Bureau of Safety and Environmental Enforcement

SAFETY ALERT

Safety Alert No. 502

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Fatigue Cracking of ¾-Inch Pipe Nipple Results in Gas Release

Figure 2-Photo shows 3/4-inch unsupported pipe nipple on suction scrubber.

Figure 1-Photo shows damaged 3/4-inch pipe after incident.

The Bureau of Safety and Environmental Enforcement (BSEE) has investigated a recent offshore gas release incident resulting from the failure of a ¾-inch pipe nipple connected to a compressor suction scrubber (Figure 1). The failure led to an immediate platform shut-in and a full muster of personnel onboard.

The released gas posed a significant safety risk, particularly due to its proximity—within 10 feet—to hot compressor surfaces, increasing the potential for fire or explosion. Fortunately, there were no injuries or significant equipment damage; however, the event highlights how minor component failures can escalate into serious safety threats under slightly altered conditions.

Incident Findings:

Post-incident inspection revealed that the threaded ¾-inch pipe nipple failed due to fatigue cracking, which had likely developed progressively over time (Figure 2). The fatigue cracking was consistent with long-term exposure to mechanical stress and cyclical loading in a high-vibration environment. Threaded connections of this size are especially vulnerable to fatigue when installed on vibrating equipment such as compressors.

Contributing Factors:

- **Over-tightening:** Excessive torque during installation may have introduced stress concentrations, weakening the pipe.
- **Vibration:** Continuous vibration from compressor operations likely accelerated fatigue.
- **Unsupported Weight:** The nipple also supported a sight glass level bridle, potentially adding stress to the connection.
- **Component Loosening:** Vibration may have contributed to the loosening of the connection over time, compounding mechanical stress.

To help prevent similar incidents in the future, BSEE recommends that operators and their contractors, where appropriate, consider the following:

- Add structural support for sight glass level bridles attached to compressor suction scrubbers to reduce weight and vibration loads on small-diameter pipe nipples.
- Apply proper tightening techniques to avoid over-stressing threaded connections during installation.
- Regularly inspect critical components—including pipe nipples, fittings, and supports—for signs of fatigue, corrosion, wear, or loosening. Initiate timely corrective actions as needed.
- Implement vibration monitoring on compressor packages to detect and manage vibration levels that may affect connected piping and equipment.
- Ensure vibration dampers are properly installed and maintained to reduce the transmission of vibration from compressor units to piping components.

– BSEE –

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.

Category: Gas Release, Personnel Safety