

Pennsylvania Summer Reliability

PENN POWER

A. Reliability Enhancement Programs

Pennsylvania Power Company (“Penn Power” or “Company”) is committed to providing safe and reliable electric service to its customers. Penn Power employs various programs to maintain system reliability. For example, to reduce the likelihood of distribution line and equipment caused outages, Penn Power follows inspection and maintenance (“I&M”) programs that set forth schedules for regular inspection of its distribution facilities.¹ In addition to I&M, Penn Power employs other routine programs to ensure the reliability of its distribution system. For example, Penn Power may perform sectionalization of the system to reduce outages, evaluate devices that experience multiple interruptions, and perform enhanced tree trimming in conjunction with the normal cycle based tree trimming.

In addition to the items described above, Penn Power has put into place additional plans, through various filings, to further support and improve reliability performance. These filings include a Corrective Action Plan (“CAP”),² Reliability Plan,³ and the Long Term Infrastructure Improvement Plan (“LTIIIP”).⁴ Components of these plans, in combination with the Company’s routine reliability programs, are described in the sections below.

Along with the vegetation management work that Penn Power routinely performs, the Company’s enhanced tree trimming has resulted in the removal of a large number of trees (healthy or not) that are located outside of the right-of-way, which impact lines and make it more difficult to restore power quickly. In 2015, Penn Power performed enhanced trimming on 200 miles of circuits resulting in the removal of a large number of trees that are located outside the right-of-way. The enhanced trimming, combined with its routine vegetation management program, removed over 14,000 off right-of-way trees in 2015. The Company plans to continue with this aggressive off right-of-way tree removal program by performing enhanced trimming on 400 miles in 2016. These efforts are already proving to be successful as the customer minutes interrupted for off right-of-way tree caused outages in 2015 is at a five-year low.

Supervisory control and data acquisition (“SCADA”) provides communication with circuit breakers and line switches, which provides the ability to remotely operate the breakers or switches to reduce restoration time. In 2015, Penn Power installed thirty SCADA line switches on its transmission system and seven SCADA line switches on a total of seven

¹ Pursuant to 52 Pa. Code § 57.198, every two years an electric distribution company shall file, and receive approval from the Commission of, a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. On December 30, 2013, Paul Diskin, Director, Technical Utility Services, issued a letter approving the Company’s biennial inspection, maintenance, repair, and replacement plan effective January 1, 2015 through December 31, 2016.

² In November 2014, Penn Power submitted a CAP designed to improve overall reliability and achieve benchmark performance in all three indices by year-end 2018. The projects and initiatives included in the CAP were for the period of 2014-2018.

³ On March 30, 2015, the Commission issued an order directing, Pennsylvania Power Company to prepare and file a revised implementation plan relating to specific topics addressed in the report issued by the Commission’s Bureau of Audits on February 12, 2015. *Implementation Plan for the Focused Management Audit of Pennsylvania Power Company*, Docket No D-2013-2365993,

⁴ On October 19, 2015, pursuant to Section 1352 of the Pennsylvania Public Utility Code, 52 Pa. Code §§ 121.1 et seq. and the Commission’s final order in Implementation of Act 11 of 2012, Pennsylvania Power Company filed their petition for approval of their LTIIIP at Docket No. P-2015-2508948. On February 11, 2016 the Commission approved the plan.

Pennsylvania Summer Reliability

PENN POWER

distribution circuits. In 2016 Penn Power, plans to install an additional thirty switches on the transmission system and three on the distribution system.

The seven distribution circuits that received SCADA line switches in 2015 were also outfitted with adaptive relaying at their respective substations. One additional circuit was also outfitted with adaptive relaying, bringing the 2015 total to eight circuits. Adaptive relaying installed within substations further allows a breaker to instantaneously trip and reclose during lightning and wind storm temporary events.

The Company also employs distribution circuit ties and loops to improve reliability. This is accomplished by creating an alternate path from which power is provided to customers affected by an outage. In 2015, Penn Power built or upgraded fifteen miles of distribution lines to create circuit ties and loops and plans to build or upgrade an additional twenty-five miles by the end of 2016.

Penn Power will continue the rehabilitation of selected transmission lines to help enhance reliability. Poles, switches, crossarms, insulators and braces are examples of equipment that is typically replaced during this type of effort. In 2015, Penn Power completed twelve miles of 69kV line rehabilitation. In 2016, Penn Power will inspect approximately twenty-four miles of transmission lines, replacing equipment as necessary. This project will strengthen Penn Power's 69kV system, thereby decreasing the risk of extended outages affecting a high volume of customers.

Penn Power's customers experiencing multiple interruptions ("CEMI") program focuses on the clusters of customers that experience frequent operations of line protection devices. This program not only aims to enhance system performance, but it also provides a means to reduce frequency of outages at the customer level that might not be otherwise addressed when targeting overall system metrics. Since 2005, Penn Power has installed over 200 reclosers and 2,900 fuses to help address these types of concerns.

B. Preventative Maintenance Programs

In accordance with 52 Pa. Code § 57.198, every two years, Penn Power files a Biennial Inspection, Maintenance, Repair and Replacement Plan (as described in Footnote 1) for approval by the Commission. This Biennial Plan is designed to reduce the risk of outages on the Company's system and form the basis for the Company's inspection and maintenance objectives. The Biennial Plan includes programs to conduct vegetation management, pole inspections, distribution overhead line inspections, distribution transformer inspections, recloser inspections and substation inspections.

These well-established maintenance programs ensure the existing system will continue to operate in a safe and reliable manner, and serve to identify any potential system issues so that they can be proactively addressed.

Pennsylvania Summer Reliability

PENN POWER

C. Capacity Planning

As a result of ongoing system enhancements and the hard work of employees and contractors, Penn Power is able to reliably serve its customers. The primary driver of customer demand this summer is again expected to be weather related.

Penn Power does not foresee significant concerns with system delivery capacity during the upcoming summer based on its performance during last summer's peak. Ongoing facility enhancements designed to improve reliability, load-bearing upgrades, and customers' adoption of energy efficiency and conservation opportunities are being viewed as additional opportunities to ensure the reliability and capacity availability of the system.

D. 2015/2016 Storm Update and Lessons Learned

In calendar year 2015, Penn Power experienced one major event caused by a severe thunderstorm with strong winds.

Throughout restoration efforts, working safely and efficiently is the main objective. Regional conference calls are executed to plan and prepare logistics. Effective planning allows for the precise deployment of crews, supplies, and equipment. Employees are also staggered around the clock to maximize productivity.

After each significant storm event, Penn Power leadership conducts post storm review meetings to identify and disseminate lessons learned which are used to improve the emergency response plan.

E. 2016 Summer Readiness

Capacitor Inspections – Penn Power has completed the inspections of all line capacitors banks and complete all necessary repairs or replacements to ensure at least 98% capacitor availability.

Mobile Substations – Penn Power completed a review of the status of its mobile substations and other spare equipment. This included inspections of the mobile trailer, transformer and breaker. Spare equipment includes voltage regulators and substation cooling items such as transformer fans.

Substation – Substation based capacitor banks on the transmission and distribution system were inspected for operability. Any necessary repairs or corrective maintenance will be completed before June 1, 2016 to ensure a minimum of 98% available reactive support.

Capacity Additions – Penn Power has determined that no additional projects are required to meet the summer demand for 2016.

Transmission Preparedness – Penn Power conducts an annual transmission readiness review with transmission operations to discuss the capability and reliability of the system for the summer. The Company's detailed review did not reveal any significant issues for the

Pennsylvania Summer Reliability

PENN POWER

summer of 2016. Based on the system conditions modeled, the Penn Power transmission system is expected to sufficiently support the forecasted peak summer loading. During the system assessment, a review of the voltage stability analysis was conducted and produced acceptable Power-Voltage response curves.

Two aerial patrols are conducted annually in Penn Power to inspect transmission facilities. The purpose of routine patrols is to ensure the integrity of in-service transmission lines to maintain safe and reliable service. The first aerial patrol was completed in May and the second will be completed by year end.

Additionally, PJM Interconnection LLC (“PJM”) has operational procedures identified to effectively control and mitigate contingency outage conditions on the transmission system. Penn Power has operational procedures to implement any PJM required actions and to mitigate contingency conditions on the lower voltage systems (<100kV).

Emergency Exercises – As part of the FirstEnergy Utilities (“FEU”) Emergency Preparedness program, Penn Power completed a Company-wide emergency exercise on May 11, 2016. The structure of the exercise facilitated the testing and validation of key emergency response roles, systems and processes. The primary objective of each exercise was to ensure a complete understanding of the restoration process by all participants through exposure to a variety of real-world scenarios and decision making challenges that could be experienced during actual restoration events.

Event Preparedness – FirstEnergy’s in-house meteorologists use highly sophisticated, proprietary data and forecasting models specifically designed to provide actionable intelligence. When predicted weather meets specific criteria, planning and preparation work is immediately initiated, many times days before any impact.

As part of the preparation efforts, Penn Power’s executive leadership and operations managers engage the emergency restoration process. Based on available data and collaboration within Penn Power, resource needs are evaluated and requests are submitted as needed to the FEU Emergency Operations Center for fulfillment. These requests can include, but are not limited to: line resources (both internal to FirstEnergy and external), hazard responders, damage assessors, public protectors, vegetation crews, equipment needs, and material requirements. Depending on the predicted magnitude of the event, staging areas are pre-identified and can be quickly activated to prepare for the efficient deployment of crews and equipment.

Refresher Training – All employees with emergency response roles receive appropriate refresher training at specified intervals in order to be immediately deployable when an event impacts the system. Expectations for employees to complete appropriate training and verify all equipment and personal protective equipment are available and in proper working order are communicated each year during emergency exercises and verified by Penn Power management.

Staffing – For the summer of 2016, Penn Power is fully staffed for the storm season. In addition, Penn Power conducts a staffing analysis annually which accounts for attrition, including retirements, to determine the proper staffing levels of craft workers. From the

Pennsylvania Summer Reliability

PENN POWER

result of this analysis, Penn Power enrolls students in the Power Systems Institute (“PSI”), which is a unique, two-year program that combines classroom learning with hands-on training, will be reinstated beginning with fall enrollment 2015. The following colleges have partnered with Penn Power to support these line worker and substation electrician development:

- Kent State University (Ohio)
- Stark State College (Ohio)

For larger-scale events, Penn Power is able to supplement its own resources by accessing FirstEnergy’s portfolio of operating companies that includes the additional three companies located within Pennsylvania, as well as an additional six operating companies in other jurisdictions. The consistency in standards and work practices employed across all ten of these operating companies enables streamlined resource sharing in a way that promotes both safety and efficiency.

FirstEnergy, for itself and its affiliated operating companies, including Penn Power, is a member of the following Regional Mutual Assistance Groups (“RMAGs”) and can call upon them to request additional resources when needed:

- Great Lakes Mutual Assistance Group (“GLMA”)
- North Atlantic Mutual Assistance Group (“NAMAG”)
- Southeastern Electrical Exchange (“SEE”)

A National Response Event (“NRE”) can be activated by EEI member utilities when multiple RMAGs cannot adequately support the resource requirements of the requesting utilities.

F. Storm Response

Outage Restoration Strategy – Penn Power begins preparing for potential outages long before severe weather hits. When severe weather is forecasted, Penn Power plans are activated days before to ensure an adequate number of crews are prepared to tackle the damage. Part of this preparation includes running a model that estimates the impact of an impending weather threat and outputs information such as the expected number of customers impacted. This output, along with historical storm experience, is used to estimate the impact of the weather event so that properly scaled preparations can be made.

Information obtained through the use of various tools and resources is critical to determine the type, number and location of resources needed to assure prompt restoration of service. Line personnel, damage assessors and hazard responders are integral resources in providing initial and ongoing assessments of the damage in the field. Line personnel are equipped with mobile data terminals (“MDTs”) in their vehicles and will input damage information directly into the MDT. This information is immediately available for viewing in the Outage Management System (“OMS”). The OMS is the central collection point for all relevant information concerning damage reports, assessment and configuration of the electric distribution system. During emergencies that meet triggering criteria, the circuit quarantine process is used for rapid assessment of heavily damaged circuits. Additionally,

Pennsylvania Summer Reliability

PENN POWER

there are two apps that employees can use on mobile devices to automatically enter damage information into the company's OMS. In the past, this process relied on paper maps, hand written notes and phone calls between field responders and dispatch offices.

In response to power outages and other systems emergencies, FirstEnergy maintains a copy of its Emergency Plan for Service Restoration ("E-Plan") which provides the guidelines for all of the common processes and procedures for conducting emergency preparedness, response and service restoration. Further, Penn Power is in the process of incorporating the Incident Command System ("ICS") principles in its emergency response organization to adhere to the principles and high level structure to the National Incident Management System ("NIMS") as appropriate in an electric utility environment.

Communications and Outreach – External Affairs managers establish communications with emergency management agencies, local officials, county commissioners, legislators and their offices in advance of and throughout a storm to keep them apprised of preparation and planning efforts. Communications representatives also contact the media to enlist their help in encouraging customers to prepare for the likely storm events and provide information on who to call if they lose power. Proactive email alerts and phone messages are initiated to key stakeholders alerting them to the potential for extended power outages. These efforts and face-to-face outreach are closely aligned with the Company's service restoration efforts. The Company also provides safety messages via newspapers, radio, and online banner ads.

Penn Power uses social media, mobile applications, websites and IVR messaging to communicate outage and restoration information customers Twitter and Facebook are used to communicate outage and restoration information to customers. During the restoration period, Penn Power uses social media to share additional safety reminders; estimated time of restoration; updates on restoration efforts, including work progress, explanations of the restoration process and information about the arrival of additional crews; water and ice locations, and links to other resources such as shelters.

The Company's mobile website and mobile app offers customers the ability to report outages and connect to an outage map that is optimized for mobile devices. From the mobile site, customers can view personalized outage status for an outage they have reported to Penn Power. The mobile website and app, as well as the full Penn Power website, also allow customers to register for outbound billing, payment and outage-related alerts via text messages and/or email, and these platforms also provide instructions to use two-way text messaging, an interactive option for customers to report outages and obtain outage updates.

Customers can access the Storm Restoration Process page of the website, for a description of the damage assessment process, information describing why customer calls and outage reporting are critical to the restoration process, as well as repair prioritization process. Customers can access the 24/7 Power Center outage map that provides county-by-county information. Through this site users can obtain the number of customers served and the number of customers out of power at the county level as well as estimated time of restoration information.

Pennsylvania Summer Reliability

PENN POWER

Customers are now able to view the status of crews restoring service on the Company's 24/7 Power Center outage map. This informs customers when crews have been dispatched, when they are working on a repair, and when additional crews or equipment are needed to complete restoration work.

Three stages of messaging are provided to customers during large scale events via its IVR messaging:

- Pre-ETR messaging during, and immediately following the event; and ETR messaging.
- The messaging is also relayed to customers who call regarding their individual outage and is also posted online on the 24/7 Power Center outage maps.
- In addition, Live Agent Customer Service Representatives have the same information at their disposal to clearly communicate to customers at these three stages.

For extended power outages, Communications issues regular news releases and media advisories over both traditional media channels and social media to update customers on the status of power restoration efforts, as well as provide realistic ETRs so customers can plan accordingly. Communications proactively issues safety messaging ranging from avoiding downed wires to properly hooking up and operating generators. The Company also has plans in place to provide free water and ice to customers without service. Once locations have been determined this information is communicated to customers via the IVR, press releases, social media and the website.

Outage Restoration and Storm Response Best Practices – Penn Power continues to review each and every storm event, and many of the practices adopted as mentioned above stemmed from sharing best practices with other utilities, a practice that continues today.