Bureau of Safety and Environmental Enforcement

SAFETY ALERT

Safety Alert No. 518
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Mechanical Failure of LACT Pump Caused Fire

Verify Pump Alignment After Motor Replacement to Prevent Fires

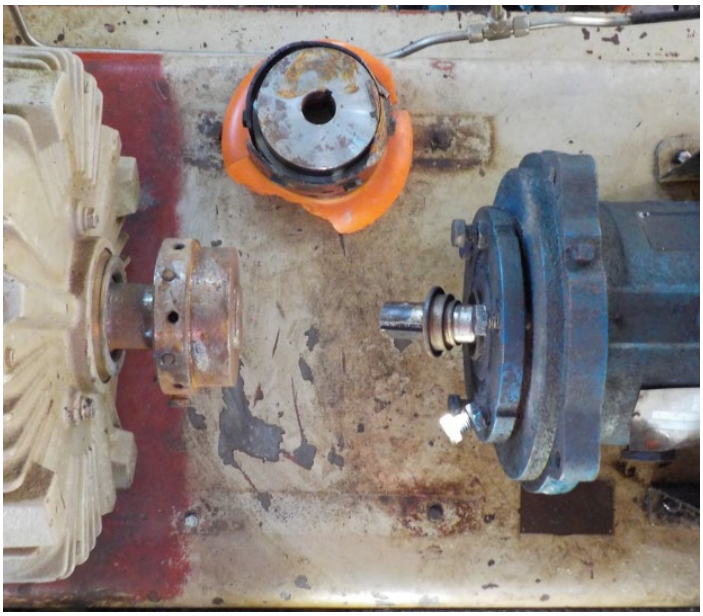

Figure 1: Damaged Lease Automatic Custody Transfer charge pump, electric motor and coupling.

Incident:

The Bureau of Safety and Environmental Enforcement recently investigated a fire at an offshore production facility in the Gulf of America. The fire occurred after motor-to-pump misalignment on a Lease Automatic Custody Transfer, or LACT, charge pump caused the pump to fail mechanically (Figure 1).

The misalignment loosened the pump casing fasteners and allowed oil to leak onto the skid.

Platform personnel extinguished the fire using handheld fire extinguishers and a fire hose. No injuries were reported. The incident damaged the pump, electric motor and coupling. Most of the oil remained in containment; however, an estimated 0.001 gallons of oil was released into the Gulf of America.

Findings:

The electric motor had been replaced recently and had been in operation for 10 days at the time of the incident. Facility personnel did not observe abnormal conditions during daily rounds before the incident.

The investigation found that proper installation procedures were not followed when the electric motor and coupling were installed. A straightedge was used to align the motor horizontally and vertically, but angular alignment was not performed. The coupling bolts were not installed to the proper torque, the motor was installed without shims, and the motor mounting bolts were not torqued to proper specifications.

Disassembly and inspection of the motor confirmed the following sequence of failure: During normal operations, the motor operated at approximately 3,600 rpm. The motor-to-pump coupling misalignment, combined with the high operating speed, caused excessive vibration. The vibration loosened the pump casing fasteners, which allowed oil to leak from the pump casing. The coupling eventually failed, causing additional damage to the pump and the electric motor. These failures and the associated leak led to ignition of oil on the skid.

Therefore, BSEE recommends that operators and their contractors, where appropriate, do the following:

- Install equipment according to original equipment manufacturer specifications and approved maintenance procedures.
- Ensure that proper installation procedures and all required tools are available before work begins.
- Ensure that all personnel are properly trained on installation procedures, proper tool use, and post-installation function checks for equipment prior to performing work.
- Evaluate maintenance procedures to determine if post-installation surveillance of equipment needs improvement, such as increased frequency of operator rounds and/or multiple-day monitoring of equipment.
- Investigate vibration alarms, equipment faults, and other signs of abnormal operation. Vibration alarms may be triggered by nearby equipment if that equipment is mechanically connected or coupled.

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: Fire, Equipment Installation