulic Drawings
  - Pod Drawings (if applicable)

- From these drawings BSEE will review the following:
  - Make sure the drawings correctly depict how the intervention system will operate.
  - *Deadman system circuitry*
  - *Autoshear system circuitry (DP vessels only)*
  - *Valving Types*
    - *(Gate Valve versus BSR)*
    - *2 barrior rule*



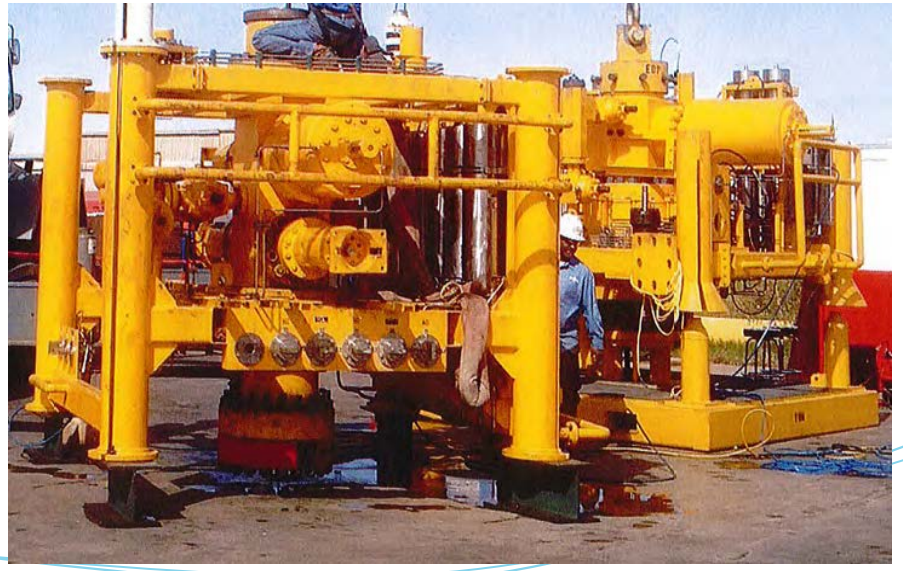
Third Party Shearing Verification

- Shearing Data that is being requested by BSEE:
  - Actual shearing data showing that the valves or rams located on the intervention unit can shear an equal or more ridged workstring/wire than what will be across the stack during the operation you intend to perform with subsequent pressure tests. This shearing test must be third party verified.
  - Third party verified theoretical calculations for each size pipe/wire that will be across the intervention stack calculated with a pressure equal or greater than the maximum anticipated surface pressure (MASP) must be submitted.

- This is to show that the valving or shear rams installed are capable of shearing any size workstring/wire across the stack under MASP.

Third Party Compatibility

- Third Party must certify that the Intervention Unit:
  - is designed for specific equipment on the rig and for the specific well design.
  - has not been compromised or damaged from previous service.
  - will operate in the conditions in which it will be used.
- This must be submitted and approved by BSEE before any well work can begin.



Stump Test and On-Bottom Procedures

- A stump and on-bottom test must be reviewed and approved by BSEE.

- <u>Stump Test Procedures</u>
  - A full pressure test is required.
  - All ROV hot stab functions must be tested.
  - Must function test deadman and autoshear systems.
- <u>On-Bottom Test Requirements</u>
  - A full pressure test is required.
  - Must function test and verify closure at least one valve or set of rams with a ROV hot stab with a subsequent pressure test.
  - Must function test the deadman system and verify closure at least one valve or set of rams with a subsequent pressure test.

Conditions of Approval

- The following Conditions of Approval are given by BSEE for every subsea intervention operation:
  - "You must have the most current set of approved Well Control drawings on the vessel and available for inspection. If there are any revisions or changes made to the approved set of well control system drawings, then you must submit a RPM and receive approval for those revisions.“
  - "The test tolerance of the pump kick on/ kick off pressure as well as the low pressure accumulator alarm will be 5%.“
  - "The well control system shall be tested every 7 days. The test every 7 days is not required for cutter valves or blind-shear rams. The cutter valves or blind or blind-shear rams shall be tested at least once every 30 days during operation. A longer period between tests is allowed when there is a stuck pipe or pressure-control operation and remedial efforts are being performed. The tests shall be conducted as soon as possible and before normal operations resume. The reason for postponing testing shall be entered into the operations log.“
  - "Notify the appropriate BSEE District Manager a minimum of 72 hours prior to the stump test and the initial test on the seafloor.“
  - "Latching up and subsea testing may commence, however an approved RPM is required to capture the third party stack verification per 250.1705(d) prior to entering the wellbore.“
  - "In the event of a system component failure or leak, a RPM will be required to capture 3rd party verification that the intervention stack has not been compromised or damaged from prior service per 250.1705(d)."

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Thank You!

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