

Lesson Learned

Plant Fuel Switching and Cold Weather

Primary Interest Groups

Reliability Coordinator (RC) Balancing Authority (BA)
Generator Owners (GO) Generator Operators (GOP)

Problem Statement

During a cold weather event, both equipment freezing and infrequent use of alternative fuels caused a plant's generation to become unreliable, contributing to the balancing authority (BA) and reliability coordinator (RC) having to shed load.

Details

A two unit 900 Mw natural gas powered plant developed significant fuel switching issues and unit reliability problems during a severe winter weather event. The plant experienced temperatures low as 18 degrees (F), wind chill as low as 1 degree (F). For three days, the daytime temperatures stayed below freezing. During the winter weather event, the plant's gas supply was interrupted. Operation on fuel oil was infrequent, thus fuel oil burning equipment remained dormant much of the time. As a result, equipment required for burning fuel oil had high failure rates, in part due to sub-freezing temperatures, but also due to infrequent use. The plant experienced:

- Instrumentation sensor lines freezing
- Condensation freezing in the air inlet needle valve for a Gas Turbine (GT)
- Unit output reduced due to gas transmission curtailments
- Failed oil cooler fan due to freezing issues
- Unit tripping multiple times when attempting to fire on fuel oil due to equipment malfunctioning and operator error

Corrective Actions

The plant's generator owner (GO)/generator operator (GOP) reviewed the fuel oil capabilities required at the plant. A team re-evaluated what upgrades, maintenance, modifications, testing and training were needed to meet required fuel oil burning capabilities and are in the process of implementing the changes.

Lesson Learned

GOs and GOPs should review their winter maintenance plans and ensure critical sensing and operating equipment are protected and can operate at the plant's designed minimum operating ambient temperature for all fuels the plant is capable of burning.

GO/GOPs should consider the following if they have dual fuel operation capability:

- Reliable unit fuel oil operation requires dormant equipment to be tested and maintained. Entities should evaluate their testing programs to insure all systems can operate reliably at all times and provide training to appropriate personnel on the maintaining and operation of the equipment.
- A review and update of procedures should be performed periodically for unit fuel oil operation and maintenance based upon expected operation capabilities to ensure reliable operation.
- Training plans should consider incorporation of processes to institutionalize the knowledge of procedures for fuel switching and operation for the non primary fuel mode of operation.
- Alternate fuel supplies should be tested for contamination or degradation

BAAs and RCs should consider the following if they have plants which have dual fuel capability:

- Verification of the output of each fuel capability provides more accurate unit commitment planning.
- Verification might include the following:
 - Document time to switch
 - Document unit capacity and maximum runtimes while on alternate fuel

For more Information please contact:

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Source of Lesson Learned:	Texas Reliability Entity
Lesson Learned #:	20111002
Date Published:	October 19, 2011
Category:	Generation Facilities

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