

Emergency Response

Plan, Exercise, Respond, Recover



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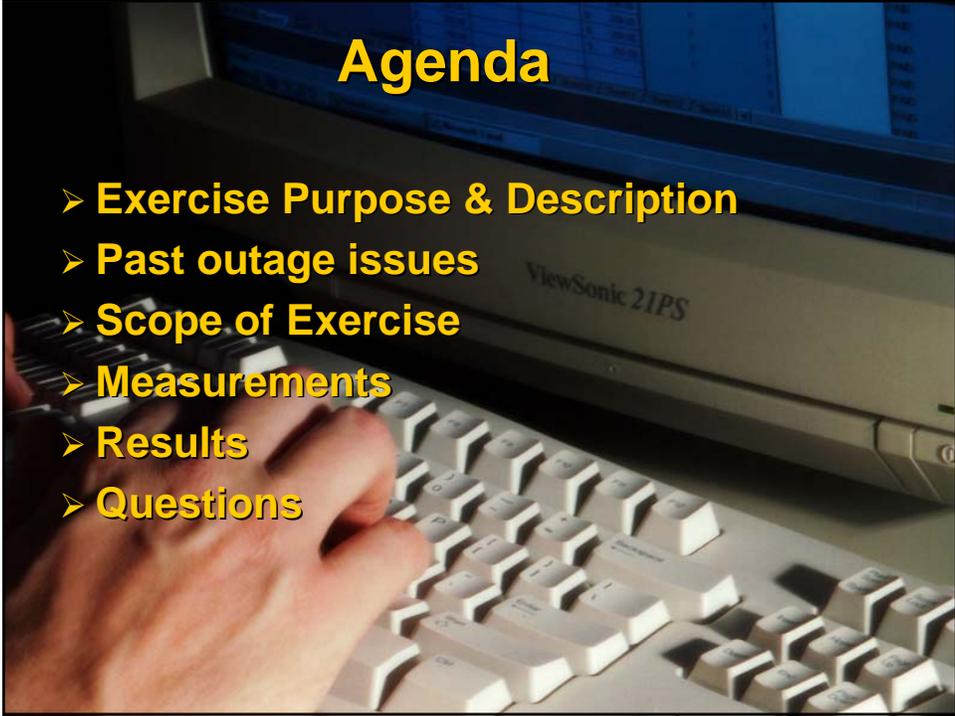
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Minnesota Valley Electric Cooperative Outage Simulation Exercises

April 6, 2006 & November 1, 2007

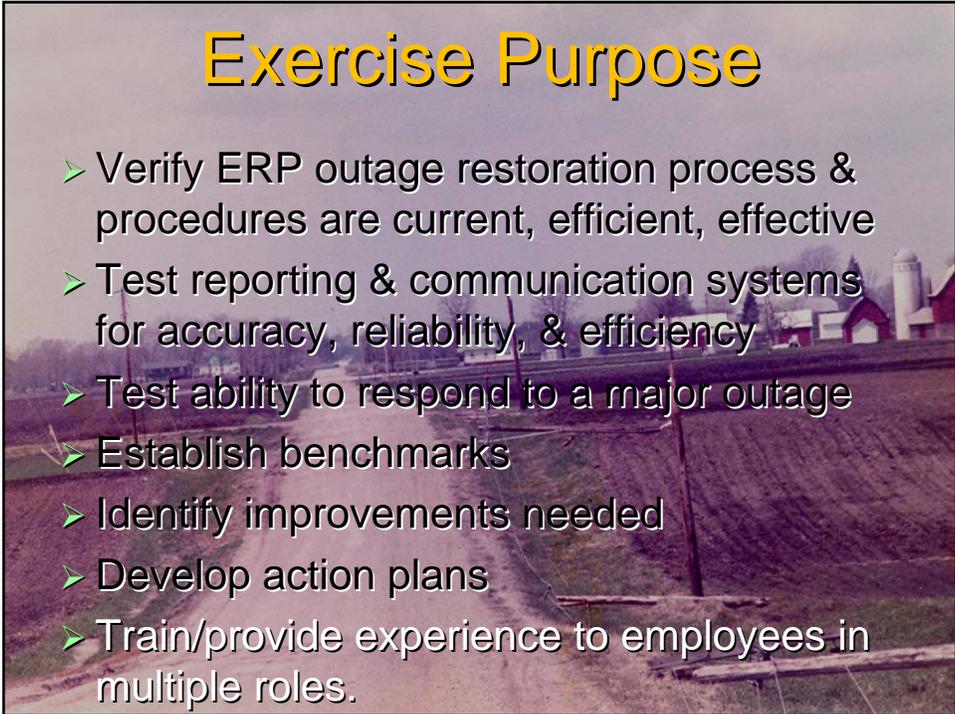
Results & After-Action Summary

Dave Beckius
Operations Manager



Agenda

- Exercise Purpose & Description
- Past outage issues
- Scope of Exercise
- Measurements
- Results
- Questions



Exercise Purpose

- Verify ERP outage restoration process & procedures are current, efficient, effective
- Test reporting & communication systems for accuracy, reliability, & efficiency
- Test ability to respond to a major outage
- Establish benchmarks
- Identify improvements needed
- Develop action plans
- Train/provide experience to employees in multiple roles.

Exercise Description

- Exercises conducted on weekday evenings
- No Prior Notice given to employees
- Both exercises were sleet storm simulations affecting about 5,000 MVEC accounts
- **Transmission grid affecting 5 substations**
- **Substation feeders affecting 9 substations**
- **5000 member phone calls simulated**
- **Mutual aid contacted: availability & ETA**
- **Implemented Power Restoration Plan**

Exercise Description

- **Distribution poles “tagged” with outage description the day the simulation**
 - **Outage calls started, Engineers dispatched**
 - **Design Engineers found tags; radioed information to the On-Call Supervisor**
 - **On-Call Supervisor evaluated the information, designated roles and responsibilities, & implemented processes & resources to restore power as quickly & efficiently as possible**

Past Major Outage Issues



- Inadequate employee response
- Phone & communication failures
- Computer system failures
- Slow response by supervisors to critical situations, e.g., understaffing

Past Major Outage Issues



- Dispatch manual outdated
- Lack of ERP training
- Mapping errors
- Equipment failures
- Contingency plan failures
- Material shortages

Scope of Exercise

- Outage Management System
- Contingency Back-feeding plans
- Telephone/communications
 - Frontier – call volume
 - Cell/Two-way radios - range
 - Marco/Porsche - efficiencies/messaging

Scope of Exercise

- Supervisory Control And Data Acquisition (SCADA) – Some done remotely
- AMR meters– voltage verification
- Material availability
- Computer system & software

Scope of Exercise

- Automatic Vehicle Locating (AVL)
- Dispatch manual
- Personnel – response time & ERP knowledge
 - Field
 - Office Support
 - Dispatch
 - Accounting
 - Marketing
 - Management

Evaluating Outage Magnitude

Measurements:

- 25% of outages identified – 1 hour
- 50% of outages identified – 1.5 hours
- 75% of outages identified - 2 hours
- 100% of outages identified - 3 hours

Actual:

- 25% of outages identified – 44 minutes
- 50% of outages identified – 1.6 hours
- 75% of outages identified - 1.9 hours
- 100% of outages identified – 2.2 hours

Response Time to Outage Site

Measurements:

- 50% of line crews response to site w/in 90 minutes
- 100% of line crews response to site w/in 2.5 hours

Actual:

- 30% - Crews report to site w/in 90 minutes
- 70% - Crews report to site w/in 100 minutes
- 100% - Crews report to site w/in 2.5 hours

Mutual Aid Crew Response

Measurement:

- 10 Mutual Aid crews identified w/in 3 hours

Actual:

- 11 Mutual Aid crews w/in 2 hours
- 15 Total Mutual Aid crews w/in 3 hours

Outage Management System (OMS)

Measurements:

- Recorded voice mail describing outage is effective
- Accuracy of predicting line devices affected by outage
- 100% accuracy of phone #s
- 100% accuracy of computerized maps
- OMS 100% accurate

Actual:

- Recorded voice mail describing outage was effective
- Accuracy of predicting line devices affected by outage
- 100% accuracy of phone #s
- 100% accuracy of maps
- OMS performance was 100% accurate

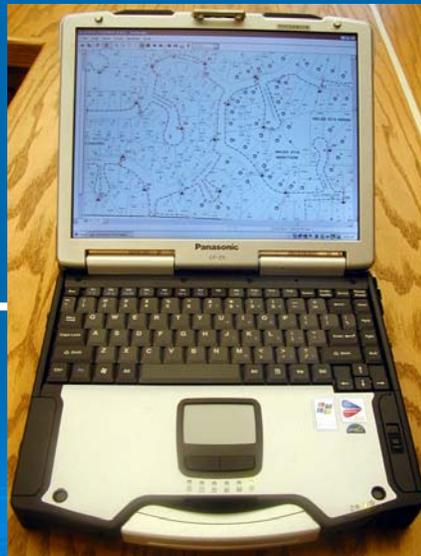
Software/Computer System Reliability

Measurement:

- No failures

Actual:

- No failures



Dispatch Manual

Measurement:

- All procedures 100% up-to-date & accurate

Actual:

- All procedures 100% up-to-date & accurate

AMR

Measurements:

- 100% voltage verification from 32 AMR meters
- Voltage confirmation received w/in 5 minutes

Actual:

- Voltage verified on 26 of 38 meters.
 - AMR communication to 2 substations failed.
- 100% accuracy on 1,100 meters during second simulation.

SCADA

Measurement:

- 100% of remote switching working
 - 4 tested
 - 2 - substation feeders
 - 2 – down stream devices
 - Internet access from home



Actual:

- One downstream device had a communication failure.
 - Since corrected

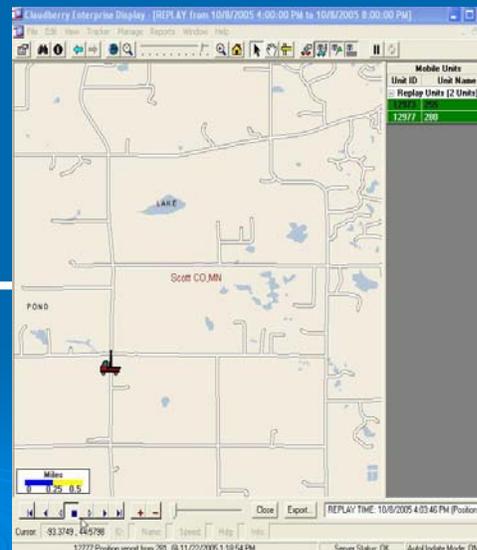
Automatic Vehicle Locating (AVL)

Measurement:

- Crew positions are 100% accurate

Actual:

- AVL to 1 truck not working - Corrected



Radio/Mobile Phones

Measurement:

- **Communications - 100% consistent throughout the night**

Actual:

- **100% of mobile phone communication working**
- **2 truck radios not working correctly.**
 - Since corrected

Vehicle Readiness

Measurements:

- **Designated line trucks fueled when crews arrive**
- **100% of small vehicles fueled when engineers, technicians, and cable locators arrive**
- **100% line truck equipment functional (aerial lifts, digger derricks, etc.)**

Actual:

- **ALL designated trucks fueled**
- **100% of small vehicles fueled**
- **100% line truck equipment functional**

Employee Emergency Response Plan (ERP) Training

Measurement:

- 100% of employees able to perform job assigned

Actual:

- 100% of employees performed job assigned

Mapping Errors

Measurement:

- 99% of all maps are accurate

Actual:

- No mapping errors detected

Equipment Failures

Measurement:

- All line switches are functional

Actual:

- **100% manual line switches functional**
 - One switch had no remote communication

Distribution Contingency Back-feeding Plans

Measurement:

- **All plans are 100% accurate**

Actual:

- 100% accurate and functional
- Mirrored system model

Line Material Needs

Measurement:

- All line materials are available

Actual:

- No material shortages
- 10 miles of 3-phase material in stock
- 8 miles of 1-phase material in stock
- Guaranteed delivery of 70-80 poles w/in 24 hours. (Bell Pole Co. agreement)

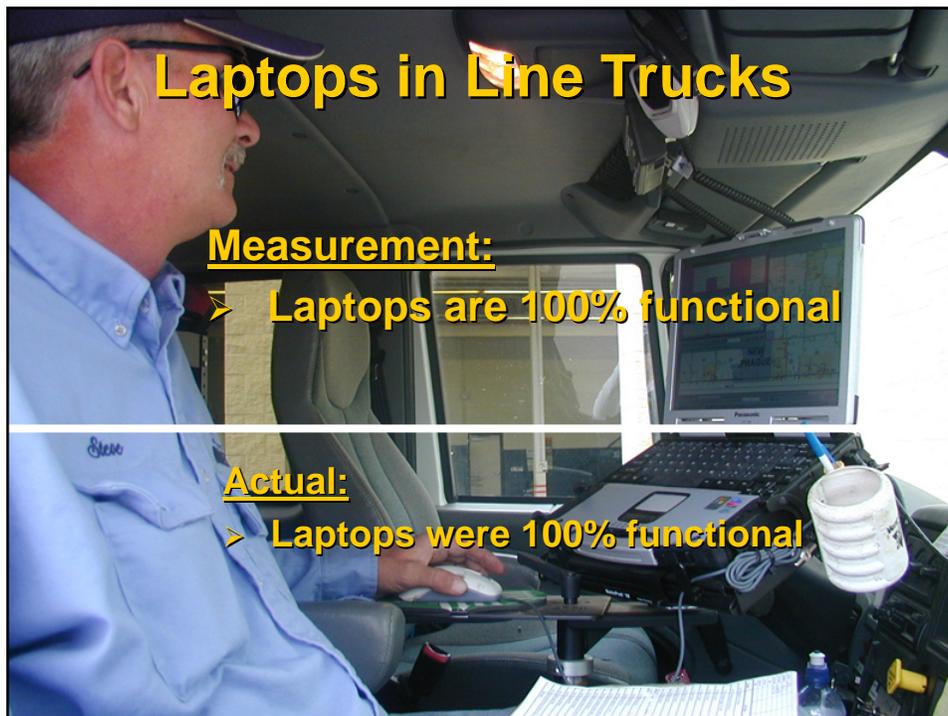
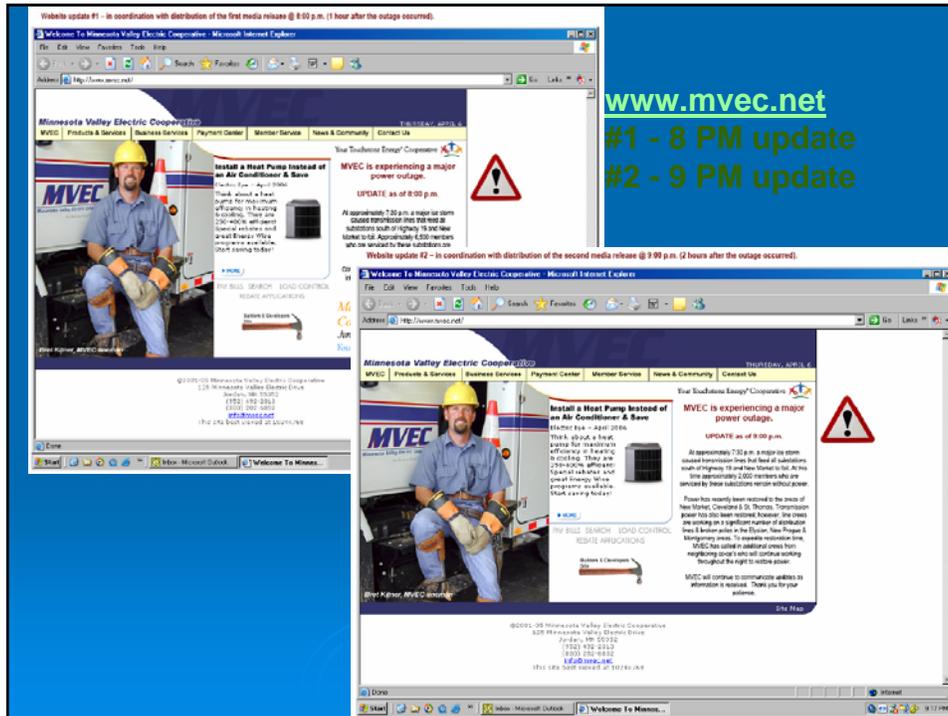
Media Communication: Radio, Newspaper

Measurements:

- 1st press release – 100% accurate; released to stations w/in 1.5 hours of initial outage
- 2nd press release - 100% accurate; released to stations w/in 2.5 hours of initial outage

Actual

- 1st press release – completed & accurate w/in 1 hour of initial outage
- 2nd press release - completed & accurate w/in 2 hours of initial outage



Crew Preparedness

Measurement:

- 100% preparedness of line crews;
Crews have all personal protective equipment when arriving on site

Actual:

- Crew personal protective equipment (PPE) at 100%

Results - What Went Well

- No mapping errors
- Phone answerers efficient
- All designated trucks fueled
- 100% of cell phones worked
- OMS 100% accurate
- Electronic Equipment & computers performed well
- Contingency back feeds accurate
- Employee Availability was excellent
- Employee PPE at 100%
- Response time was excellent

Results - What Went Well

- AVL in all vehicles working
- All trucks were equipped with tools & materials
- No material shortages
- OMS/AVL/SCADA worked from supervisor homes
- Mutual aid response excellent
- MVEC people identified to assist mutual aid crews
- Media releases/website updates timely/accurate
- Most exercise Measurements were met
- Corrective Actions were identified & completed
- Benchmarks for future performance set

Results - What Needed Improvement

- Inadequate number of log-in stations for phone answerers - identified prior to 1st simulation
- Only 1 outgoing phone line at HQ in 1st simulation
- Remote SCADA failed to one VCR
- 2 truck radios not working
- Hand held flashlight shortage
- AVL to 1 truck not working
- AMR to two substations Failed to report back
- Some cell phone dead spots were noted

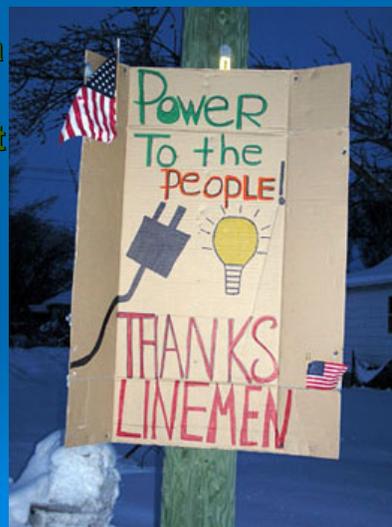
Results – Exercise Project Cost

Total personnel time (4 hours on average)

➤ Labor	\$7,400
➤ Equipment/mileage	\$1,100
➤ Automated phone calls	<u>\$4,500</u>
TOTAL	\$13,500

Future Outage Simulation Test

- Conduct at least one test a year
 - Compare results against prior simulations.
 - Test new technologies.
 - Identify and repair failures.
 - Track indicies improvements
CAIDI, SAIDI, SAIFI, MAIFI



Minnesota Valley Electric Cooperative August 25, 2006 Tornado

- Tornado hit southern service territory approximately 6:05 PM affecting 4,600 members (3 miles SW of Cleveland extending on a 1 mile wide path for 8 miles SW to 4 miles north of Elysian)

- Approximately 115 distribution poles & 10.5 miles of line destroyed

- The GRE transmission grid lost power; affected 5 substations



Actual Event - What Went Well

- Zero mapping errors
- All employees successful in job duties
- 100% of radios & cell phones working
- SCADA 100% functional
- OMS 100% accurate
- Media releases were timely & accurate
- Employee meals & mutual aid hotel accommodations were timely & sufficient



Actual Event - What Went Well

- **Electronic equipment/computers performed well**
- **Contingency back-feeds were accurate & functional**
- **Employee availability; excellent response times**
- **Phone system & messaging functional & accurate**



Actual Event - What Went Well

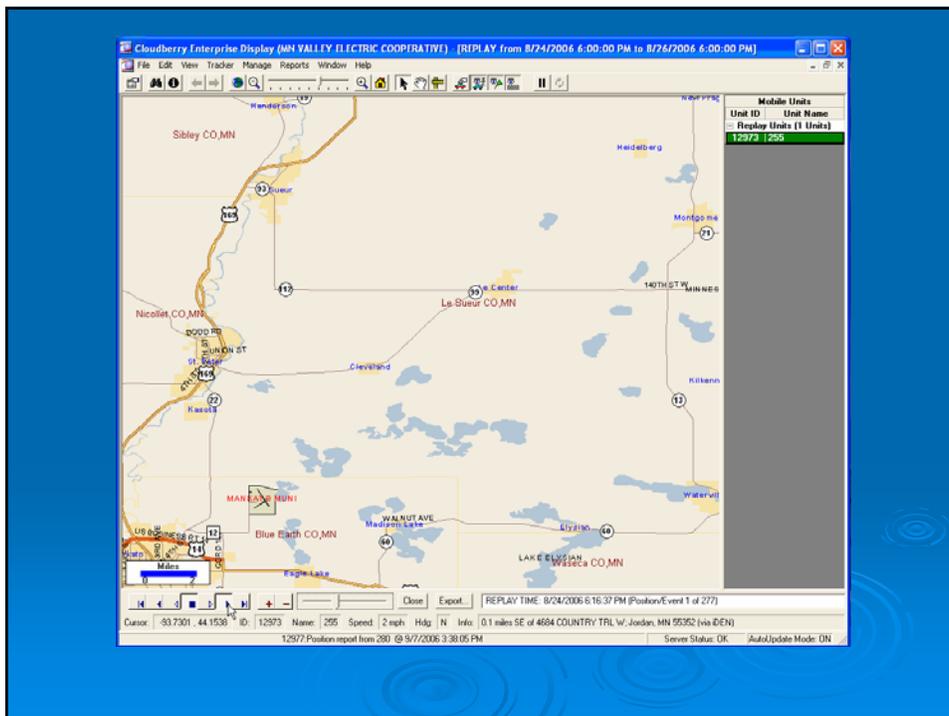
- **Sufficient employees to assist with all restoration**
- **5 supervisors available & working**
- **AVL to all line trucks working**
- **All trucks equipped with tools & materials**

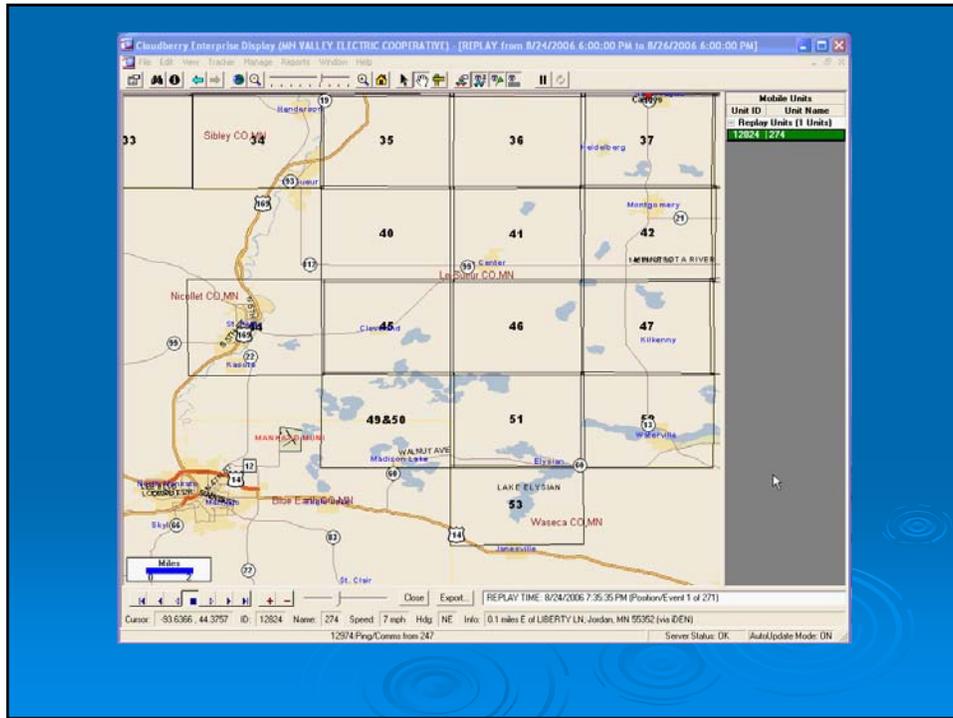


Actual Event - What Went Well

- No material shortages
- OMS, AVL & SCADA 100% functional
- Mutual aid response excellent
- Employee PPE at 100%

- 115 poles replaced & 10.5 miles of line rebuilt & switched back to normal w/in 48 hours
- All but 8 members' power restored w/in 24 hours
- All members' power restored w/in 46 hours





Emergency restoration

Eddie Moran, GFR Oklahoma

How to treat an emergency with FEMA

- Same as Any Emergency
- Be Prepared
- Enact the Plan
- Track the Costs
- Restoration of Service/System
- Evaluation

BE PREPARED

What, When, Where's it coming

- Weather Channel
- www.noaa.gov
- Check early/Check often

BE PREPARED

Prepare accordingly

- Little –
 - Inform Staff

BE PREPARED

Prepare accordingly

- Big –
 - Inform Staff
 - Initiate ERP – Assistance, Materials, Lodging, Food
 - Other Requirements – Communications, Money

BE PREPARED

Prepare accordingly

- Really, Really Big –
 - Inform - Staff, Media, Consumers
 - Initiate ERP
 - Communications
 - Pray

BE PREPARED

Prepare for the unknown

- Go to people (Statewide, etc.)
 - Labor
 - Materials
- React

ENACT THE PLAN

Determine Scope of Damages

- Follow Developments
- The Larger the Damage, The Greater the Need for Assessment
 - Little – Emphasis on Coordination of Crews
 - Big – Emphasis on Logistics for Restoration
 - Really Big – Plan, Organize, Implement

ENACT THE PLAN

React Accordingly

- Little –
 - Get the crews out
- Big –
 - Organize labor and materials
 - Communicate to members and public
- Really Big –
 - Make Plan for Action
 - Prioritize
 - Plan for Permanent Restoration
 - Meet with FEMA

TRACK THE COST

- Work order system
 - All costs (separate expense later)
 - Cost by county, contractor, etc.

- Construction Work Plan Amendment

- FEMA Information
 - Categories
 - Receipts

RESTORE SERVICE

- Extraordinary Costs
- Emergency Procedures
- Reasonable Actions and Costs
- Limited Time
 - Last Service is Restored
 - Reasonable Time Frame

RESTORE SYSTEM

- Normal Procedures
- Best Practices on Actions and Costs
- Longer Time
- Coordination with FEMA
 - Scope of Work
 - Damaged by the Storm
- Doing the Right Thing

EVALUATE PLAN

- How did we do
- How can we improve

Questions?

Thank You!

