

Progress with Open Phase Detection

Exelon Nuclear Update

**NRC Public Meeting Open Phase
Detection**

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Current Status

- The algorithm (wye-wye) developed in 2012 has been deployed at Byron 1 and 2, Braidwood 1 and 2, Dresden 3, LaSalle 2, and Quad Cities 1.
- Fleet implementation schedule is based on operational impact from a single phase event and ability to remove transformers from service during maintenance outages
- Trip functions will be enabled after a successful monitoring period that includes an outage period.
- Proof of concept testing on algorithms for delta-wye and wye-delta configuration transformers is in progress.
- Testing and implementation for a detection/protection scheme is planned through December 2015.

Technical Challenges

- Coordination with plant equipment protection devices and transmission system protection devices has resulted in a lower time delay (0.5-0.8 sec).
- Algorithm parameters are based on analytical models.
- Algorithm has required extensive modeling and simulation to establish expected voltage and current imbalance at the switchyard.
- Initial evaluation at Byron of these algorithms show that for two open phase (Forsmark event) the wye-wye algorithms will detect the condition with some load restrictions.
- A n evaluation is in progress to address open phase with concurrent accident signal at Byron and Braidwood and is currently scheduled to be complete by the end of 2013.
- Dresden, Quad Cities and LaSalle utilize a fast transfer scheme of one safety division to the UAT if it is available.
 - Analyses are planned in 2014 to identify appropriate modifications to address the concurrent accident signal question.
- Dresden, Quad Cities and LaSalle backfeed off site power through the main transformer and unit auxiliary transformer to support maintenance on the reserve auxiliary/system auxiliary transformers.
 - Evaluation is in progress to determine appropriate actions to ensure shutdown safety.

Summary

- Technical challenges continue as conceptual designs are implemented.
 - Relay performance has been satisfactory through a range of transients.
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- Questions?