Bureau of Safety and Environmental Enforcement

SAFETY ALERT

Safety Alert No. 504

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Malfunction of Rental Generator's Engine Air Shutoff System Led to Fire

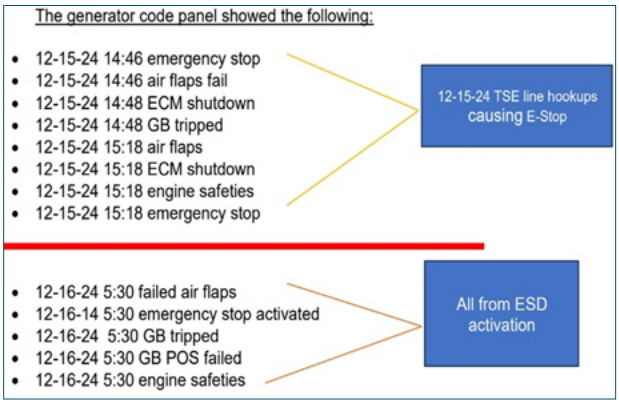

Figure 1: Active Codes Reported on Generator.

Figure 2: Generator Error Codes.

Background: The Bureau of Safety and Environmental Enforcement (BSEE) recently investigated a fire on an offshore platform in the Gulf of America involving a rental generator. The incident stemmed from a malfunction in the engine's air shutoff system. Initial investigation findings indicated that the oil fill cap was absent, and both exhaust gases and oil venting from the open fill neck were potential ignition sources. Further inspection revealed significant fuel leakage into the engine, leading to the accumulation of unburnt diesel fuel.

The primary cause of the incident was determined to be improper operation of the engine's right bank air shutoff valve (air flap). The emergency air flap remained closed, restricting adequate airflow to the engine and preventing proper fuel combustion. As a result, unburnt diesel fuel and excess oil that had leaked past the piston rings accumulated. This accumulation, combined with heat generated from the operational left bank, ignited the fire.

Contributing Factors:

- The right bank air flap failed to fully engage with its microswitch[1], preventing the activation of a critical alarm that could have alerted personnel to the issue.
- The malfunction of the air shutoff valves during maintenance indicates that existing procedures or verification checks were insufficient to ensure that all components functioned properly before the engine was returned to service.
- The accumulation of unburnt diesel fuel and excessive oil levels suggests that inadequate monitoring or maintenance practices may have failed to detect and address fuel leakage past the piston rings.
- The absence of the oil fill cap may have contributed to the excessive oil levels and leakage, indicating a potential lapse in routine maintenance or post-maintenance inspection procedures.

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

- Enhance inspection protocols for air shutoff valves and related alarm systems during routine maintenance to ensure proper functionality and early detection of potential failures.
- Conduct training sessions for personnel on monitoring engine performance, identifying abnormal conditions, and verifying the functionality of critical alarm systems to enhance operational awareness and response readiness.
- Review and update maintenance procedures to include comprehensive checks for potential fuel and oil leaks, especially following maintenance activities to confirm system integrity before returning equipment to service.
- Ensure diesel engine air intake shutdown devices are installed and fully operational in compliance with 30 CFR 250.856. Air intake systems should be functionally tested according to manufacturer instructions or prior to use.

[1] A microswitch is a small, sensitive electrical switch used to detect the physical position of a component—in this case, the engine's air shutoff valve (air flap). When properly engaged, the microswitch confirms the valve's open or closed position and triggers alarms or interlocks if the valve fails to operate as intended. This ensures early detection of malfunctions that could lead to unsafe engine conditions.

- Incorporate requirements into rental generator procurement processes to include documentation of safety device functionality, engine maintenance history, and verification of critical operating functions. This recommendation addresses the contributing factors identified in this alert. Specifically, if an engine has more than one emergency air flap, each must be tested independently during the third-party inspection prior to commissioning, and each should be capable of shutting down the unit independently.

– 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: Fire, Personnel Safety