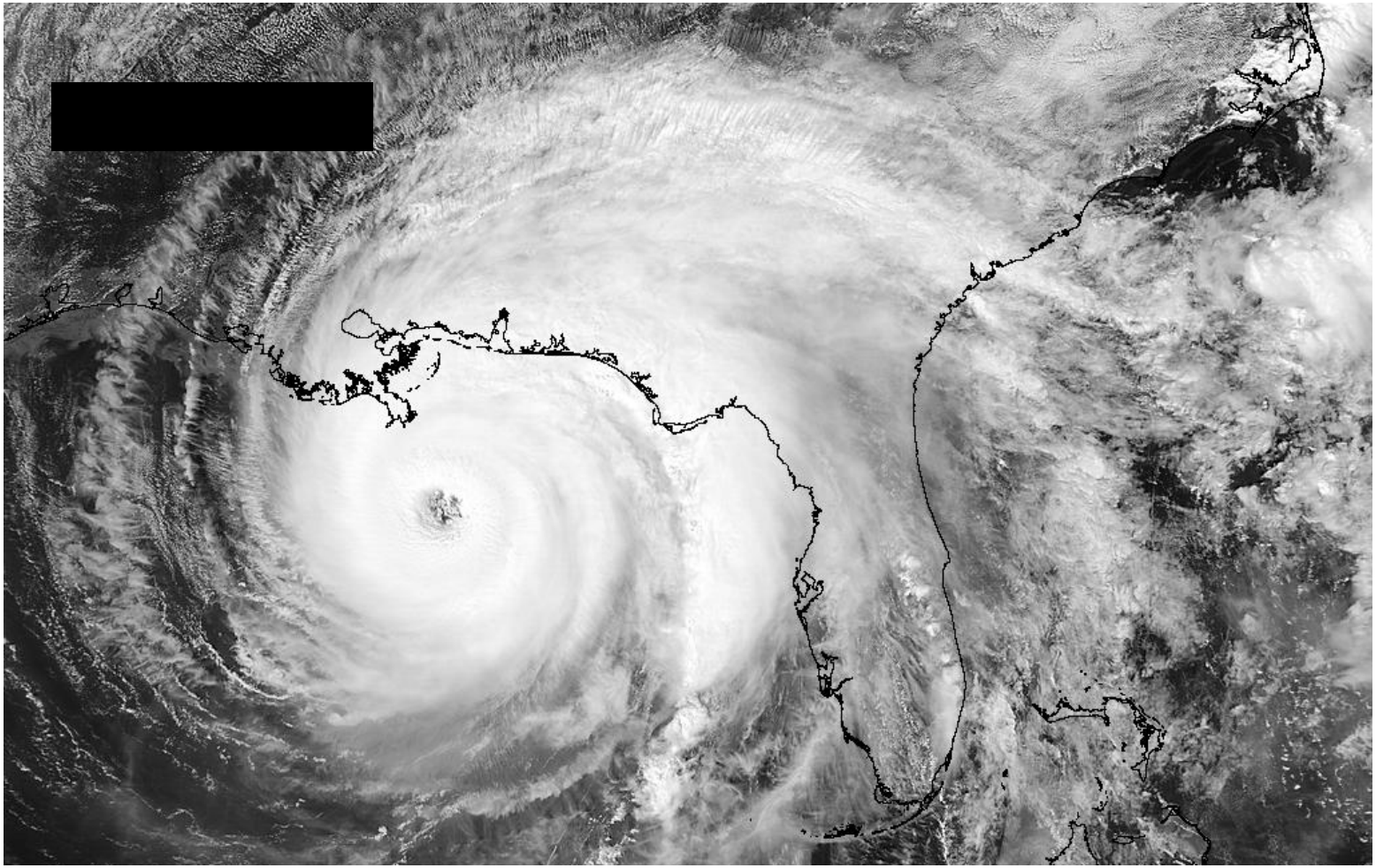
Managing a Limited Resource

TVA

Presented to the Transmission Customer Conference
By Terry Boston, EVP, Transmission/Power Supply
October 25, 2004

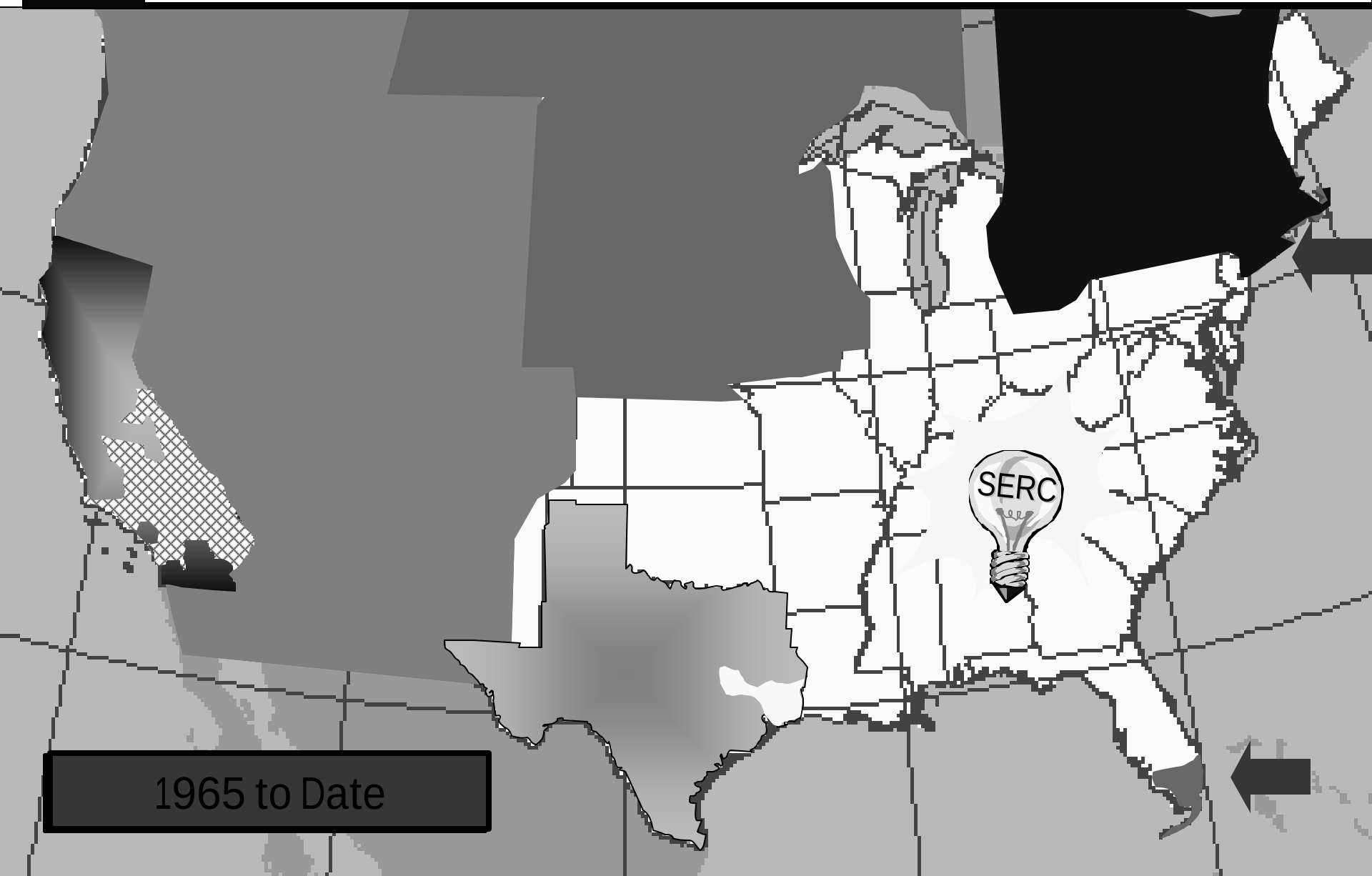
An Imminent Threat

Underinvestment & Overuse Threaten the National Grid

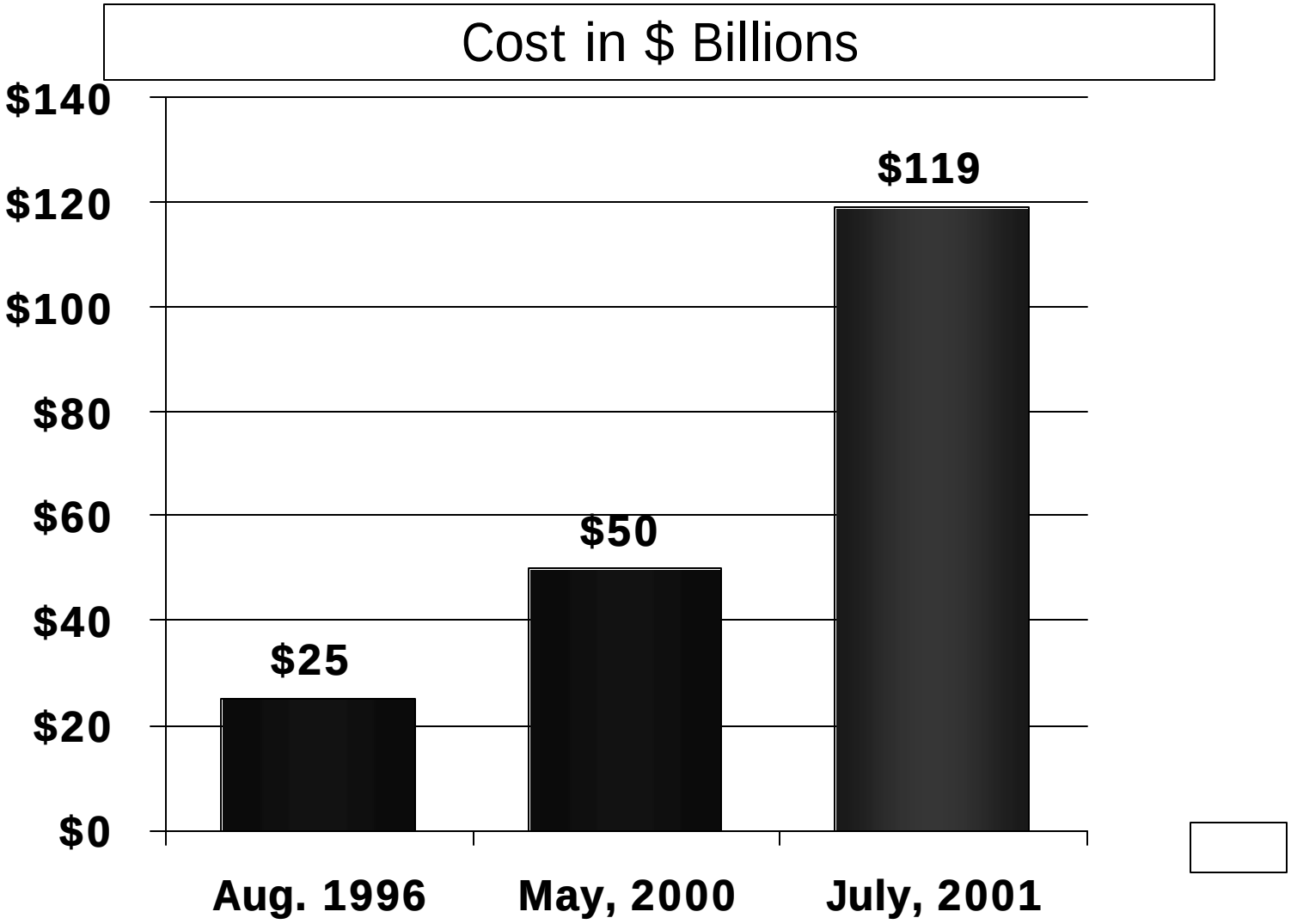


--NASA Photo

Major Grid Disturbances



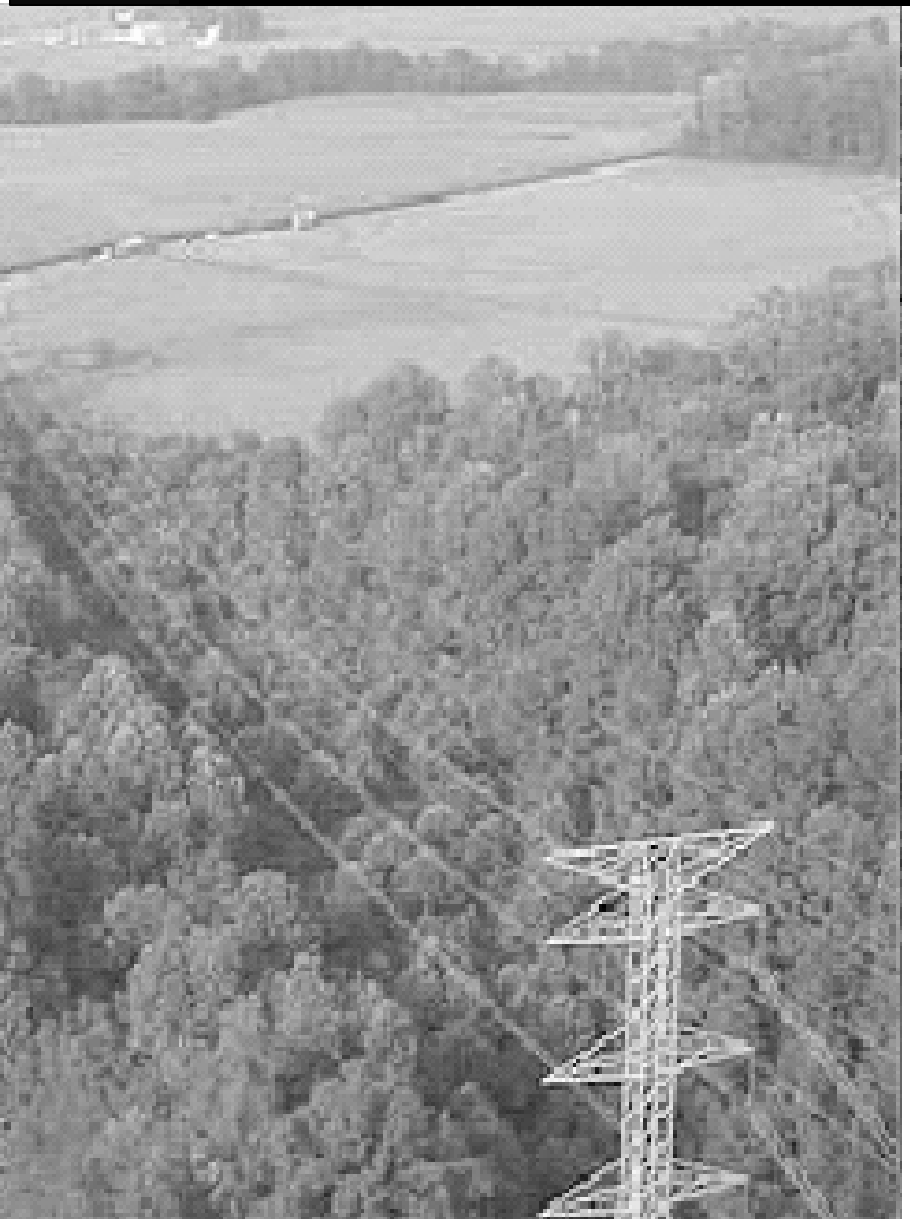
EPRI Cost of Power Failures



DNA of Historical Outages

- Trees
- Tools
- Training

Trees—Managing Vegetation



- Focusing on 230-kV & above lines & interties
- Over ½ million trees were removed in FY ’04
- Set record of 176 days without a tree contacting any line
- Filed FERC vegetation management report

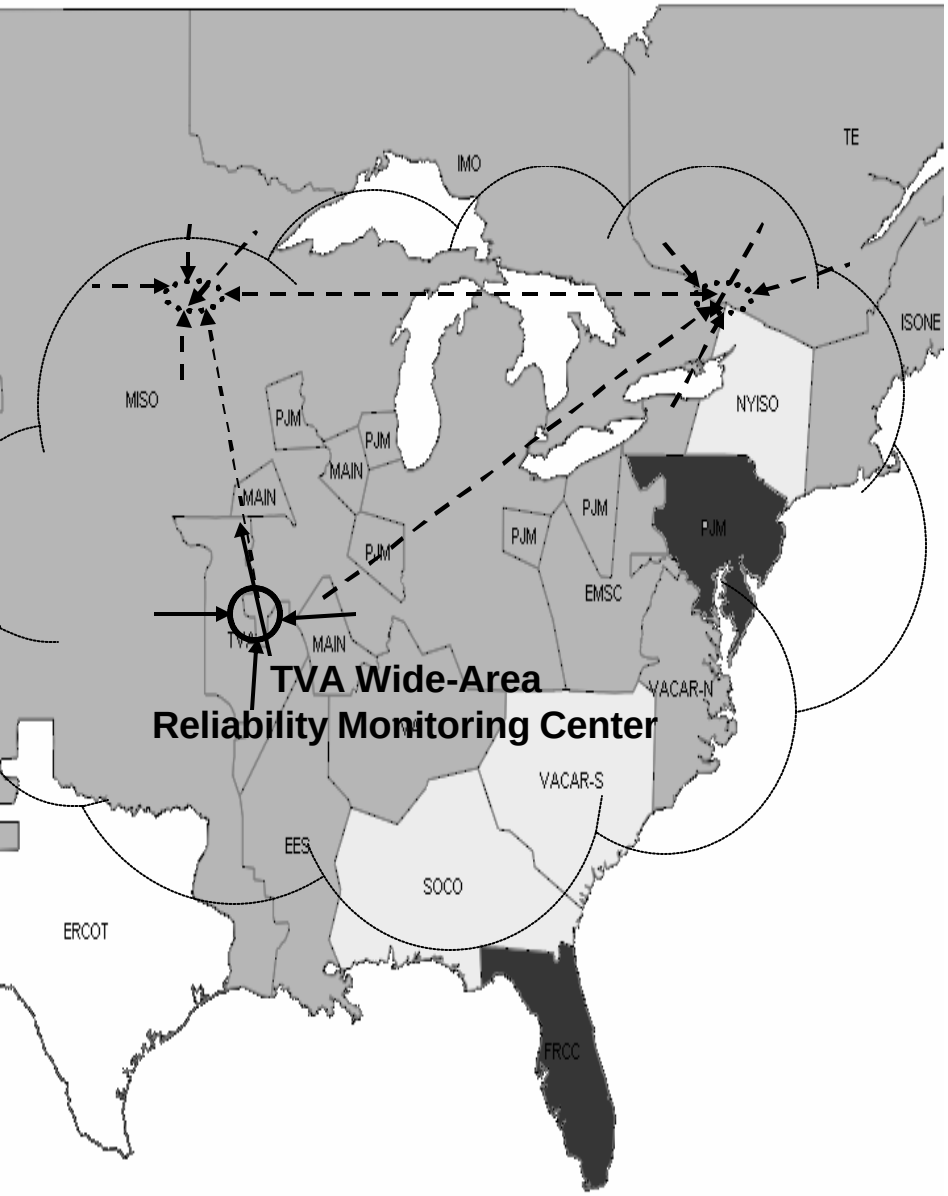
A Tree Grew in Mississippi

Trees—Improvement Trend

Tools—Expanding the System

- 23 new delivery points built in FY 2004
- 760 miles of new line built over last 7 years
- Building new 500-kV substations -- 2 banks this year; 8 planned
- Planning new 500-kV lines
- Installed 954 MVARs of new capacitors in just 1 year
- $1.3 billion invested since 1999

Tools—Increasing Grid Visibility



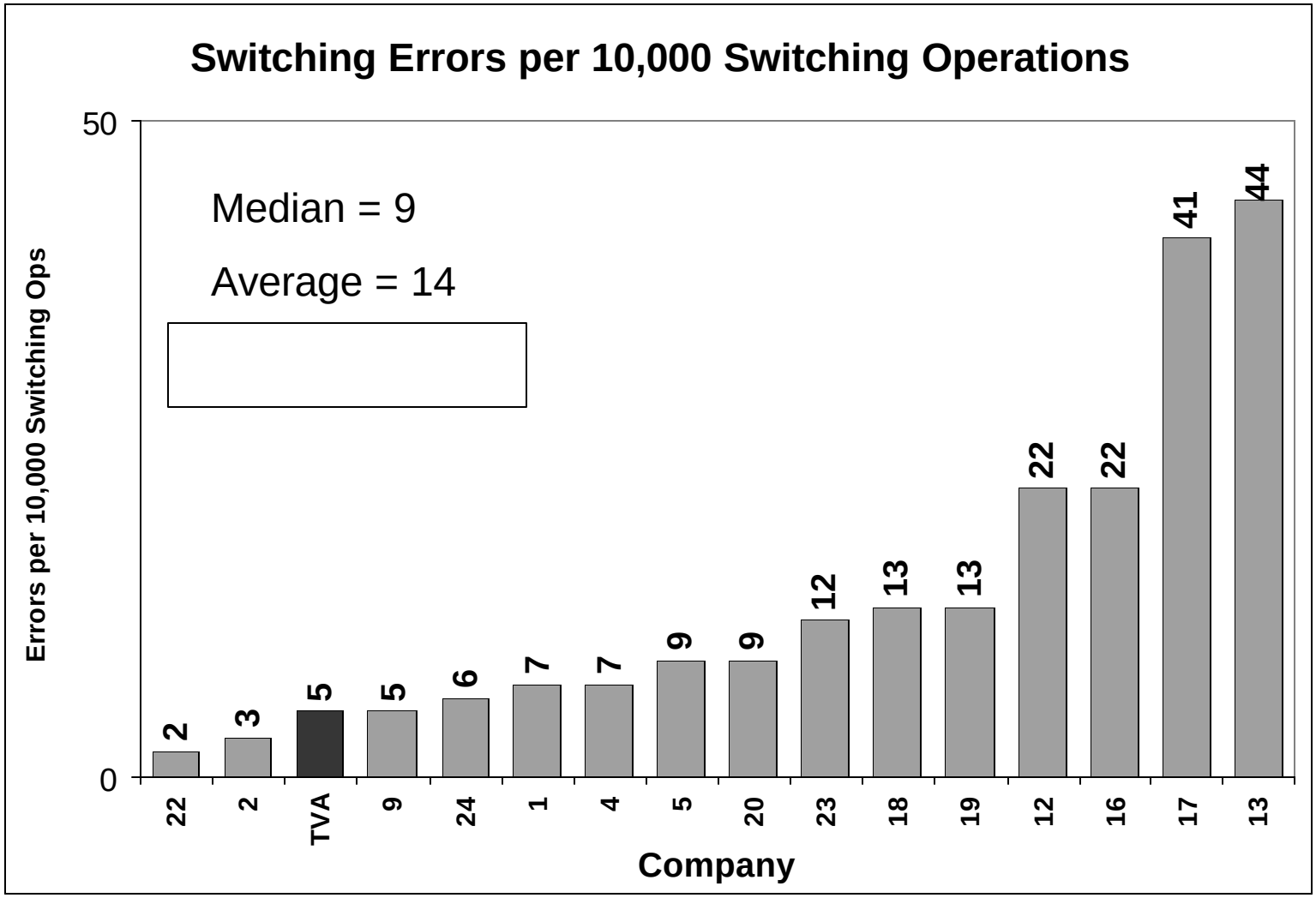
Good Decisions From a Sea of Data, Alarms & Indicators

- Power World simulator shows real-time flows
- PSOP shows real-time generator/transmission/ interchange/customer data
- Data Exchange Agreements: TVA/Entergy/Southern & TVA/PJM/MISO
- Phasor Measurement Units will extend visibility across Eastern Interconnection

Training—Engaging Employees

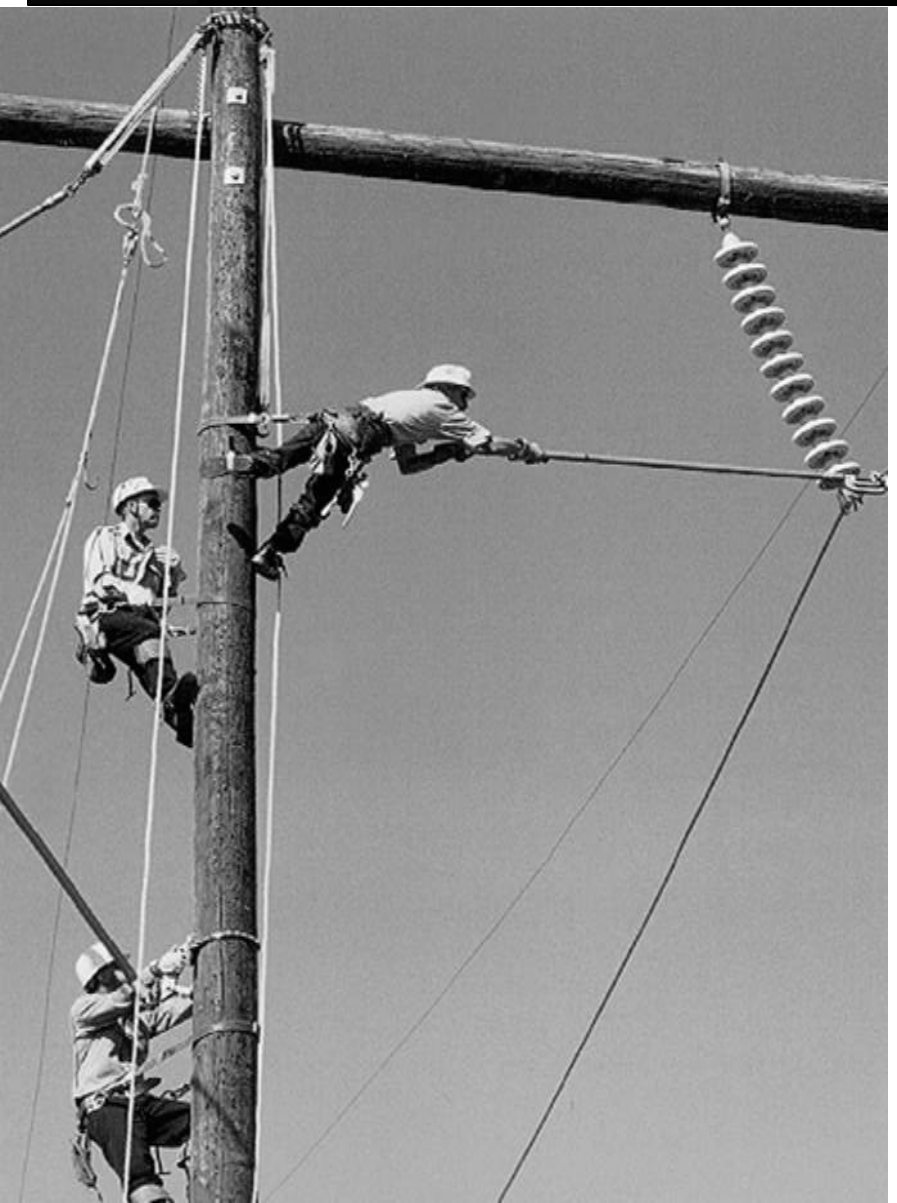
- Conducted at fully redundant backup control center
- Installing full-function control room simulator
  - Operations training
  - Emergency training
- Training Program regarded a “best practice” in NERC Readiness Audit

Training – Switching Errors



– ITOMS Benchmark Data

Safe and Reliable



Transmission in FY '04

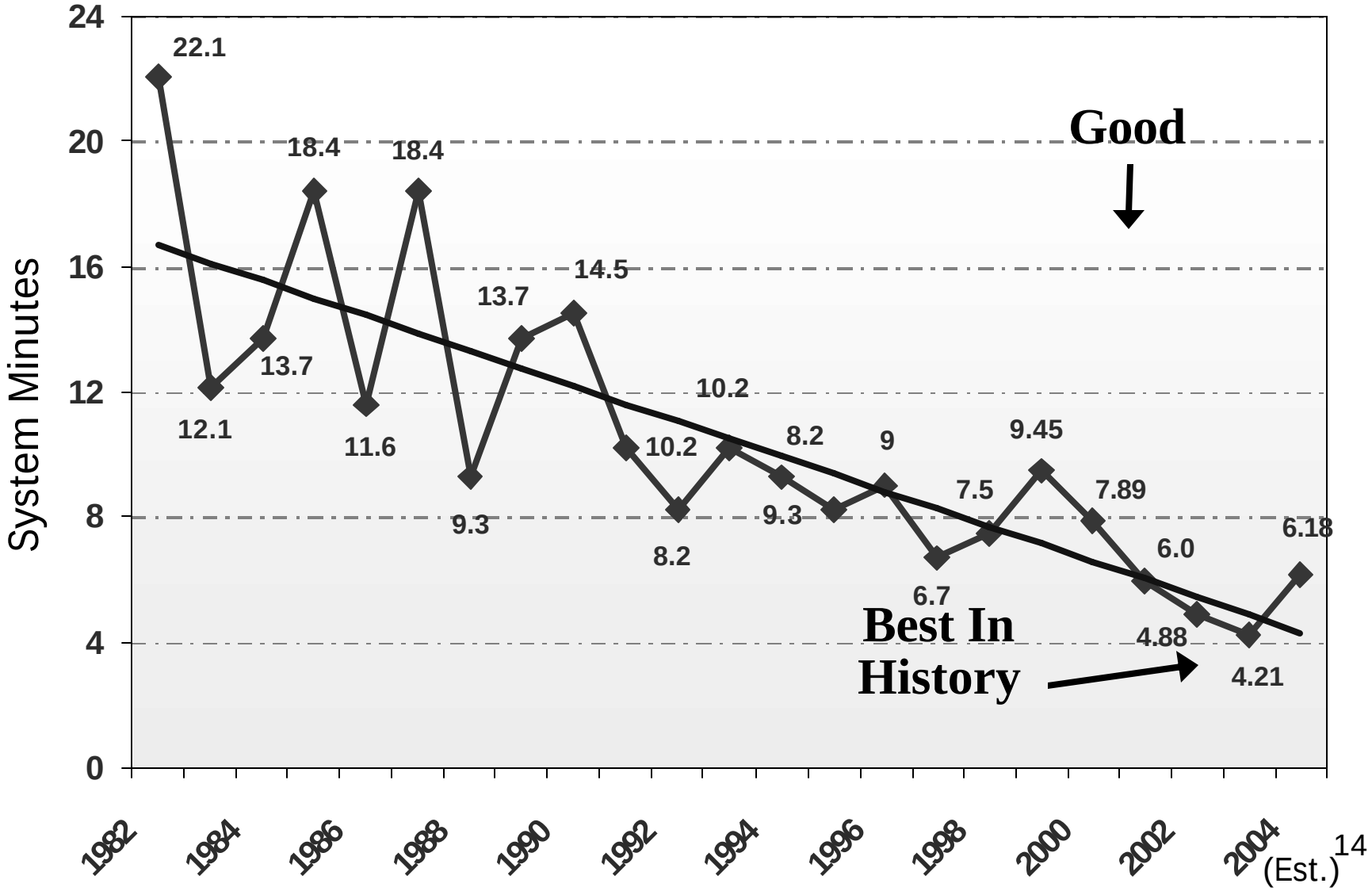
- **3 Million Safe Workhours**

  . . . *Again!*

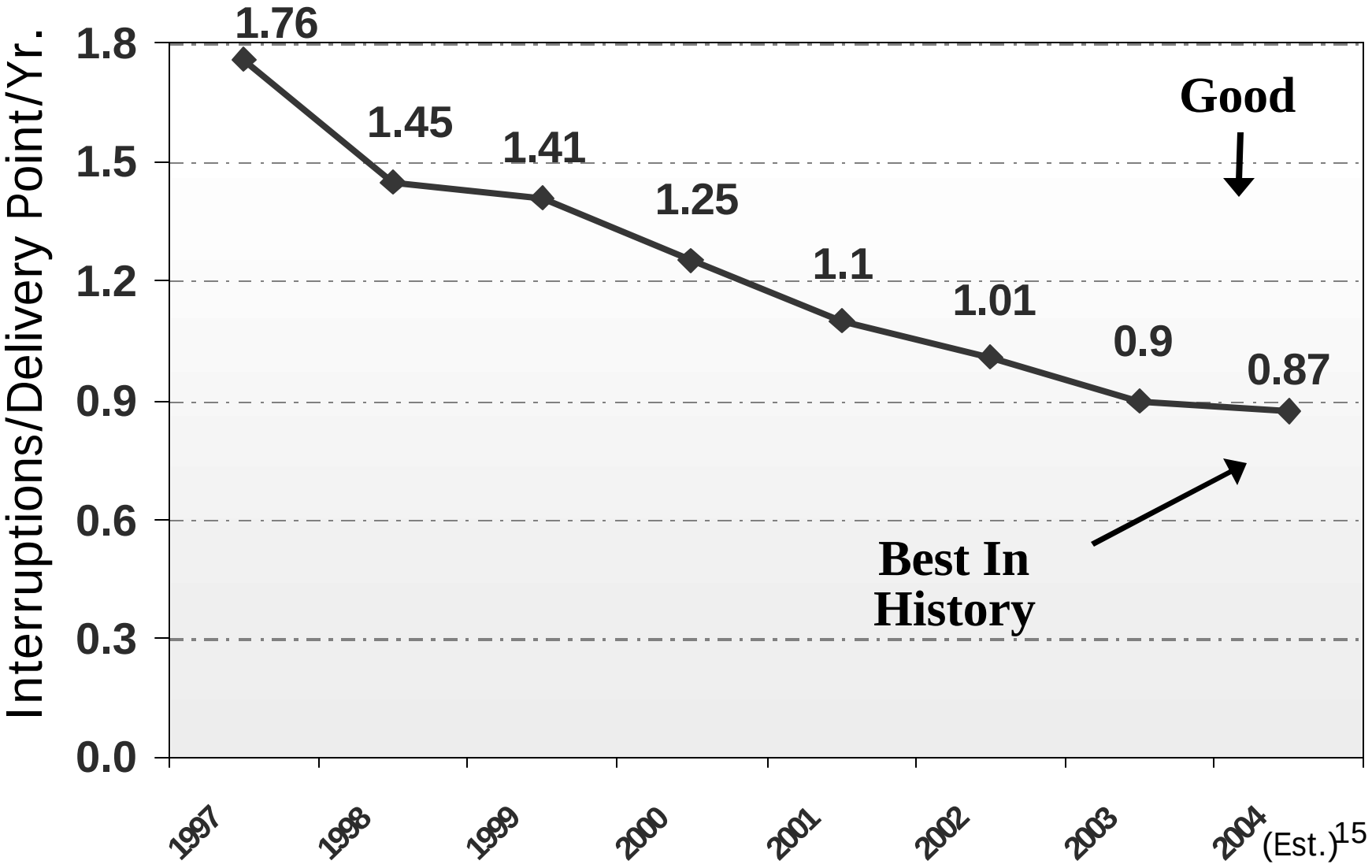
- **99.999 % Reliable**

  . . . *Again!*

Load-Not-Served Trend

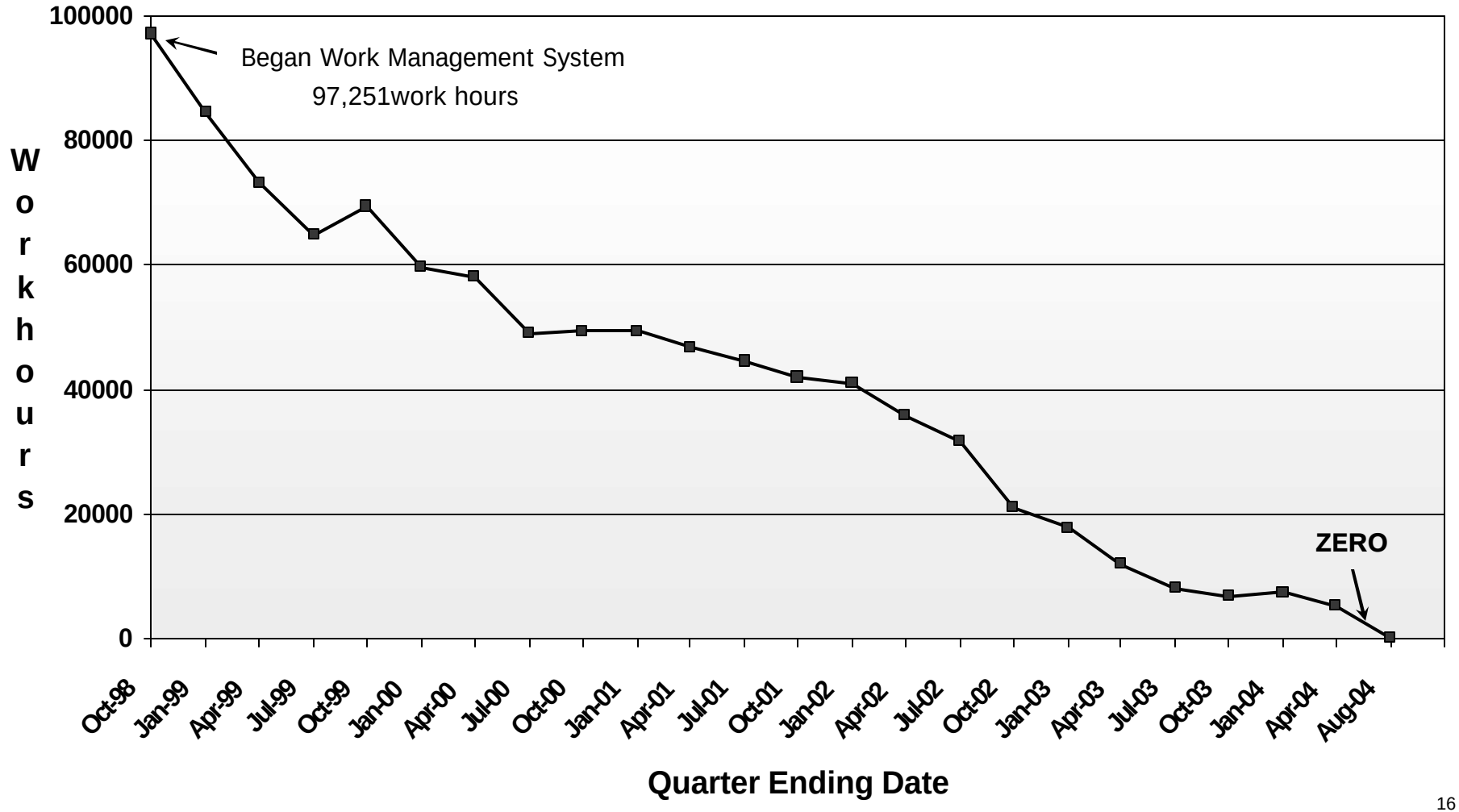


Connection Point Interruptions



Low Cost – Worker Productivity

Preventive Maintenance Backlog



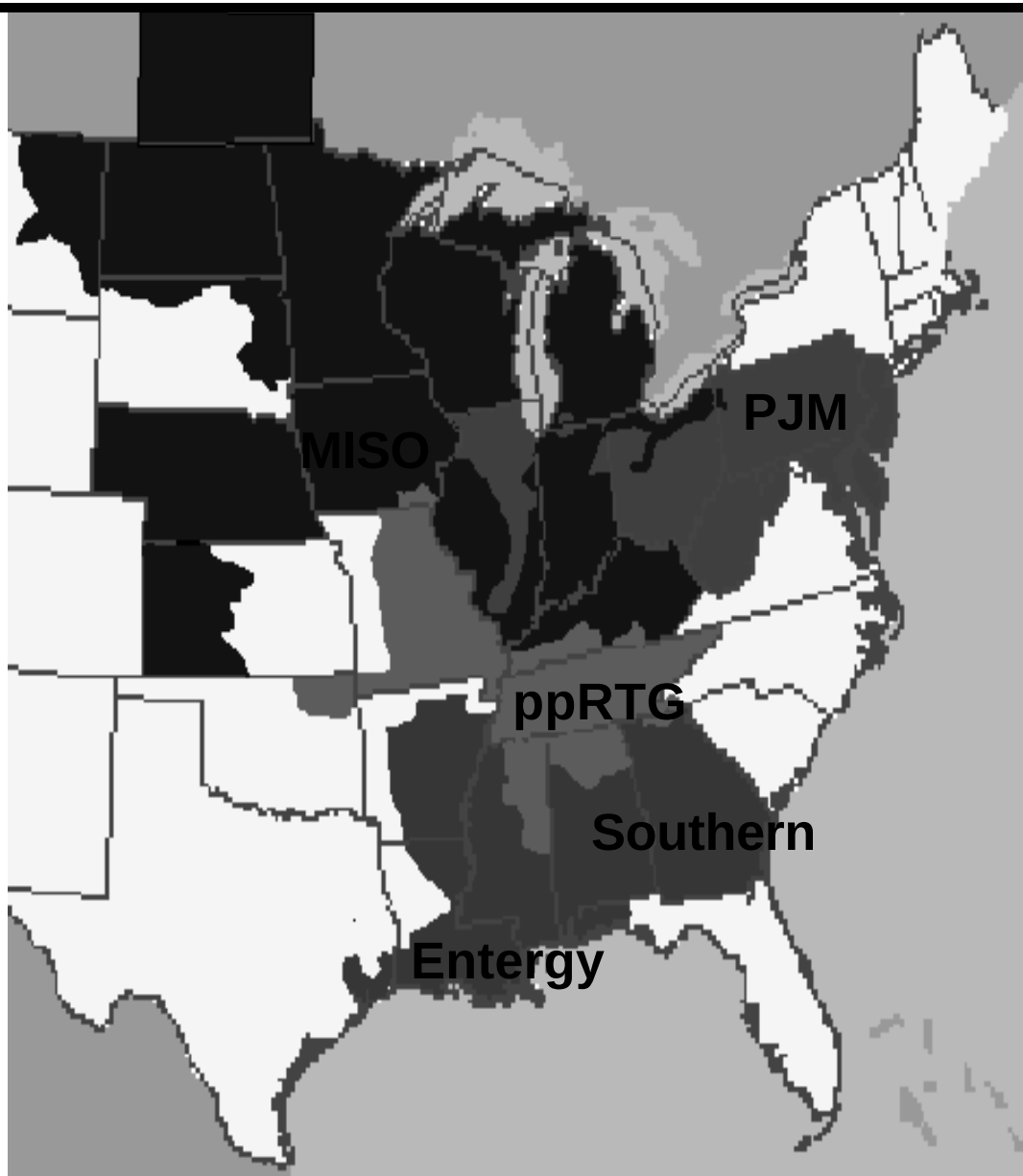
. . . To State of the Art .

Regional Operations Center

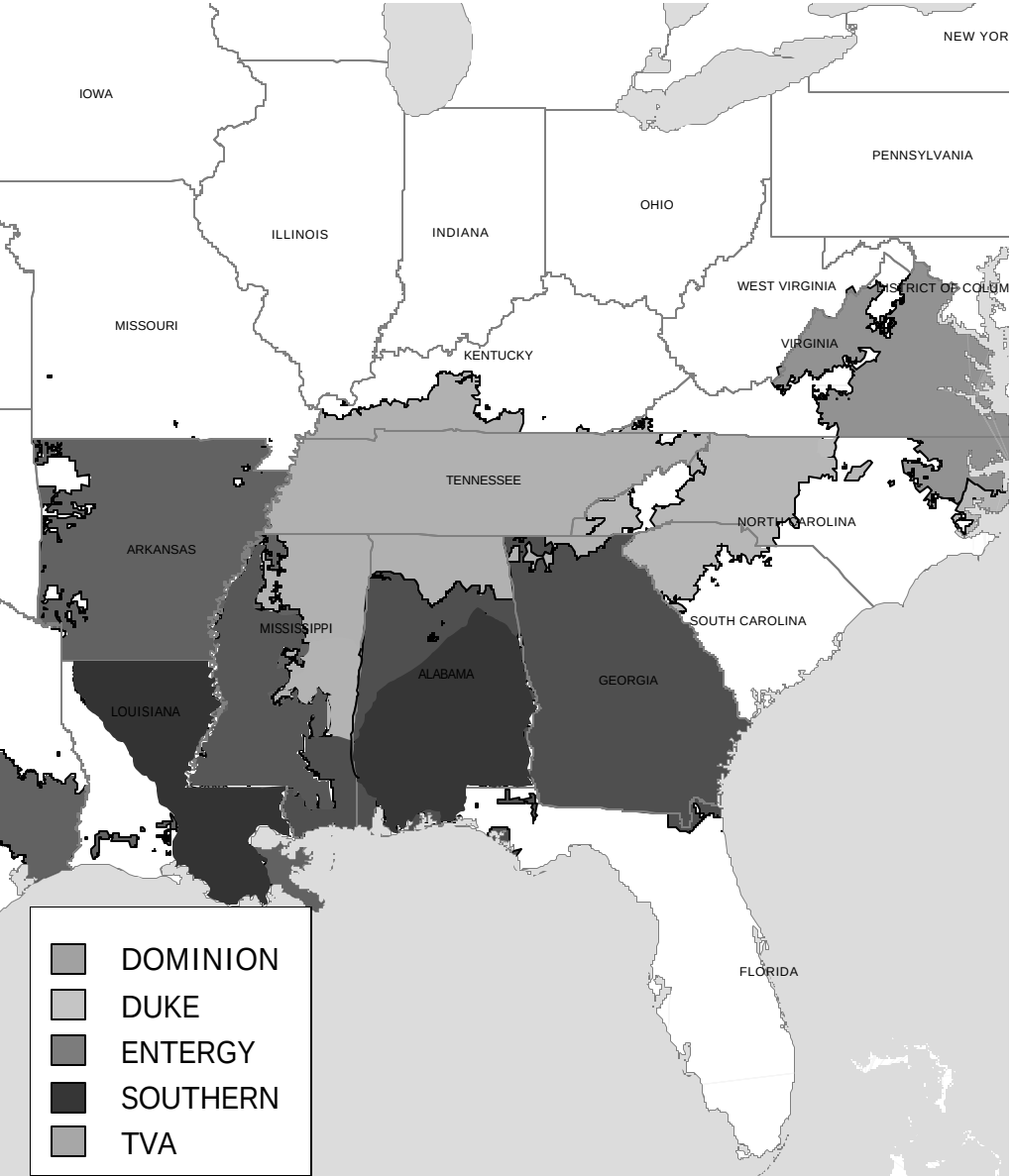
System Operations Center

Regional Coordination

- Data exchange & operational coordination agreement with Southern & Entergy
- Agreements with MISO & PJM to exchange critical grid information
- Negotiating with SPP to improve coordination across the combined service areas

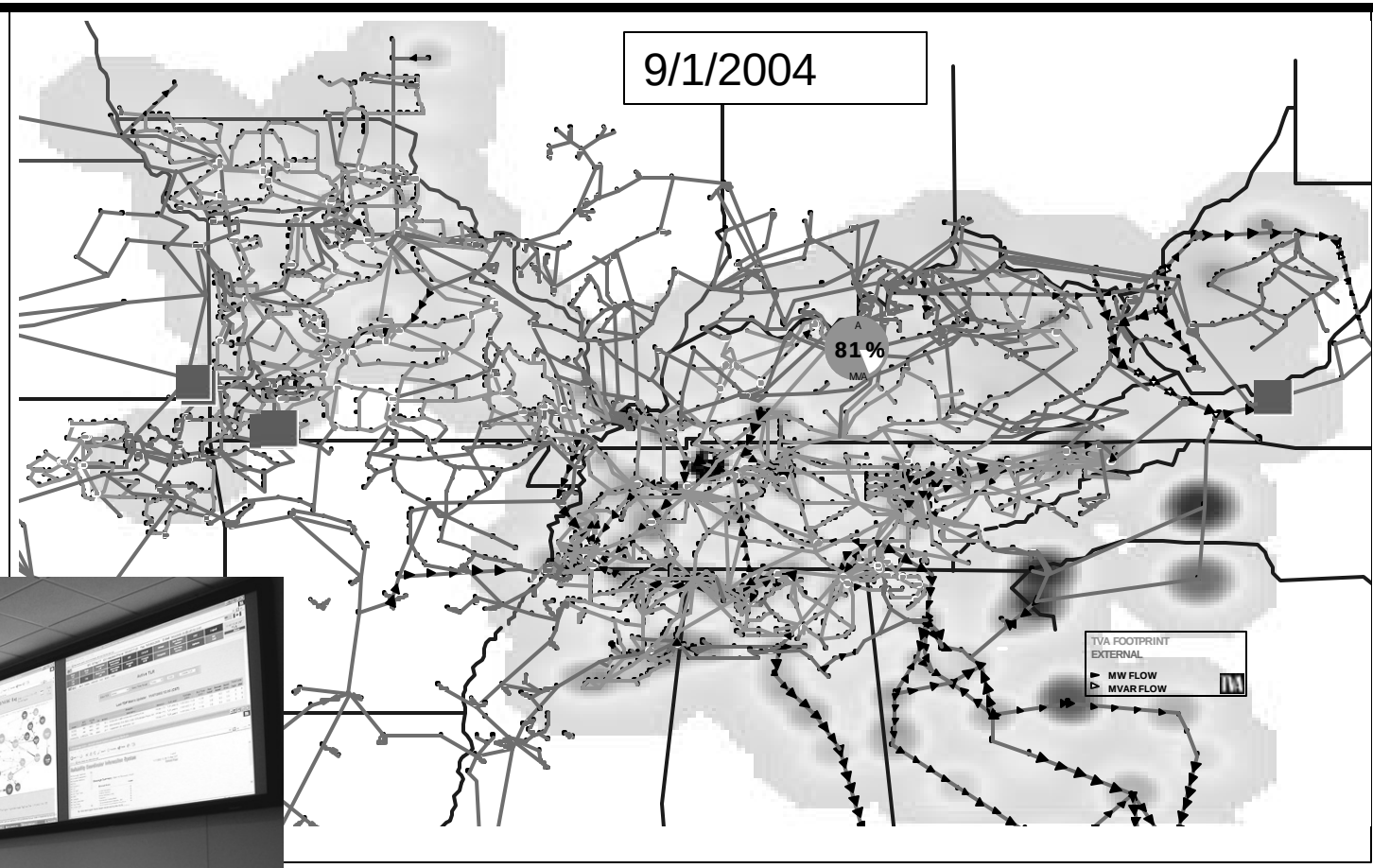


Adding Teeth to Compliance

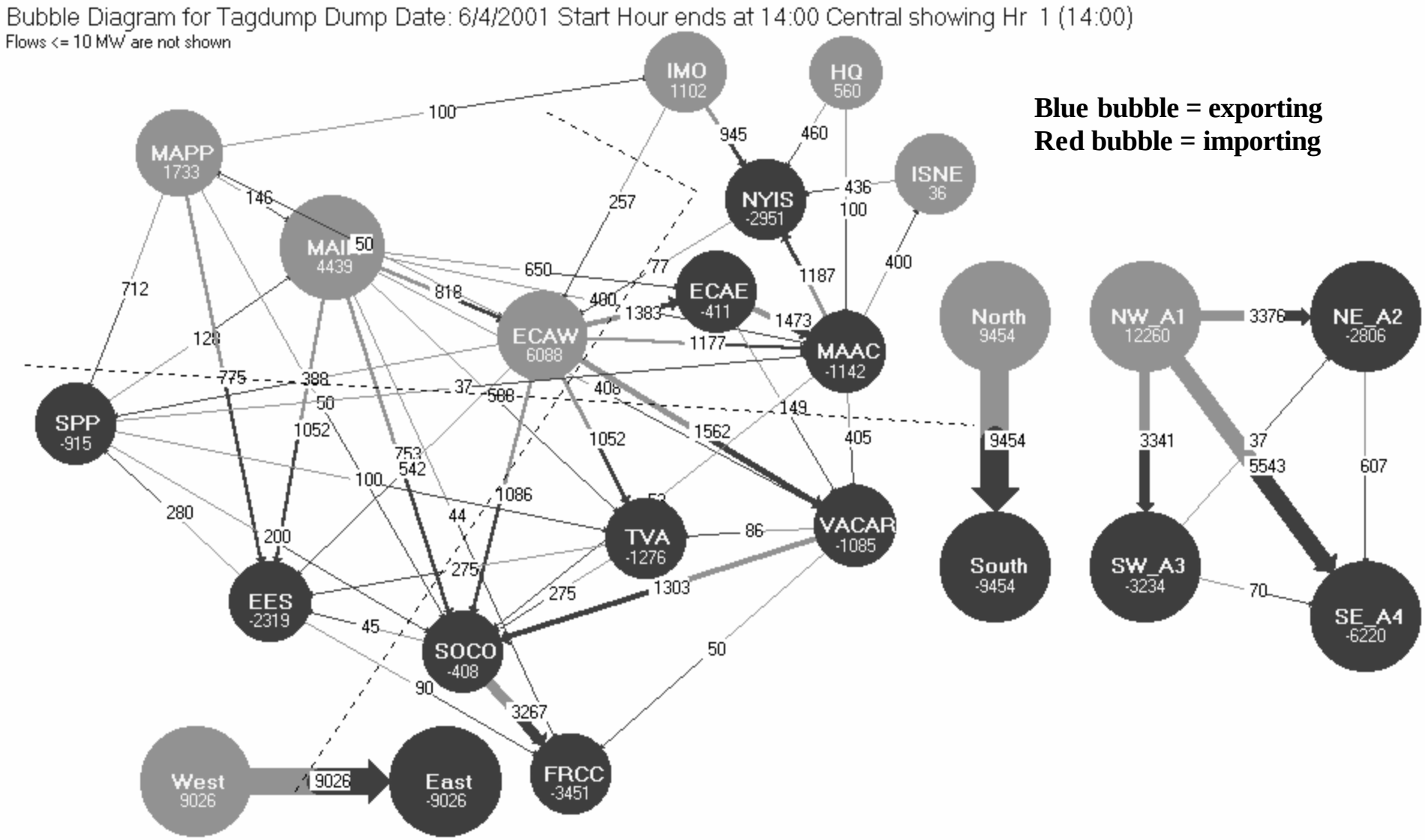


- TVA joined major SERC utilities in a new compliance & enforcement program
- Responsible to meet reliability standards
- Violators subject to penalties
- National reporting of NERC standards violations within 48 hours

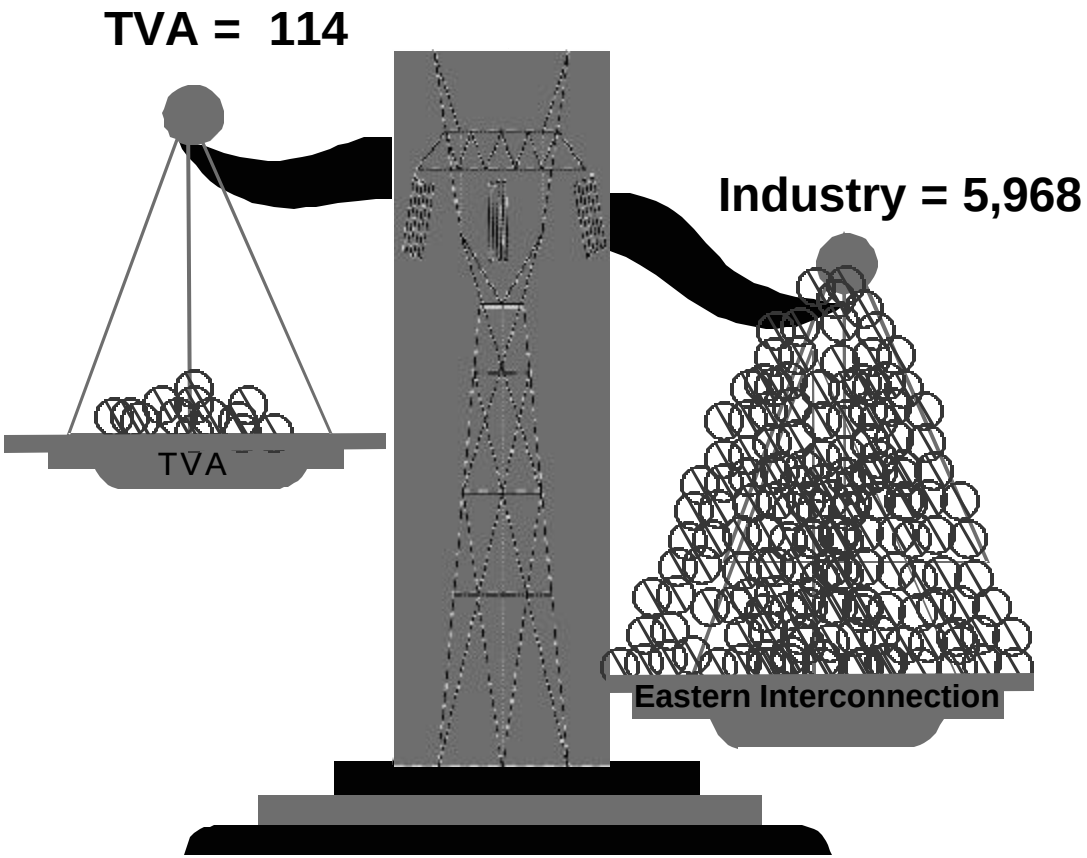
Reliability Authority



Named Largest Tag Dump User

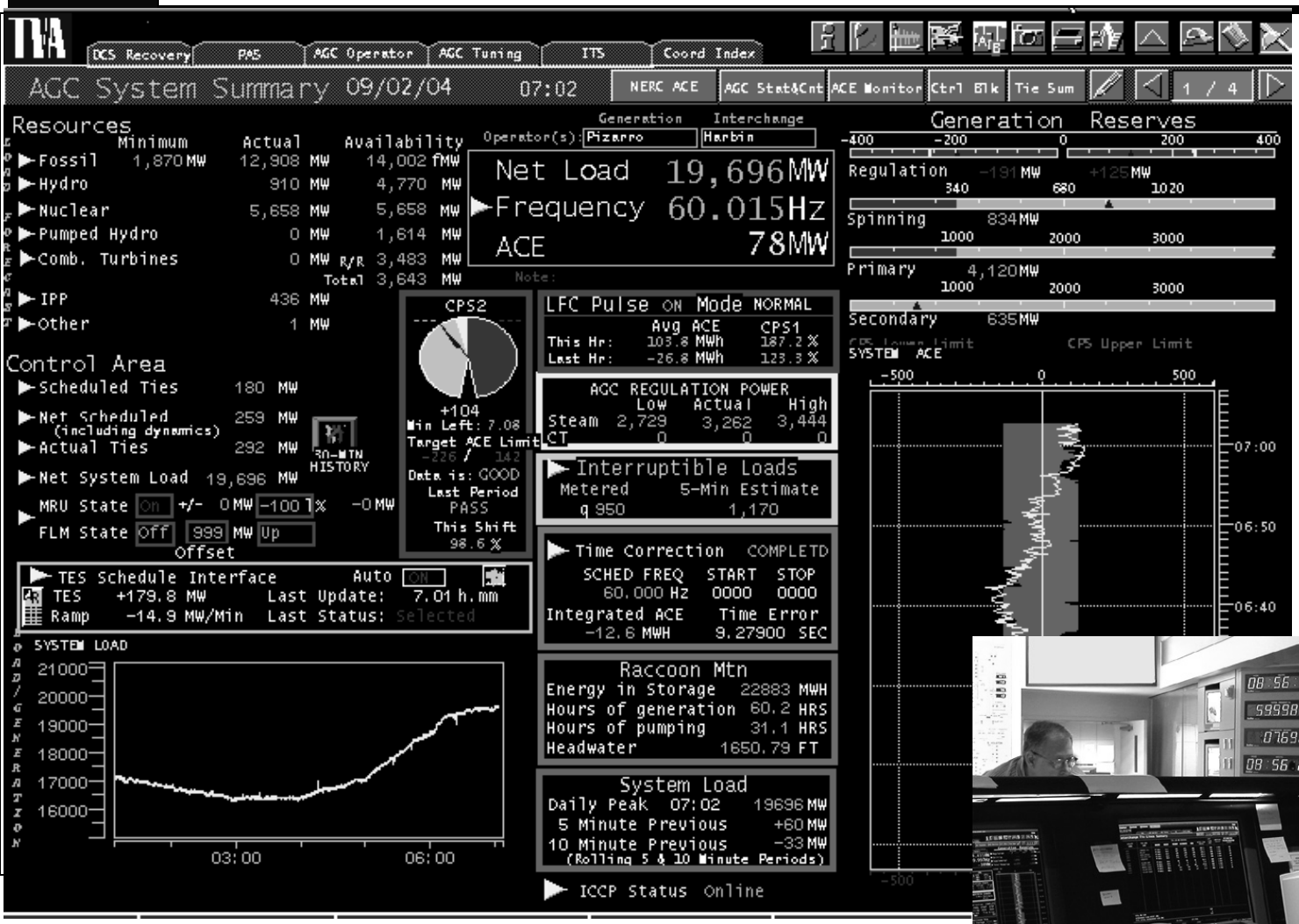


Transmission Loading Relief

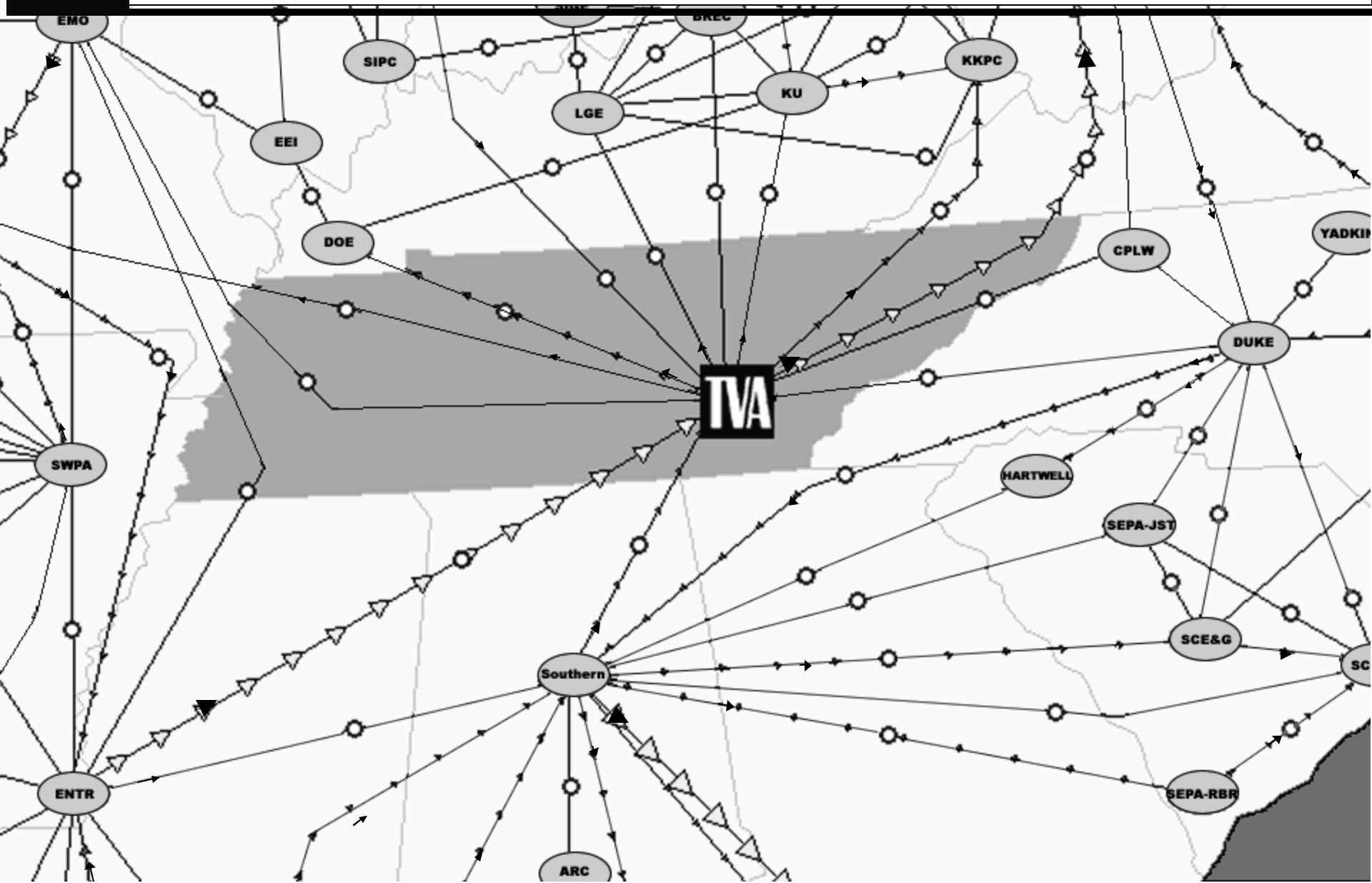


= Transmission Loading Relief (TLRs) Level 3 & above in 2001-04
TVA represents less than 2 percent

Balancing Authority

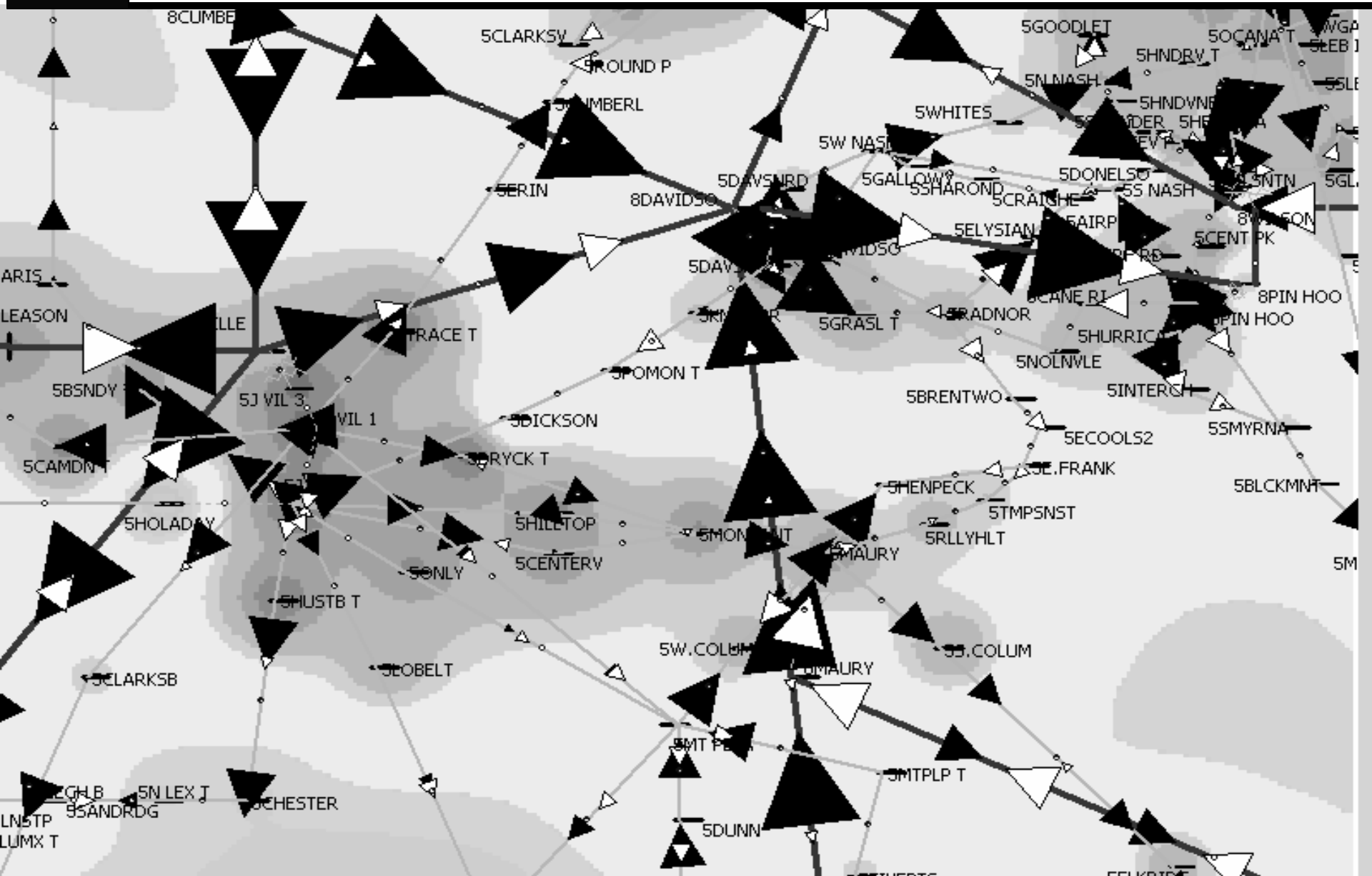


Power World Simulation



Transmission Operator

Monitoring Power Flows

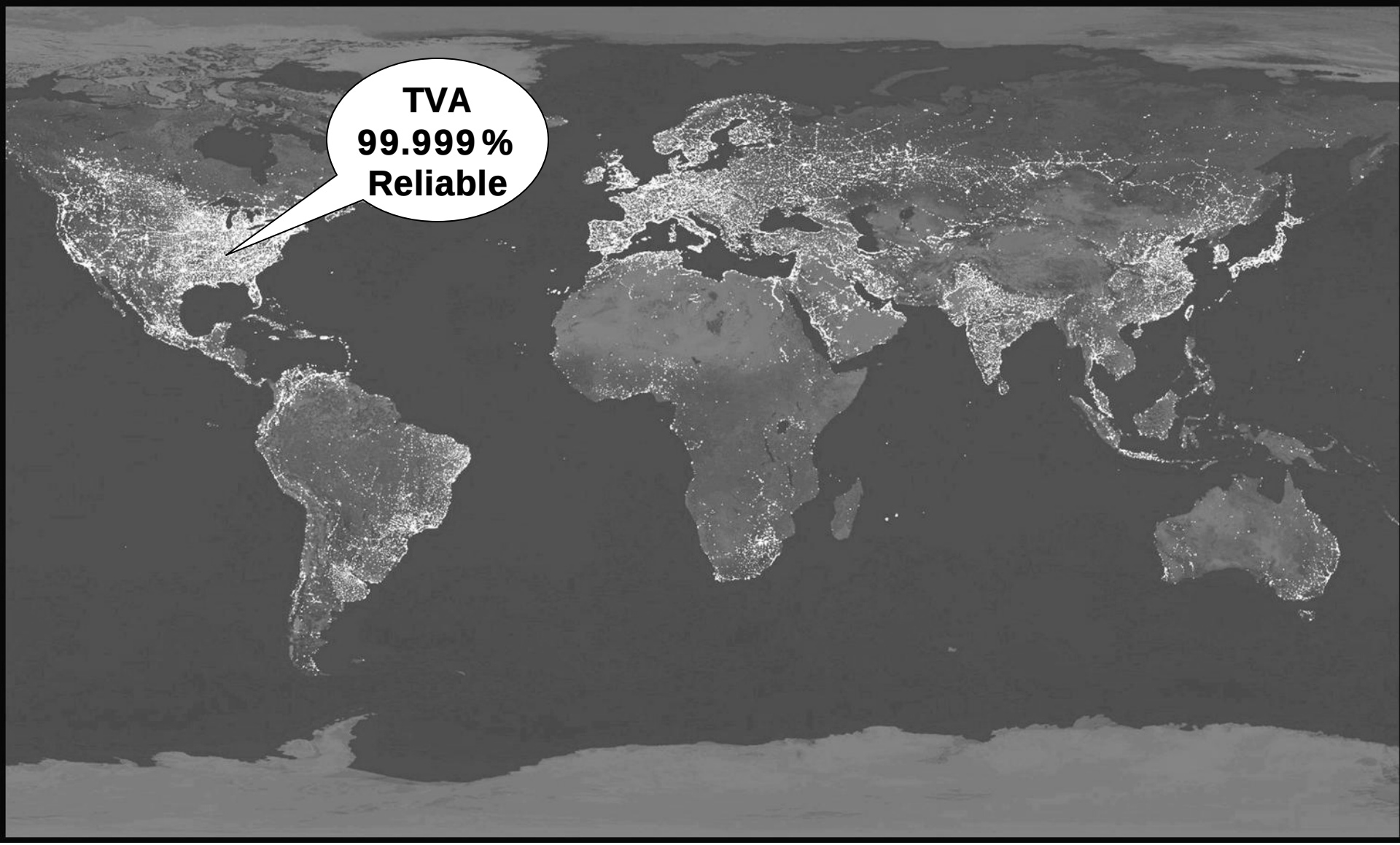


NERC/FERC Audit Findings

"TVA is outstanding the following areas:

- *Training*
- *Seven-shift operation to allow time for training*
- *Backup facilities that are operated and manned*
- *Redundant computer hardware & communications facilities*
- *Status monitoring of the supporting systems*
- *Maintaining a wide area view of the TVA and neighboring systems*
- *Documentation*
- *Overall organizational engagement with a culture of reliability"*

--NERC 2004 Control Area Readiness Audit
http://www.nerc.com/~rap/audits.html



Keeping the Lights On & Generating Prosperity You Can See