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Overview:

For one utility that operated a highly reliable network system, responding to network emergencies on an ad-hoc basis had and continued to work well.

Yet with pending retirements in both its engineering and operations groups, along with homeland security concerns in keeping the downtown business district energized, there was an urgency to capture the retiring knowledge and experience plus the need for a disciplined and defensible approach.

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Operations & Engineering

Emergency Restoration: Targeting Underground Networks

"Success is measured prior to making the decision to shut down the network."

The Challenge:

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With that in mind, the utility turned to fcgEnergy for their consulting expertise in underground network systems and emergency response planning.

The overall company emergency response plan primarily emphasized the period after which customers became de-energized, whereas the network emergency plan primary goal was focused more so on managing the system overloads and contingencies, placing a strong reliance on the expertise of and cooperation between its engineering (e.g. planning or equipment ratings) and operations units (e.g. cut/cap, temporary repairs, and deciphering field conditions).

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The fcgEnergy Approach:

fcgEnergy, drawing on its wide industry contacts, library of both public and confidential work practices and outage history, and having done similar work both as utility employees and consultants, provided the following guidance:

- **Review and compare the utility's specific practices versus industry practices with a targeted focus on utilities that operate networks**

  Regardless of the size of their networks, most utilities have a high-level plan influenced by historical performance, engineering standards, and operating procedures. Furthermore, they often rely on the depth and confidence of in-house experts.

- **Provide network-specific examples in which the partnership between the engineering and field operations units proves vital**

  In the absence of support from engineering, the burden falls to the operations group to perform the engineering load flows, calculate the equipment emergency ratings, and determine the best approach for temporary repairs as a crisis evolves.

- **Highlight the importance of linking the utility's downtown network plan to its overall system emergency response plan**

  A utility's overall system emergency response plan is a great resource that is regularly tested by both regulators and media.

- **Identify existing and future initiatives that will support the utility's network restoration plan – taking the program to the next level**

  Utilities often have detailed asset programs that they can leverage (or often enhance), such as its knowledge of the locations of nonstandard cable sizes, equipment inspection and condition records, or current operating

restrictions (e.g. protectors and substation equipment) along with selected SCADA points.

- **Emphasize five decision factors the utility should consider prior to giving the order to shut down the network**

  Factor #1 – Increased risk of continuing cascading feeder contingencies

  Factor #2 – Rising frequency of manhole events (fires, explosions, smokers)

  Factor #3 – Limited opportunities to quickly make temporary repairs

  Factor #4 – Limited short-term opportunities to quickly shed strategic load

  Factor #5 – Substation and sub transmission constraints difficult to mitigate

The Results

fcgEnergy, now with a network-specific draft plan in hand, facilitated several table-top exercises using recent high-profile network failures (media details supplemented with requests to utilities to get the "real story").

Based on our findings, we identified opportunities to improve the incident command role, increase training, supplement emergency stock levels, and identify enhancements to current capital and O&M investments.

We also customized every item to the utility's unique practices and design.

To continue this discussion and learn more about how fcgEnergy can work with your team, please feel free to contact us at info@fcgEnergy.com