Great River Energy Winter Storm Wesley response

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IN MARCH: FRIDAY THE 13TH, FULL MOON, TURNED CLOCKS AHEAD, ALL IN ONE WEEKEND.

OCTOBER 31ST: HALLOWEEN ON A SATURDAY, FULL MOON, TURN CLOCKS BACK AN HOUR. MAYBE THIS WILL RETURN US TO FACTORY SETTINGS?
April 10-11, 2019

Winter Storm Wesley Snow Recap

Image courtesy weather.com
Structures down

The south feed to Rushmore substation
You get the call, what next...

1. Note line name and structure numbers
2. Call area foreman (refer to GIS if unsure, search for line name and turn on service area layer)
3. Verify line name and structure numbers
4. Is this an emergency (will they replace it today)?
   - YES: Send email to project controls requesting work order, cc NOTIFY land rights and permitting and compliance
   - NO: Plan to model with existing framing
5. If applicable, do they have materials on hand to upgrade to a new standard (e.g., change from arms to horizontal posts)?
   - YES: Plan to model with post insulators where applicable
   - NO: Plan to model with existing framing
6. Is there distribution underbuild?
   - YES: Determine and contact the member (who will provide the necessary material?) Usually GRE arms and member
   - NO:
Locate/create model

Is there a model of the line in C:/PLS_CADD/Projects folder that includes this structure?

NO

Create folder using line name in C:/PLS_CADD/Projects

YES

Is there a model of the line in Adept that includes this structure?**

*11SAV and higher should have models due to NERC alert

NO

Is there a model of the line in C:/PLKS_CADD/VERIFICATION folder that includes this structure?

YES

Is there a model of the line in C:/PLKS_CADD/Common/workflow/Backup Files folder that includes this structure?

NO

Digitize the corresponding P&I sheet

YES

Restore model in newly created folder
Verify and design

1. Verify model is correct (wire sizes, tensions, and structure models match what is in Maximo and are accurately modeled).
2. Ensure proper weather conditions and structural loading criteria are being considered.
3. Structure check adjacent models (if above 100% make note of existing strength and swing rating).
4. Check for galloping (if ellipses overlap, make note of percent overlap).
5. Replace structure with previously determined framing and size pole/adjust spacing as necessary.
6. Ensure field verification clearances are met (try to meet new design clearances when possible).
7. Structure check adjacent models.
8. Is structure usage and swing equal to or better than existing check noted previously?
   - Yes: Check for galloping.
   - No: Refer to Maximo pole replacement procedure.
9. Is galloping equal to or better than existing check noted previously?
   - Yes: Refer to Maximo pole replacement procedure.
   - No: Refer to Maximo pole replacement procedure.
Structures down
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FE-RH structure #197
Ice

Impact icing on pole

Pole NO-RC:33
ASSET 142533
Ice
Ice
Storm impacts

- Worst damage in Great River Energy’s history
  - 352 structures down
- Federated Rural Electric Association, Nobles Cooperative Electric, South Central Electric Association
  - BENCO Electric Cooperative and Steele-Waseca Cooperative Electric
- 32 member-owner substations impacted
- 12,000+ end-use members out
Map of structures down

87 miles end to end

135 structures
Challenges

- Damage assessment and restoration delayed by unsafe conditions
- Lines down on roadways
- Widespread impact – ITC and Xcel Energy sustained major damage
- Operational coordination added complexities
- Material availability
Great River Energy response

- Restoration priority spreadsheet created
  - First Great River Energy transmission widespread/critical use of file sharing
Response cont...

- Divide and conquer
  - Mobilized 54 line technicians, five engineers, operations, purchasing, a mechanic and warehouse staff
    - Employees worked long hours and weekends
- Daily calls with impacted member-owners and neighboring utilities
- All member-owner substations restored by April 16
- All downed structures replaced by mid-May
  - One line required engineered angle structures, but fortunately could be routed around in the meantime
Winter Storm Wesley
April 11-12, 2019
Timeline

Happy Birthday to me!!

PEAK (APRIL 11, 9AM)
5 cooperatives affected
32 GRE member subs
~12,000 GRE consumers
6 SMEC subs

DAY 1 (APRIL 11, 10PM)
3 cooperatives affected
14 GRE subs remaining
~5,000 consumers
3 SMEC subs

DAY 2 (APRIL 12, 11PM)
3 cooperatives affected
9 GRE subs remaining
~3,500 consumers
3 SMEC subs

DAY 3 (APRIL 13, 1PM)
2 cooperatives affected
7 GRE subs remaining
~3,000 consumers
3 SMEC subs

DAY 4 (APRIL 14, 6PM)
1 cooperative affected
3 GRE subs remaining
~2,000 consumers

DAY 6 (APRIL 16, 7PM)
Fully restored

5,000+
GRE & contractor field personnel work hours
352
GRE structures replaced
67
Foreign-owned poles
6
Days to restoration
Community support and gratitude

- Local businesses
- Property owners
- Restaurants
- Law enforcement
Communications

- CEO updates
- Press release – stay away from downed lines
- Social media posts
- Employee intranet site
- Pics from line crews
- Community ads and thank you letters to supporters
Lessons learned

- Reviewed material inventory and location
  - Consolidated to one primary pole yard
  - Analyzed Great River Energy’s line assets and procured inventory on a ratioed basis

- Changed design practices to utilize twisted pair conductor 336 ACSR and above in ice prone areas

- Reviewed and continue to work with FEMA to install pole enforcers in the storm impacted area for resiliency
Lessons learned cont....

- Developed and documented criteria for pre-positioning operations and field staff prior to storm events
- Updated our Transmission System Restoration Plan document
  - Established a threshold for having an on-site materials coordinator
  - Established primary and backup point people for each functional group
- Performed training on grounding facilities during widespread emergency conditions
Questions?