



# **Northeast Blackout**

## **August 14, 2003**

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**John Cooley, PE**  
**Manager, Power Control**

**August 27, 2003**  
**Board Presentation**

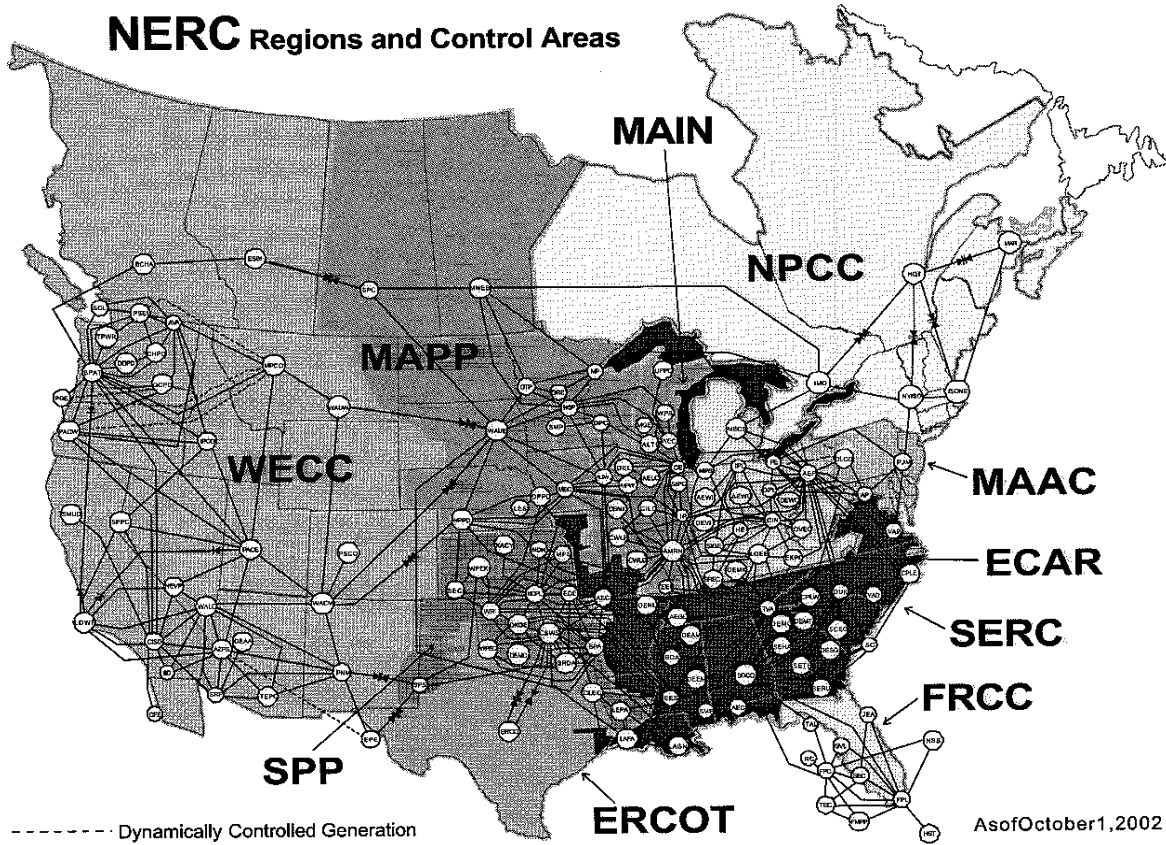
# **Underlying Problem**

- **Transmission infrastructure has not kept up with**
  - **Load growth**
  - **Market changes**
- **System operated under different conditions than for which it was designed**

# **Underlying Problem (cont)**

- **Energy flows distinctly different from manner scheduled**
- **Security monitors cannot model the level of detail to recognize all potential problems in advance**
- **Too many people in areas without adequate power plants**

# NERC Regions and Control Areas



----- Dynamically Controlled Generation

As of October 1, 2002

# Exact Cause

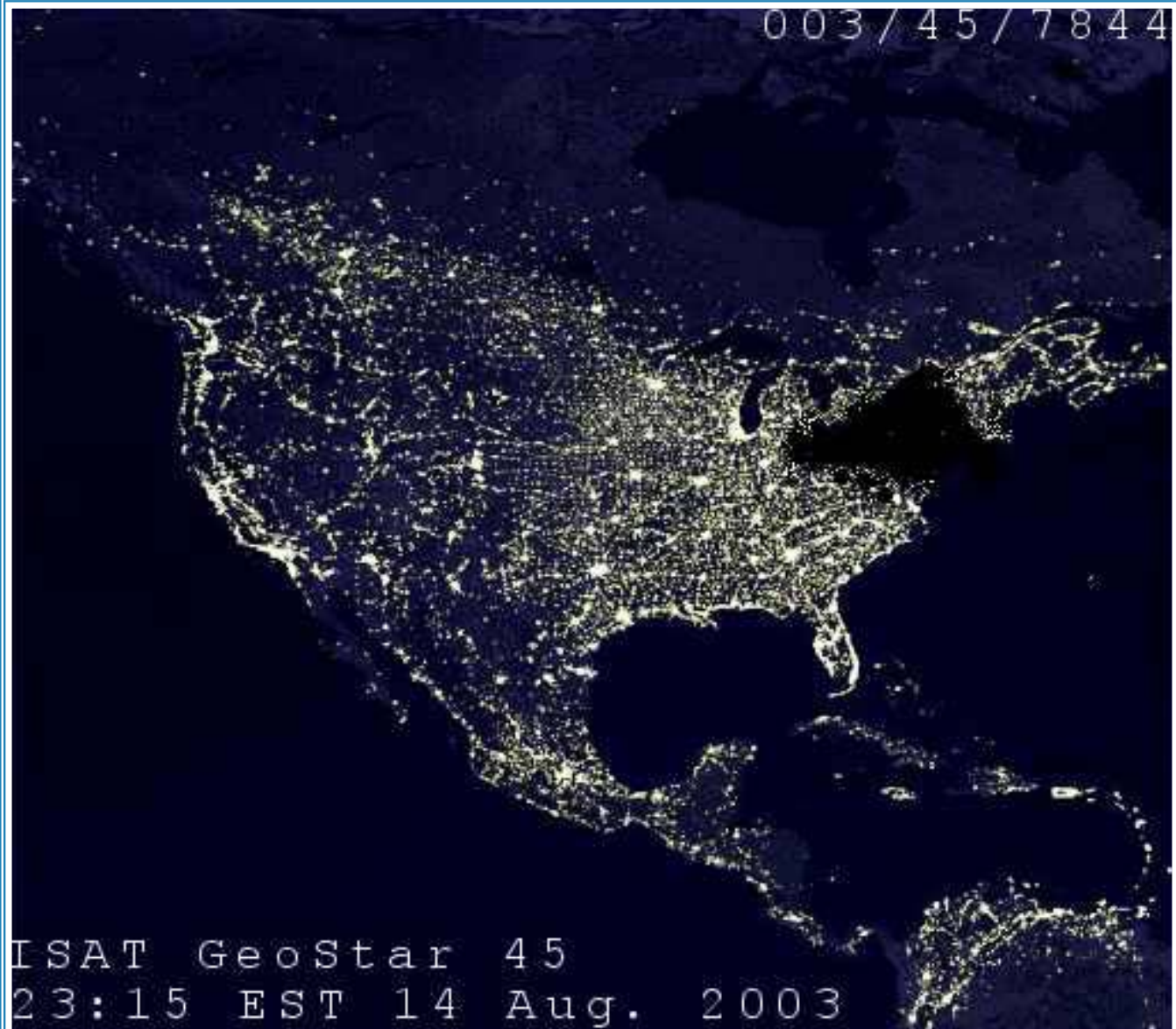
- **Not yet determined**
- **Sequential loss of several 345 kV transmission lines in Ohio may have overloaded other lines**
- **Operators were unable to adjust power flows over other lines before system became unstable**

# **Exact Cause (cont)**

- **Power swings resulted in islands with generation-load imbalances**
- **A blackout resulted**

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ISAT GeoStar 45  
23:15 EST 14 Aug. 2003



# **Alaskan Protective Actions**

- **Railbelt operated by 3 vertically integrated utilities**
- **Chugach operates its own lines**
- **Chugach dispatches Bradley Lake**
- **Operating limits**
  - **Don't normally use full Bradley Lake capacity**
  - **Limit Beluga capacity with a line out**
- **AGC recognizes some transmission limits**

# **Could it happen here? - YES**

- **July 1996 Anchorage and much of the Railbelt blacked out!**
  - **Chugach took one Beluga - Pt Mac line out for maintenance**
  - **2<sup>nd</sup> Beluga - Pt Mac sagged into a tree and tripped out**
  - **3<sup>rd</sup> Beluga - Pt Mac line tripped on overload isolating Beluga from load**

# **July 1996 (cont)**

- Kenai and other generation tried to make up for lost generation**
- Kenai 115 kV line tripped (blown relay fuse)**
- Anchorage load much greater than generation resulting in blackout**
- Fairbanks separated automatically and saved some load**
- Kenai saved some load**

**Questions?**