UGI Utilities, Inc. – Electric Division
Electric Reliability Outlook & Summer Readiness for 2016

Summary

UGI Utilities, Inc. (UGI) continues to review and implement programs aimed at improving our summer readiness with respect to providing safe and reliable service during peak summer loading conditions and to minimize customer outages and restoration times during the summer storm season. The programs that UGI currently has in place and the programs and initiatives currently under review are discussed below.

Reliability Enhancement Programs

In addition to fulfilling its Biennial Inspection, Maintenance, Repair, and Replacement Plan as filed with the Commission that became effective on January 1, 2015, UGI Electric Division has the following ongoing programs geared toward enhancing the reliability of service it provides its customers:

- UGI initiated a Distribution Automation Pilot Project in 2015 and continues to work toward implementation in 2016. The goal is to extend remote monitoring and control capability via wireless communication links to field devices such as 3-phase reclosers and sectionalizers. Remote management of these devices, by UGI System Operators, will significantly reduce switching times to sectionalize and/or restore customers impacted by outages. The initial phase of the project will focus on three (3) OCR's spread throughout the service territory. Plans for 2017 include adding communication functionality to all 3-phase devices on a selected substation.
- A Danger Tree Mitigation Program to identify and address off right of way trees that pose a threat to its transmission and distribution lines. This program involves line clearance crews identifying and addressing such trees. In addition UGI continues the practice of "ground to sky" trimming on multi-phase circuits and on single phase lines where appropriate.
- A Line Segmentation Program focuses on identifying locations to install fuses, disconnects, and other devices to limit the number customers affected when line damage occurs and enable field personnel to restore service to customers on unaffected line segments through switching before repairs are made. To date UGI has completed patrols of 58% of our overhead distribution feeders identifying over 190 locations for new devices with installation completed at 144 or 75% of these locations. In 2016 UGI will complete patrols of an additional five (5) distribution circuits and plans to install 15 new sectionalizing devices.
- A Line Relocations Program to move distribution lines from troublesome off road locations to road side rights of way. Relocating the lines to road side enable quicker patrolling as well as making repairs quicker and safer because mechanized aerial equipment can be used as opposed to climbing the poles to do repair work. Two (2) line relocation projects identified as priority locations by field and operations personnel have already been completed in 2016. Four (4) additional projects are currently in the design or review phase. UGI will continue to identify and relocate additional line sections going forward.
- A secondary modernization program aimed at upgrading open-wire secondary that is undersized, out of specification, end-of-life etc. to the current triplex wire construction standard. In 2015, UGI completed 6 projects and another 3 have already been completed in 2016.

Preventive Maintenance Programs

In addition to fulfilling its Biennial Inspection, Maintenance, Repair, and Replacement Plan as filed with the Commission, UGI Electric Division has the following other programs geared toward enhancing the reliability of service it provides its customers:

- All 170 capacitors on the UGI system are checked biannually. This includes a visual inspection, operation of switched capacitor controls and recording voltage checks.

- All overhead line devices (3-phase and single phase), which includes recolosers, sectionalizers, and voltage regulators and their controls are removed from service and maintained on a fixed periodic basis.
- An intrusive inspection is made on all underground line terminal equipment and a neutral integrity test is performed on all line segments on a fixed periodic basis. Corrective maintenance or replacement is performed on deficiencies identified during these inspections.
- Intrusive inspections and/or diagnostic tests are made on all substation equipment on a periodic basis with corrective maintenance or replacement performed to address identified deficiencies.
- Automatic splice connections on the distribution system are being visually inspected and their location documented for future reference. Any critical issues identified during the inspection are corrected immediately.
- An aerial patrol of the UGI 230kV transmission system was completed in early 2016. During the patrol a visual inspection is performed with respect to wire, insulators, structures etc. and areas of concern are photographed and reported for follow-up work. All issues identified during the 2016 patrol were addressed based on their criticality.

Capacity Planning

Based on the forecasted summer peak load, UGI does not expect any significant issues with respect to capacity from a transmission or distribution perspective. UGI performs annual planning studies and reviews transmission, substation and feeder loading under various contingencies for compliance with UGI Planning Standards. Delivery system capacity expansion plans are made based on these study results. For 2016, UGI is continuing work on existing transmission and distribution projects. On the transmission side, UGI is in the third (3) year of a four (4) year project to re-conductor the Swoyersville-Huntsville 66kV line to provide an additional 54 MWs of transmission capacity to customers served by substations in the Back Mountain area. UGI is also working with our neighbor PPL Utilities, to develop plans for the upgrade of an existing 66kV tie-line, which will increase tie-line capacity by nearly 40 MWs.

On the distribution side work continues on the Huntsville Substation expansion project. This project will add a second 66/13.8kV, 25MVA transformer and three (3) additional feeder circuits. These lines will be used to shift load onto the new transformer thereby reducing load on existing substations/transformers. The additional capacity and feeders will also improve reliability by providing new, full capacity tie-lines to adjoining substations which will be used to restore customers impacted by outages. Target areas for the tie-lines include some of the worst performing circuits. Capacity enhancements are also underway at several other locations including Dallas, Swoyersville, and Hunlock Substations. In particular the Hunlock-Koonsville tie-line project was designed to extend a high capacity three-phase circuit into a rural portion of UGI's service territory to provide additional capacity and restoration options. This is a multi-year project which is scheduled to be completed in 2019. Finally, UGI has an ongoing line rebuild and voltage conversion program to rebuild vintage 8 kV and 4 kV distribution lines and convert them to operate at 13 kV.

2016 Summer Readiness

As mentioned above in the Capacity Planning section, UGI has a number of projects either completed or in various stages of completion that will increase the capacity of its distribution lines and provide more options to restore service to customers during storm restoration events.

UGI performed the annual planning review of the transmission system utilizing current and forecast load flow models to identify any voltage or thermal criteria violations. Results of the analysis did not indicate any issues under the various contingency scenarios. Finally, UGI completed annual inspections of its transmission lines including an aerial LiDAR inspection of the 230kV bulk electric facilities. These inspections look to identify facility

deficiencies, maintenance issue or vegetation conditions which require attention. Priority concerns are addressed immediately.

UGI conducted its 2016 Spring Restoration Drill on May 18, 2016. The focus of the drill was dispatch/field communications and use of the Partner mapping system. UGI's Outage Management System (OMS) was utilized during the drill, populated with customer calls reflecting a typical summer storm. Personnel from UGI's Electric Operations Department participated in the drill. As always the drill provided UGI the opportunity to evaluate and update its current restoration and communications plans. Personnel were also trained on new Partner functionality for damage assessment and device status confirmation. The goal is to reduce unnecessary calls to dispatchers through the use of Partner map updates, automatically delivered to dispatchers via the map and a corresponding spreadsheet. UGI also continues to be an active member of the EDC Best Practices Operations Team and the North Atlantic Mutual Assistance Group.

Outage Restoration Strategy

UGI's outage restoration strategy is similar to that of other electric utilities in the state. It first restores power to its substations and then focuses on restoring service to feeders that serve critical infrastructure, such as water, sewer, and emergency services facilities. It then works on restoring its remaining distribution lines starting from the substations and working outward locally prioritizing the repair jobs based upon the number of customers that can be restored, the location of its resources, and the magnitude of the repair jobs so that it generally restores service to the most customers in the shortest period of time. Restoring service to critical needs customers is factored into its restoration process. Public safety situations get immediate attention regardless of where UGI is in its restoration process.

UGI uses a restore before repair approach such that customers that can have their service restored through switching and fuse replacement are restored before engaging the field crews in repair work. This method of operation applies throughout the restoration effort such that as line segments become available to return to service after repairs are made, they are placed in service to restore service to customers on them.

UGI uses a decentralized mode of operation during major event restoration effort. Depending upon the extent of the damage its delivery system UGI divides its service territory into areas and assigns an area coordinator to manage damage repairs in each area. Each area coordinator has complete responsibility to plan and manage the resource to restore service in his/her assigned area. UGI has found this strategy eliminates communications bottlenecks such that available resources are used most effectively.

Storm Updates/Lessons Learned

Following our last major storm event in July 2014, UGI conducted a post storm review to identify areas for improvement and to communicate lessons learned to the entire restoration team. The review produced a number of recommendations. Beginning in 2015 and continuing in 2016, UGI is working to implement these recommendations. With respect to the recommendations, implementation status is as follows:

- A need for additional damage assessment and support personnel – UGI contracted with Osmose Utility Services Inc. to provide additional storm restoration services such as damage assessment and wire watching. UGI is also expanding its storm restoration resource base to UGI Gas Operations personnel. A group of Gas Operations employees received initial training on wire-watching and the Partner mapping system in early 2016. These employees will fill a field support role during large scale restoration events.

- Investigate other weather service providers – UGI contracted with a new weather service Earth Networks, which offers several monitoring stations within the UGI service territory and more in-depth weather reports.
- A need for more frequent updates from field personnel relative to device status – Enhancements to the Partner mapping system, initiated in 2015 continue in 2016. Training on the device status functionality within Partner was emphasized during the 2016 Spring Drill.
- Customer information handouts for crews to provide to customers that stop by restoration sites - The UGI Communication Department developed a draft handout which is currently being reviewed. The final version is expected to be completed in 2016.
- Establish First Responder Training Programs – UGI in partnership with RTUE developed an on-line and in-person First Responder Training Program for Electrical and Natural Gas Emergencies. The program provides important safety information for first responders related to down-wires, step potential, utility interaction as well as an introduction to electricity and fundamentals of the electric transmission and distribution system. This program has already been presented at the Pennsylvania Fire Academy Instructor Workshop and the on-line version went live on April 2016.

UGI also completed an informational booklet for mutual assistance crews in October 2015. Titled "Electric Operations Manual for Mutual Assistance Workers", the booklet provides crews with information related to:

- Safety
- PPE Requirements
- Emergency Medical Locations
- System Parameters (Voltages/Wire Sizes)
- Lock-out/Tag-Out Procedure
- Restoration Practices
- Communications

UGI will continue to review and update this booklet as necessary to provide beneficial information to incoming mutual assistance crews.

Communications and Outreach

Traditional Customer Communication Channels

UGI maintains traditional direct-to-customer communication channels. These include information provided via continuously-updated Call Center messages on the Company's phone system, scripts prepared for use by Call Center representatives when interacting with customers, and messages prepared for use with the Company's 'predictive dialer' capability.

Additionally, UGI provides regular updates, information and links to additional resources on key topics to customers via bill messaging, as well as inserts, notices and a monthly newsletter called "Plugged-In" included with printed and electronic bills.

UGI also conducts an extensive municipal outreach program aimed at reinforcing relationships with, and providing information to, elected and appointed municipal leaders, public safety professionals and emergency response officials. Municipal outreach meetings are conducted throughout the year. Topics include coordination of incident response efforts, safety, and coordination of construction projects, among other items.

Broadcast Media, Social Media, Digital Communication Channels and Tools

The UGI Communication, Community Relations and Outreach Programs use an integrated platform of channels to provide critical information to customers. Additional communications are provided to customers and community

residents during extreme weather events, emergency situations and service outages. The communication channels and tools UGI utilizes include:

- Media communications, such as:
  - Public Service Announcements
  - Media advisories
  - News releases
  - On-air interviews and appearances
- UGI website postings, such as:
  - Banners on UGI.com homepage
  - Activation of Outage Center 'tile' on the UGI.com website
  - Live/updated information on Outage Center Map
- Social media information and update postings, such as:
  - Facebook
  - Twitter
  - UGI Connection (blog)
  - Linked-In
  - Instagram
- Outbound email to UGI Electric Division customers

All content provided to customers and interested parties is consistent across the traditional, broadcast, digital and social media channels. In addition, UGI maintains response protocols for inquiries from customers posted on social media sites. Social media postings from customers are treated as 'escalated' inquiries and the customer is asked to send a private communication (email or call) so that specific customer information can be collected and an appropriate response provided.