

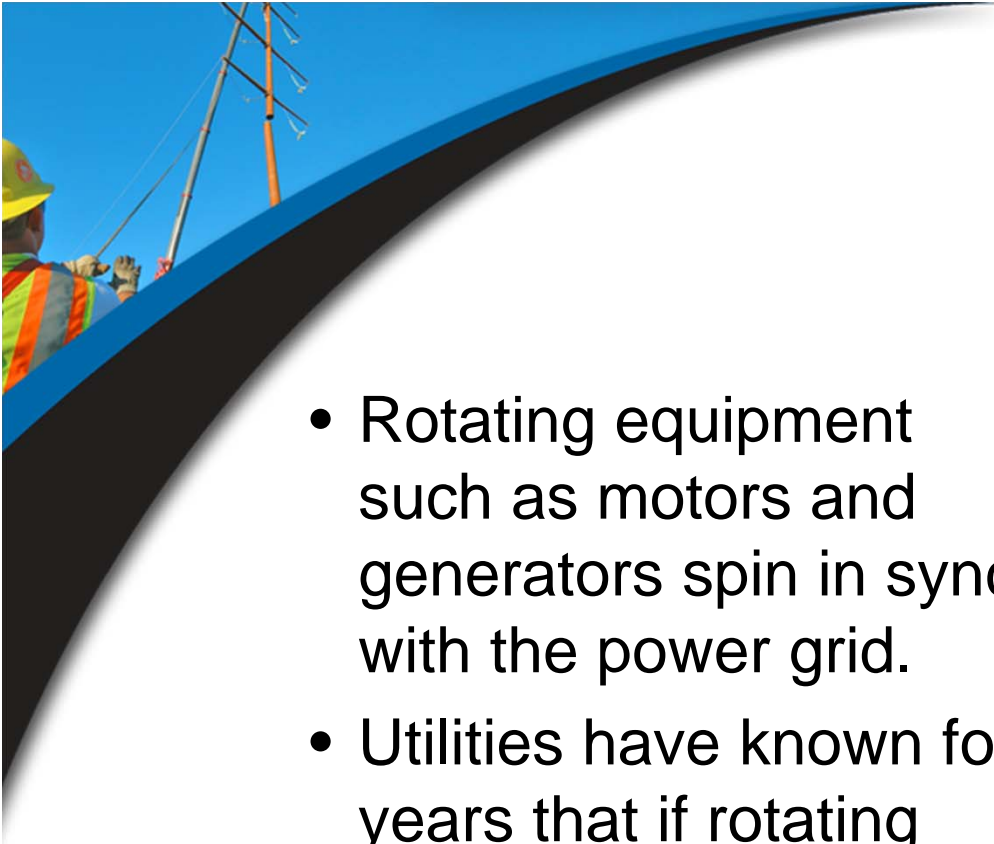


# NERC Aurora Alert Update

Michael Francis  
ATC Customer Meeting  
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Helping to **keep the lights on,**  
businesses running and communities strong®





# AURORA – What it is

- Rotating equipment such as motors and generators spin in sync with the power grid.
- Utilities have known for years that if rotating equipment is brought onto or reconnected to the grid out of sync bad things can happen

In Phase



Out of Phase



# 2007 Idaho National Labs Aurora Generator Test



3.2.8 MVA New Age Cummins-Wartsila diesel generator unit.



Figure 9. Smoke and pieces of generator coupling being ejected.

# 2009 Aurora Controls Tests



a. Controls in 138 kV Breaker Cabinet



b. Controls in Relay House



# Options to Reduce Risks

- Improve cyber security
- Limit personnel access
- Improve security to physical access to generator controls
- Improve security to physical access to local and remote breaker controls
- What NOT to do
  - Do not over complicate schemes
  - Do not “Over Secure” that results in operational limitations or complexities for company personnel
  - Do not build any scheme or procedure that could cause more problems than it fixes



# Types of Mitigations

- “Protection and Control Engineering Practices”
  - Relay or scheme design that can detect and prevent a single AURORA out-of-phase circuit breaker reclosing
- “Electronic and Physical Security”
  - Manage the physical and electronic access to the Digital Protective Control Devices (DPCDs) and physical access to manual breaker controls that could initiate an AURORA attack
- Entities are urged to consider and implement mitigation measures, as appropriate, to address their specific vulnerabilities for the protection of their equipment protection
- Entities should employ engineering judgment to develop an effective mitigation plan



# Reporting Requirements

## **Required to respond to the following by December 13, 2010:**

1. Does your organization fully understand AURORA, especially given the new information? If not, contact NERC for assistance.
2. Has your organization assembled a project team to assess AURORA susceptibility, and/or develop AURORA mitigation recommendations based on the new information?
3. What is your plan to respond to customer inquiries regarding AURORA?
4. Has your organization taken steps to mitigate the risk of an AURORA event or attack, as both a consumer and provider of electric power?
5. Is your project plan for mitigation complete? If not, when do you expect it to be complete? Please indicate within the mitigation plan what types of assets were considered for inclusion.
6. Are your mitigation efforts complete? If not, when do you expect them to be complete?

Updates to NERC required every 6 months until complete

# A Possible HMD Solution ???

- The iGR-933 is a commercially available protection relay designed to detect and isolate (protect) a facility from an AURORA event
  - Named the 'Rotating Equipment Isolation Device (R.E.I.D™)'
  - It fills the gap in protection
  - AURORA events have taken place by accident for years
  - Accidental reclose into an out of synchronization condition – BROKEN MOTORS / GENERATORS
  - The average cost for the R.E.I.D hardware and installation is about \$10K
    - Depends on the number of feeders and size of the facility and equipment in place



• R.E.I.D™ Cooper Power Systems

Forensics: How would you know if it was an AURORA?

- The R.E.I.D. can tell you if it was an AURORA event
- It can be used for Forensics – event and log files show what happened
- Who pays if it was an attack?
- Who pays if equipment malfunctioned and created an AURORA?

References: <http://www.cooperpower.com/products/protective/>  
<http://www.cooperpower.com/products/protective/idea/reid.asp>

[www.atcllc.com](http://www.atcllc.com)







# Questions