AMERICAN TRANSMISSION COMPANY ®

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VIA -EMAIL

U.S. Department of Energy
1000 Independence Ave. SW, Mailstop OE-20
Washington, DC 20585
Attn: Office of Electricity, Guidance for Enhancing Grid Resilience

Re: Grid Resilience

Dear Sir or Madam:

Thank you for the opportunity to respond to the Office of Electricity, Department of Energy (DOE)'s request for information (RFI) titled "Codes, Standards, Specifications, and Other Guidance for Enhancing the Resilience of Electric Infrastructure Systems Against Severe Weather Events". American Transmission Company LLC (ATC) was founded in 2001 as the first multi-state, transmission-only utility in the United States. ATC's service territory encompasses the eastern half of Wisconsin, the Upper Peninsula of Michigan, and a portion of Illinois. ATC owns, operates, and maintains more than 9,890 miles of high-voltage transmission lines and more than 568 substations.

ATC takes pride in its main duties and responsibilities to (1) operate the transmission system reliably; (2) assess the ability of the system to adequately meet current and future needs; (3) plan system upgrades to meet those needs in the most efficient, effective, and economic ways; (4) construct upgrades in time to meet those needs; and (5) maintain the transmission equipment and surroundings to minimize opportunity for failures.

ATC is constantly seeking cost-effective ways to make our transmission system more resilient against severe weather events. ATC has adopted several substation design practices and stringent criteria to mitigate weather impacts to the grid. Given that the purpose of this RFI is to gather relevant consensus-based codes, specifications, and standards, state and industry best practices, and other pertinent materials to provide guidance for enhancing the physical and operational resilience of electric grid systems and their components against these events, ATC is sharing its transmission design specifications below that help enhance its transmission system resilience. Electric companies such as ATC already engage in many programs and practices to improve resilience, and any further

discussion of codes and standards should be framed within an understanding of these existing measures.

Existing Resiliency Measures

Enhanced Substation Design. To enhance safety in its substations, ATC uses a 1 in 100-year frost depth for substation ground grid design. This design is more stringent than required by the IEEE 80 guide and therefore gives ATC workers a wider range of safe operating parameters.

Hardened Control Houses. All new ATC control houses are designed to withstand a direct hit by an EF3 tornado to provide for more rapid restoration of a substation to service. ATC selected this standard because the control house is critical to substation functionality and visibility to ATC's Operations department. In addition, ATC has purchased a back-up control house that can be deployed at almost any substation on its system in short notice.

Resilient Equipment. ATC's equipment is specified to operate in extreme temperature ranges of +/- 40ºC. ATC's disconnect switches are specified for ice loading requirements above NESC minimum. Fiber splice boxes are designed to withstand debris damage from EF3 tornadoes in order to make ATC's communication systems inherently more resilient. In critical locations control house communications are often supported by ATC's own resilient and redundant fiber optics system. This system is, in turn, backed up by satellite links that offer adequate performance during an emergency. In some densely populated urban locations, ATC has installed new EF3 resistant pump houses for its underground cable systems. Emergency generators with onsite fuel are installed at key locations to maintain critical communication paths during a local outage or a black sky event.

Resilient Transmission Line Design Practices. ATC has adopted weather resilient transmission line design practices and specifications as well. These practices include:

- easement acquisition standards to prevent tree outages;
- dual insulator strings at all 345 kV dead-end assemblies for redundancy;
- resilient foundation designs;
- NESC Grade B construction for all new transmission construction;
- a 100-year return period for wind and ice events;
- steel and laminated wood structures can withstand a single broken wire.;
- critical lines are designed to even more stringent standards as the service conditions warrant, such as when a new 345-kV line shares a corridor with double-circuit 138 kV structures—all new structures, including relocated double circuit 138 kV structures, are designed to the once every 1,400-year wind speed.

Recovery Stocks. ATC stocks emergency transmission line structures for recovery after extreme events and has arrangements with steel structure manufacturers to ensure a steady supply of needed structures.

Enhanced Maintenance. Structures supporting twisted pair conductors are designed using larger phase spacing to mitigate galloping outages. ATC has a thorough and deliberate maintenance inspection program to identify structures that need remediation or replacement.

Incident Command System. ATC has put a NIMS Incident Command System in place that it has used several times and continues to improve with each use. ATC has formed public/private partnerships with Wisconsin Emergency Management, Wisconsin National Guard and with other first responder and governmental entities in its service territory.

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As the Department reviews these responses, ATC requests that the Department consider the types of activities utilities are already undertaking to further resiliency. Through the efforts listed above, ATC seeks to enhance the resiliency of its transmission system in a cost-effective, efficient, and economic way—to the ultimate benefit of the ratepayers and users across the system.

Very truly yours,

Jim Vespalec
Director, Asset Planning & Engineering
American Transmission Company LLC &
ATC Management Inc.