NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Lesson Learned

Electricity and Natural Gas Interdependency

Primary Interest Groups

Reliability Coordinator (RC)
Balancing Authorities (BA)
Generator Operators (GOP)
Generator Owners (GO)
Transmission Owners (TO)
Transmission Operators (TOP)
Distribution Providers (DP)

Problem Statement

During a winter cold weather event a generation capacity deficiency caused rolling load sheds to be implemented in one region which contributed to a natural gas shortage. This shortage caused the notification by natural gas suppliers of a possible curtailment of firm natural gas supplies to some natural gas fired generating facilities in another region. This notification required a BA to implement emergency procedures to provide the generation that might be lost if gas was curtailed.

Details

Extremely cold temperatures contributed to the lost of generation due to freezing problems and increased loads across a large area caused operations to have to implement and manage rolling load sheds on a region basis. Some natural gas compressor stations and gas processing plants were affected by these regional load sheds because of the interruption of electricity to them. Gas compressor and processing facilities, which had to be restarted after losing electricity, combined with regional supply freeze-offs*, created gas shortages and caused the interstate and intrastate natural gas pipeline transportation suppliers to notify a BA in another region that they might not be able to meet scheduled firm deliveries of natural gas to generation facilities.

Due to this notice, the BA made plans for potential re-dispatch to maximize available non gas-fired generation and for potential fuel switching and began implementing steps of its Emergency Operations Plan. These steps included:

- Loading all available non gas generating capacity,
- Determining status of adjacent BAs for potential assistance,
- Informing the RC and adjacent BAs of system status,
- Reducing load through public appeals and curtailment of interruptible loads,
- Declaration of Energy Emergency Alert through its RC.

Through these steps, as well as the use of alternative fuels, the BA was able to carry all firm load and the required level of operating reserves.

Corrective Actions

No corrective actions identified by the operating entity to implement since its practices and procedures provided the sources of energy needed to meet the demand. In the region which had to implement the regional load sheds, there were changes implemented to improve coordination between its gas and electricity entities to insure service was not interrupted to critical natural gas facilities.

Lesson Learned

This event brought forward lessons learned which are:

- TOPs and DPs should conduct critical load review of natural gas production and transmission facilities and determine the level of protection such facilities should be accorded in the event of system stress or load shedding. This review should take into account the importance of pipelines which supply fuel to entities outside the region. Electric-powered instrumentation, compression pumps and processing equipment are essential links in the process of creating and moving gas to the end customer. In some instances, even the brief, temporary loss of electric power can put a gas production, processing, compression, or storage facility out of service for long periods of time, especially where weather conditions delay access to those facilities.
- Because gas pipeline and production facilities change which also changes their dependence on electricity, it is critical the natural gas facility review of dependence on electricity be conducted yearly to ensure all key gas facilities are identified and protected from load shed or stressed system conditions.
- Generation dependent on gas should insure it has sufficient storage capability readily accessible to meet generation demands and if it is dependent on "long haul" gas delivery, it should have access to alternative fuels.
- BAs and GOPs should seasonally review all generation capacity and load balancing plans to ensure the plans:
  - Efficiently maximize generation with available firm gas supply and minimize non-firm gas supply generation with alternatives in place if gas becomes unavailable.
  - Address the usage of alternative fuels where available.
  - Reduce loads (interruptible load, demand side management, etc.) when possible to allow continuing service to all firm loads with no interruptions.

*A freeze-off occurs because the natural gas coming out of the well contains a varying amount of water in the mix. When temperatures get cold enough, even though the gas comes out of the ground quite warm, this water can freeze. When it does it blocks the flow channels, and the well is shut-in until it thaws.

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