
Asset Management Business Update

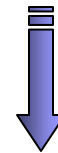
Improvements through Asset Management

Mark Davis,
Director, Asset Management & AW

From Maintenance to Asset Management

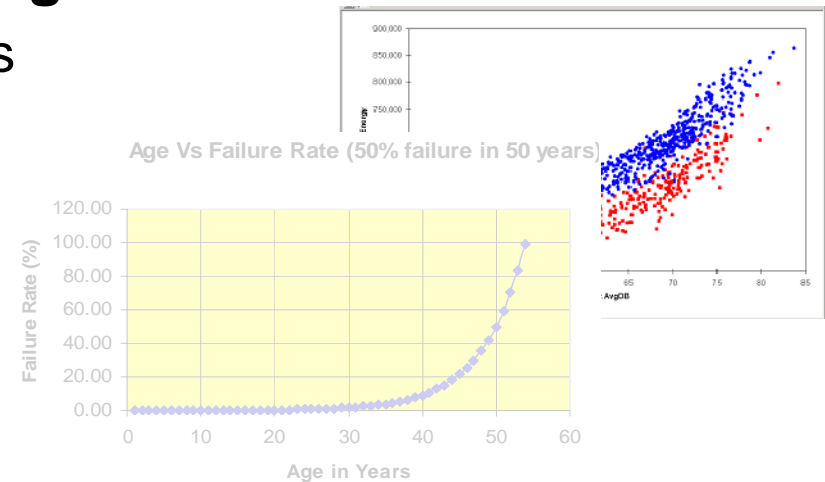
❑ *Maintain the System* - Initial Focus

- Operate, Build and Maintain it.
 - ❑ Assets from several utilities
 - ❑ Major spend to improve the system (new assets)



❑ *Managing our Assets* – Raising the Bar

- Maintenance & Renewals Basis
 - ❑ Compliance emphasis
 - ❑ Reliability improvements
 - ❑ Risk based decisions
 - ❑ Financial transparency



Current Operating Environment

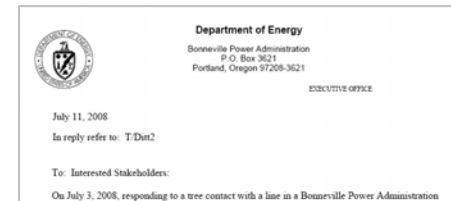
■ Increased Regulator Scrutiny . . . *Changing Times*

□ Vegetation Management

- *Baltimore Gas & Electric - \$180,000.*
- *MidAmerican Energy Company - \$75,000.*
- Bonneville Power Administration (BPA) - WECC comprehensive inspection of all critical bulk BPA transmission ROW.

□ Feb 2008 Florida Power & Light Blackout fallout

- NERC Issued 3 Industry Wide Advisories
 - Authorization Processes for Disabling Key Protection Relays
 - Provisions to grid operators and planners for generator disconnects from grid.
 - Each entity needs to perform a lessons learned analysis on the event.



Current Operating Environment

■ Current NERC Impact

□ 10 NERC standards currently apply

- ✓FAC-003 Trans. Veg. Management Program
- ✓FAC-008 Facility Ratings Methodology
- ✓PRC-004 Analysis & Mitigation of Trans. & Gen. Prot. Sys. Misoperations
- ✓PRC-005 Trans. & Gen. Protection Sys. Maint. & Testing
- ✓PRC-008 Underfrequency Load Shedding Equip. Maint. Programs
- ✓PRC-009 UFLS Performance Following an Underfrequency Event
- ✓PRC-015 Special Protection System Data & Doc.
- ✓PRC-016 Special Protection System Misoperations
- ✓PRC-017 Special Protection System Maint. & Testing
- ✓EOP-004 R2 R3.4 of Disturbance Reporting (partial)

□ 3 additional NERC standards in process



□ Resulting in **154** requirements & Measurements currently applied

NERC
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Reliability Standards for the
Bulk Electric Systems of
North America

to ensure
the reliability of the
bulk power system

July 21, 2008

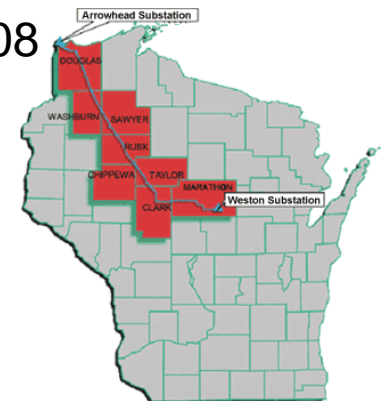
116-390 Village Blvd., Princeton, NJ 08540
609.452.8060 | 609.452.9550 fax
www.nerc.com

Reliability Driven Improvements

- Arrowhead Weston Line January In Service
 - Arrowhead, Stone Lake, Gardner Park (Weston) –345kV line energized January 23, 2008

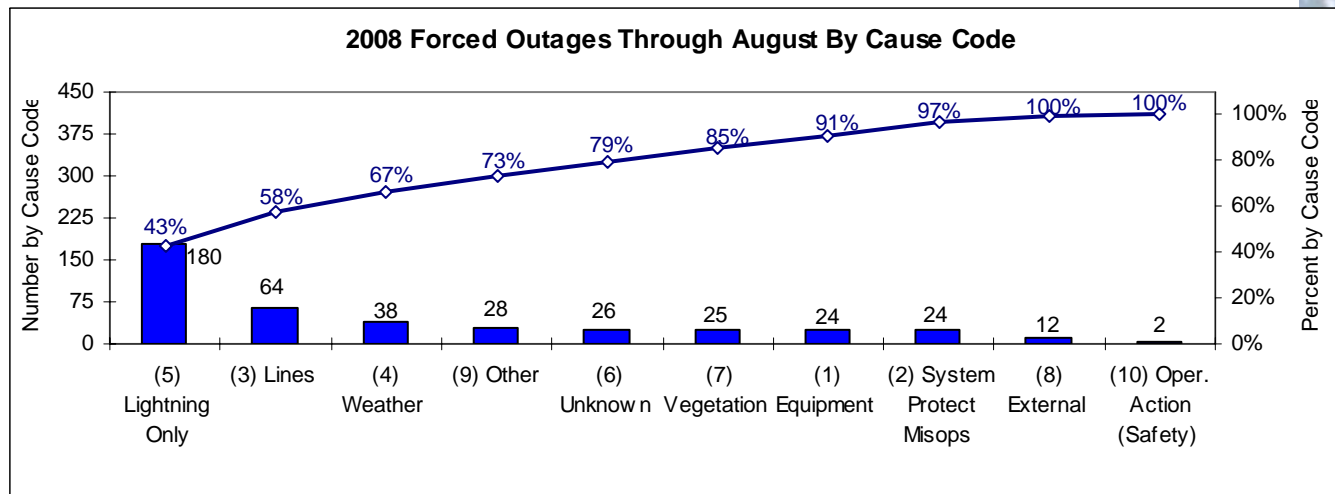
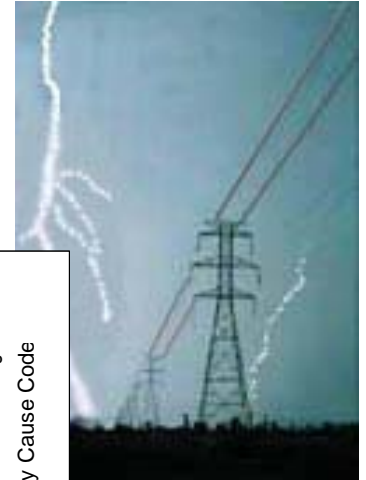


- **Reliability Improvements Since 2007•line•**
 - Increased transfer capability between MN and WI for about 500 MW
 - Allowed deferred maintenance work to occur in spring of '08
 - Minimal impact for unplanned line outages
 - Multiple N-2 voltage stability contingencies eliminated
 - Supported commercial operation of Weston 4 unit
 - Stone Lake supports non-ATC northwest WI area
 - Supported flow into MRO



Reliability Driven Improvements cont.

- Forced Outage Reduction
- Outage Cause Code Analysis



- Outage Root Cause Analysis (as needed)
- Historical Mis-Ops Cause code analysis (2004-2008)

Reliability Driven Improvements cont.

- Forced Outage Reduction (continued)
 - Forced Outage Reduction Plan includes:
 - Lightning Projects
 - Line Equip./Galloping Mitigation Efforts
 - Relay Verification Reviews
 - Corrective Work Order Backlog Prioritization
 - Post Construction Inspections
 - Weekly Forced Outage Calls
 - Human Error Performance Review
 - Sponsored Information Exchanges
 - Relay Testing Summit
 - Reliability Summits
 - Vegetation Management Summit



Reliability Driven Improvements cont.

■ Vegetation Management is. . . *Changing with the times*

□ Improvements

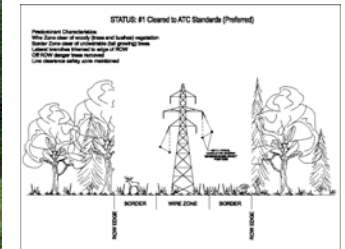
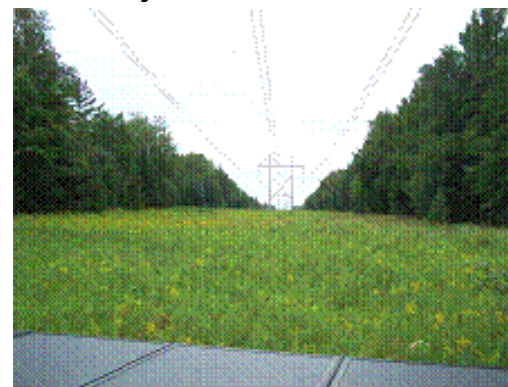
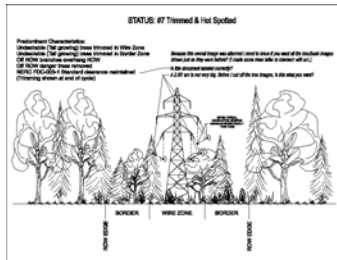


- Forestry Coordinator & Compliance Positions
- Slower patrols to view Off-ROW danger trees.
- T Line Corrective Maintenance (Find and Fix)



□ ROW Condition Based Veg. Management Initiatives

- 2 Targeted Vegetation Management Projects



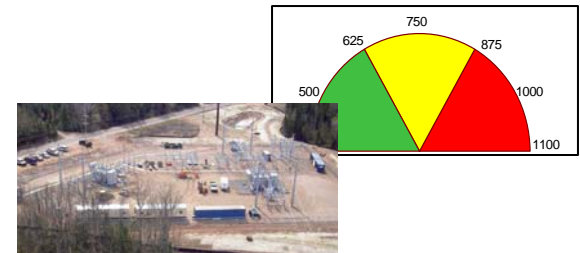
Reliability Driven Improvements cont.

■ Risk-based Program Development

□ Maintenance Program

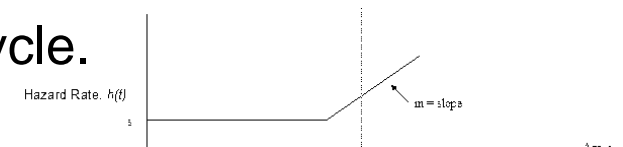
■ Critical Number “Need for Maintenance Testing & Inspection”

- Equipment specific
- Inspections are aligned
- Real Time Risk Calc's tied to EMS sys.

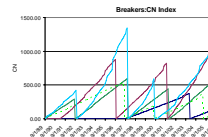


□ Renewal Program

- Total Life Cycle & Statistical Probability of Failure
- AIM Process supports Total Asset Life cycle.



□ Risk based Maintenance Program & Renewal Budgeting



Reliability Driven Improvements cont.

■ Industry Leadership in Transmission Owners & Operators Forum

- Vegetation Management Practices Group
- Focusing on practice improvements



Improving to Meet the Challenges

■ Focusing on

- Reliability analysis & improvement initiatives
- Reducing our vegetation management risks
 - Vegetation Management Coordinator
 - Improved easement rights
 - Additional focus on program
 - Transmission Owner's & Operators Forum Leadership role
- Data & analysis based maint. & renewal decisions
- Compliance mindset
 - Asset Management Compliance Position
 - Compliance monitoring and oversight

