

SAFETY ALERT



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Floating Production Platform Evacuated Amid Power Outage

During September, 2017, a floating production facility in the U.S. Gulf of Mexico was operating on a single uninterruptible power supply (UPS) due to an “on line” UPS replacement project when the inverter on the functioning UPS failed. This failure cut automatic battery back-up to emergency power users, including the vessel management system (VMS) and operational critical telecoms.

During their initial investigation of the failure, members of the crew detected a potentially hazardous hydrogen release in the UPS battery room. They believed the hydrogen was discharged from the UPS batteries. This led to the offshore installation manager (OIM) mustering all personnel. Additionally, the ventilation in the battery room was not working properly, which prevented exchange of air volumes and contributed to the continuing perception of a fire and explosion risk. Closed dampeners, plugged filters, and failure of motor controllers contributed to the ventilation deficiencies.

While battery room issues were being addressed, the emergency generator was started so that power would be maintained if the main power was lost. In the process of syncing the emergency generator with main power, the UPS's static bypass switch opened due to the emergency generator's frequency falling slightly out of range with normal power. When the static bypass switch opened, all loads on the emergency bus lost power (including the VMS and critical operational telecoms.) As a result of these loads being dropped, an abandon platform sequence was initiated, which shut down all main power and made safe the process.

At the point the abandon platform sequence was initiated, the platform was experiencing a full electrical blackout. A well that was being worked on had already been secured with two tested barriers. Several attempts to re-establish power were unsuccessful due to the logic sequence in the VMS which continued to send shutdown trip signals to the emergency generator circuit breaker whenever the control system rebooted. This logic sequence was hidden from the workers because the VMS ordinarily rebooted from battery power, which was unavailable. The backup script in the application did not inhibit the abandon platform shutdown signal during reboot. The solution that resulted in power restoration was to physically inhibit (disconnect wires) to the emergency generator breaker.

During the event, the 264 nonessential personnel safely evacuated. After the detection of smoke in the UPS room, the OIM decided to have the core crew of 34 personnel also abandon the facility.

BSEE is aware of other floating production facilities that experienced power issues in 2017:

- 14-15 November 2017: A floating platform had a series of trips in its power system over a two-day period. During the first day the gas train went offline due to a failed transmitter and a scrubber high level; then one turbine generator shutdown from diesel issues. On the second day, failures relatively unrelated to the first day resulted in three separate power outages.
- 27 January 2017: A shut-in floating platform was performing required regulatory testing. Following a false fire alarm, the facility underwent a full power outage and was unable to restore power. A full evacuation of all 56 essential and nonessential personnel was conducted via helicopters.

Therefore, BSEE recommends that operators consider the following options:

- Review the black start procedure for facilities to include, as a minimum consideration, the complete loss of power to the VMS.
- Consult with the original equipment manufacturer (OEM) to evaluate and make appropriate recommendations for UPS protective features and their impact on availability of sub-distribution systems.
- Review the performance of critical ventilation systems relative to their basis of design and develop a strategy to address maintenance requirements.
- Review the project engineering handover process for critical electrical systems to ensure personnel are properly trained to operate new equipment. Particularly, electrical technicians should be knowledgeable of what is necessary to power up emergency loads after failures.
- Create or review a platform evacuation procedure specifically prompted by a facility blackout. This evacuation procedure is unique because it is:
 - more urgent than an evacuation due to, for example, a hurricane.
 - the procedure should consider a possibility of limited communications and reduced availability of resources due to the blackout.
- Verify that all necessary Safety and Environmental Management System (SEMS) documentation (Emergency Response Plans, As-Built Electrical Drawings, Piping & Instrumentation Diagrams, Operating Procedures, etc.) are up-to-date and accessible in hardcopy format.
- If you have further questions not addressed in the recommendations above, contact BSEE at the number listed on this Safety Alert.

A **Safety Alert** is a tool used by BSEE to inform the offshore oil and gas industry of the circumstances surrounding an accident or near miss. It also contains recommendations that should help prevent the recurrence of such an incident on the Outer Continental Shelf.