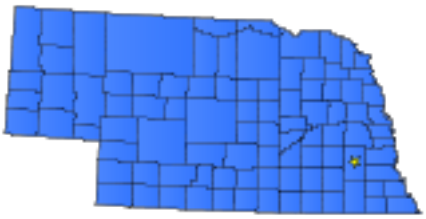
Nebraska Public Power District Minimizes Damage to Transmission System

Full Mitigation Best Practice Story

State-wide, Nebraska



The State of Nebraska - High winds and ice storms are common hazards in the plains of Nebraska. Such hazards can cause a transmission system to collapse as one transmission line structure (power pole) fails, “triggering” adjacent structures to topple in succession like a string of dominos. Recognizing this horrifying potential, the Nebraska Emergency Management Agency (NEMA), through Hazard Mitigation Grant Program (HMGP) funding, has assisted various public power districts throughout the state to mitigate the cascading effect of transmission lines from severe wind, ice and snowstorms. To date, NEMA has provided more than $5.9 million in Federal funding to mitigate approximately 1,120 miles of transmission lines.

The recent storms the State of Nebraska experienced in June and July of 2003 caused extensive damage to transmission systems. However, this damage would have been more severe without the mitigation project completed in the fall of 2002. The purpose of the mitigation project was to install the dead-end structures at five- to seven-mile segments, thereby breaking the string of "dominos" into manageable limited failures. By utilizing the HMGP funds through NEMA, the Nebraska Public Power District (NPPD) installed eight, five-pole guyed, dead-end structures along the 230 kV power transmission line from Columbus to Grand Island. The future benefits of this mitigation project were an estimated $4.95 return for each $1 invested over the project’s life.

This project proved to be successful when extreme winds and tornadoes caused failure of five standard two-pole wood structures, setting up a cascading effect from the Columbus to Grand Island transmission line. The cascade ended at the dead-end structure funded through FEMA’s HMGP, demonstrating that these structures performed as designed.

The purpose of these structures was not to prevent the loss of power, but to limit the extent of the damage. Without this mitigation effort, the cascade failures would likely have continued, increasing the damage. With 230 kV line restoration costs estimated at over $200,000 per mile and cascade failures often extending for miles, the potential savings are significant.

Activity/Project Location	
Geographical Area:	**State-wide**
FEMA Region:	**Region VII**
State:	**Nebraska**

Key Activity/Project Information

Sector:	**Public**
Hazard Type:	**Severe Storm**
Activity/Project Type:	**Utility Protective Measures**
Activity/Project Start Date:	**10/2000**
Activity/Project End Date:	**10/2002**
Funding Source:	**Hazard Mitigation Grant Program (HMGP)**
Funding Recipient:	**State Government**
Funding Recipient Name:	**Nebraska Emergency Management Agency**
Application/Project Number:	**9999**

Activity/Project Economic Analysis

Cost:	**$6,000,000.00 (Estimated)**

Activity/Project Disaster Information

Mitigation Resulted From Federal Disaster?	**Unknown**
Value Tested By Disaster?	**Yes**
Tested By Federal Disaster #:	**No Federal Disaster specified**
Year First Tested:	**2003**
Repetitive Loss Property?	**No**

Reference URLs

Reference URL 1:	**http://www.fema.gov/government/grant/hmgp/index.shtm**
Reference URL 2:	**http://www.nema.ne.gov/**

Main Points

- High winds and ice storms are common hazards in the plains of Nebraska. Such hazards can cause a transmission system to collapse as one transmission line structure (power pole) fails, “triggering” adjacent structures to topple in succession like a string of dominos.
- This project proved to be successful when extreme winds and tornadoes caused failure of five standard two-pole wood structures, setting up a cascading effect from the Columbus to Grand Island transmission line.
- The purpose of the mitigation project was to install the dead-end structures at five- to seven-mile segments, thereby breaking the string of "dominos" effects into manageable limited failures.

Damage to pole structures from June 2003 tornadoes.

Remains of a sheared off two-pole wood structure.