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Safety Alert 019 - ANP/SSM

Discharge through the DHSV function control line, at the WCT, during rig intervention

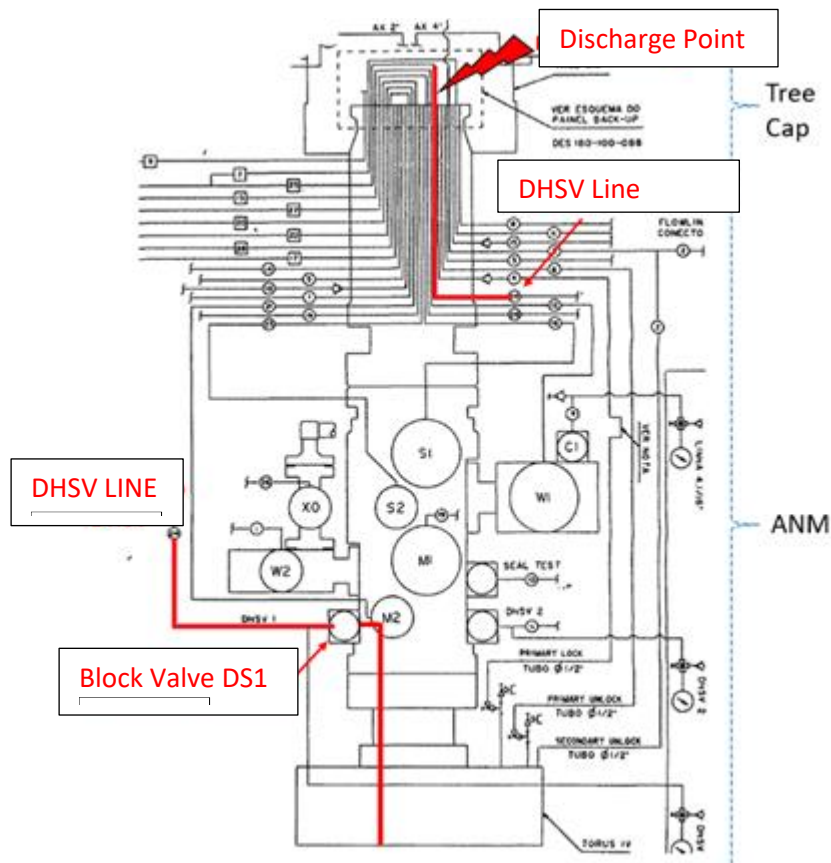
This Operational Safety and Environment Superintendence alerts the oil and gas industry and other stakeholders about a discharge (blowout) through the DHSV function control line, at the Wet Christmas Tree (WCT), during rig intervention.

What happened?

Discharge of a mixture of hydrocarbon plus produced water, through the control line of the DHSV function, during the permanent abandonment operation of the well with rig intervention.

The discharge took place in two stages of the intervention:

- Step of laying the Tree Installation Tool (TIT) on the Tree Cap: during the repositioning of the Tree Cap panel, due to a mechanical interference generated by the TIT being laid on the Tree Cap, there was a rupture in the control line of the DHSV function and fault in the corresponding lock valve, resulting in the discharge of the mixture into the sea.
- After Tree Cap disconnection: the discharge continued through the top of the WCT (tree manifold), remaining until the Installation Tool (TIT) was reconnected on the WCT.



WCT and Tree-Cap hydraulic diagram: fluid discharge circuit in red.

Potential consequences

The event resulted in a discharge of oily fluid into the sea and the Emergency Response Team was activated. Support vessels were activated for pollution control, vessels with underwater containment equipment were mobilized and helicopter flights were carried out for monitoring. The leak was interrupted 4 days after the start of the event.

Identified causes

- Lack of seal of the DHSV control line (below the Tubing Hanger):
 - Deficiency of the downhole control line installation execution procedure in 2004.
- Lack of integrity of the production Column and Gas Lift Valve, establishing column x annular communication:
 - Failure in the process of design, manufacture and qualification of the Lift Gas Valve.
 - Deficiency of the well component integrity management process.
- Impossibility of closing the DS1 block valve (referring to the DHSV1 function) on the WCT panel:
 - Failure in the qualification process for new services: injection of sealant fluid through subsea equipment.
 - Failure in the change management process: injection of sealant fluid through subsea equipment.
 - Failure in the subsea equipment design/manufacturing process.
- Tree Cap instrumentation line damage.

Note: the discharge would occur even if the Tree Cap was not damaged, this event increased the severity of the discharge:

- Deficiency in the rig mooring planning/design process.
- Failure in the risk analysis of well intervention planning: unmapped risk of hydrocarbon leakage through downhole control lines:
 - Well Handover process training failure.

Lessons learned

- Execute the production and injection column integrity management process;
- Qualify subsea equipment and services;
- Execute the change management process when identifying scope change and/or expected project condition;
- Use international standards, best practices and technical requirements to design subsea and well equipment and execute the rig anchoring project;
- Perform leakage risk assessment of downhole lines in the well intervention planning phase;
- Define the procedure and the person responsible for connecting the downhole instrumentation line;
- Conduct training on Well Handover standards;
- Include in the Well Handover document relevant information on the operation history of the subsea equipment and the well;
- Define the receipt of the Well Handover documentation prior to the well intervention planning stage;
- Include the information of the Production Column test parameters in the Well Handover documentation.

Regulatory Framework

According to the technical regulation of the SGIP annexed to ANP Resolution No. 46/2016:

Item 3.3. 1 - Establish, document and implement methodology for monitoring and recording the training performed by the Workforce.

Item 8.1.1 - Ensure the management of information and documentation related to Well Integrity Management, aiming at formalization, traceability, standardization, updating and accessibility for relevant stakeholders.

Item 9.2.2.1 - The failure of any element of the WBE and the operation outside the established operational limits constitute incidents and must be recorded.

Item 9.2.2.2 - After failure detection of one of the WBE, a failure management or change management procedure should be performed immediately to define the most opportune security time for the reestablishment of the WBE that has lost its integrity.

Item 10. 1.2.1 - Establish, document and implement manuals, standards or procedures for the development of the well project that are aligned with legal requirements, observing industry best practices.

Item 12.2. 1 - Establish, document and implement procedure for risk management associated with Well Integrity Management.

Item 13.2.1 - Establish, document and implement acceptance criteria, inspection plans and procedures, verification, maintenance and monitoring of the integrity of wells in compliance with industry best practices.

Item 15.2.1 - Establish, document and implement clear and concise procedures, with specific instructions for the safe execution of activities related to Well Integrity Management, considering the specificities and operational complexities.

Item 16.2.1 - Establish, document and implement procedure so that changes in operations, procedures, standards, project, program or personnel applicable to Well Integrity Management must be evaluated and managed so that the risks arising from these changes remain at the ALARP level.

Contact

For additional information regarding this safety alert, please contact ANP Operational Safety and Environment Superintendence at incidentes@anp.gov.br.