

SAFETY ALERT



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Improper Riser Tension Leads to Subsea BOP Falling Off Wellhead Mandrel and Failure of Riser Adapter



Failed Riser Adapter

On January 14, 2019, a subsea blowout preventer was being disconnected from a wellhead mandrel when the BOP rolled over due to excessive weight applied at (i.e., not enough tension on) the riser adapter and BOP stack prior to disconnecting the BOP. The weight of the riser overloaded the riser adapter, causing bending, which led to the adapter parting from the riser. The failure resulted in the disconnected BOP falling to the seafloor. Prior to the incident, the well was secured with multiple plugs; thus, no pollution occurred.

The planned operation was as follows: (1) pressure test against the lower blind shear ram and a full function test of the BOP (these steps were both completed); (2) apply a predetermined weight to the stack by reducing drilling riser tension; and (3) proceed to disconnect the BOP stack and hop the BOP stack to the next well without returning it to surface, as approved by BSEE.

The procedure did not prescribe a specific weight to apply to the BOP prior to release. The Company Representative and Drilling Contractor reviewed the data and agreed on a set amount of weight, or tension, to be applied to the BOP stack prior to opening the primary connector latch. The Drilling Contractor, who was responsible for performing the adjustment to the riser tension system, adjusted the riser tension to a different weight for

reasons unknown. Even with the tensioner weight information displayed on the drill floor, he released more weight than previously agreed.

After the riser tension was adjusted, the underwater Remotely Operated Vehicle inserted the flying lead into the hydraulic stab on the BOP ROV panel and unlocked the primary connector from the wellhead. The BOP shifted to a 45-degree tilt. The resulting tilt put undue bending stresses on the tapered joint above the BOP, and it completely failed some hours later. The BOP came to rest on the seafloor after the joint failure. An independent third-party review concluded the riser adapter failed due to reduced top tension while unlatching the wellhead connector.

Therefore, BSEE recommends that operators consider the following:

- Develop a comprehensive procedure for unlatching a subsea BOP. The procedure should incorporate all the necessary calculations to determine the appropriate tension settings for all unlatching scenarios. Base the procedure specifics on actual conditions including, but not limited to, weight of the BOP, water depth, weight of the drilling riser in seawater, weight of riser fluid, and all other pertinent factors.
- Unlatching procedures for BOPs should make reference to riser analysis in the body of the program and provide a hold point for review and verification of riser tension being set to the recommended setting point prior to landing the BOP and unlatching the BOP.
- Establish an Emergency Disconnect Sequence (EDS) weight down for simulation and an EDS over pull for actual EDS function, if required.
- Establish safe operating parameters for all drilling operations. Drilling contractors and operators should be equipped with proper information and calculations to know when any operation is outside normal expectations and needs to be reevaluated.
- Re-evaluate all risk assessments associated with moving a BOP at depth from well to well.
- Ensure that all rig personnel understand the risks associated with disconnecting blowout preventers from wellhead mandrels and all additional risks associated with hopping a BOP stack to the next well. Ensure that personnel fully understand the jobs they are performing, and perform the necessary risk assessments and calculations that will make each job safe.

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A Safety Alert is a tool used by BSEE to inform the offshore oil and gas industry of the circumstances surrounding a potential safety issue. It also contains recommendations that could assist avoiding potential incidents on the Outer Continental Shelf.