Predictive Distribution Reliability Practice Survey Results

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Predictive Reliability Task Force
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Scope

• **Survey utilities to gain an understanding of current reliability study practice in the industry;**
• Provide recommendations or guidance on conventional predictive reliability study methodologies;
• **Survey utilities for reliability study plan in preparing for emerging technologies and identify challenges.**
• Provide recommendations or guidance on adapting predictive reliability methodologies to new trends and challenges, such as aging infrastructure, distribution automation, distributed energy resource, smart distribution, and micro grids.
Object

- To gain a better understanding of the current practice of distribution reliability study in the industry and how utilities are preparing their distribution predictive reliability studies for emerging technologies.

- Provide recommendations or guidance on predictive reliability study methodologies and their adaptation to emerging trends.
Survey

• Questions:
  – 17 core questions and 2 additional demographic questions.
    • 9 multiple choice questions, whose results were presented in pie chart, and
    • 7 multiple response questions, whose results were presented in bar chart, and
    • 1 open question.

• Responses:
  – 31 utility responses and 1 university response.
    • Multiple responses from the same utility were consolidated, and each utility
      response is considered as one valid response.
  – 27 valid utility responses
    • 17 responses were from Investor Owned Utilities,
    • 9 responses were from Cooperatives, and
    • 1 response was from Municipality.
Reliability Indices tracked

- 27 valid utility responses
- The other distribution reliability indices tracked include:
  - CEMI (CEMI$_5$, CEMI$_6$)
  - CELID
  - CAIFI
Feeder Models

• 27 valid utility responses
Software

• 27 valid utility responses
• Other software used for feeder computational models include:
  • PSS/E
  • DEW
  • ABB Feederall
Modeled Feature

• 26 valid utility responses
Reliability Analysis

- 27 valid utility responses
- Some of the comments:
  - Depend on the project scope and history of the area.
  - When a capacity-related project involves a feeder with certain characteristics.
  - Reliability is included, but system reliability modeling is not done.
  - Planners only consider capacity and outages that would drop over 80MW. Operating engineers are the ones who manage reliability.
Frequency of Reliability Analysis

- 26 valid utility responses
- Some of the comments:
  - We perform Reliability & Coordination studies on 5 circuits each year.
  - Reliability performance is continuously monitored. Data centered reliability programs are developed to address the major reliability drivers.
  - The lowest reliability performing feeders are identified and studied.
  - When we are developing lists of reliability focused projects for submittal to the budget managers.
Scope

- 25 valid utility responses
- Some of the comments:
  - 5 circuits are studied each year until all circuits have been studied.
Tools for Analysis

• 25 valid utility responses
• Other tools include:
  • Minitab
  • MS Access
  • ORACLE NMS Outage Management
Features included in Analysis

- 26 valid utility responses
- Some of the comments:
  - We are in process of implementing distribution automation on a few selected feeders.
  - By phase operation does not include 1 phase tripping with 3 phase lockout.
  - These are done more manually than with the coordination program.
Beneficial Features

• 19 valid utility responses
• Some of the comments:
  ▪ Complete availability of all options for by phase operation would be helpful.
  ▪ Consistent tracking of momentary faults
  ▪ Real time power flow
  ▪ Some software is adding a storm hardening flag for sections
Outage Data History

- 27 valid utility responses
- Some of the comments:
  - Typically we focus on the last 5 years of reliability data.
  - Consistently tracked outage data since 1998.
  - Good data since 2007.
  - Investments are made based on a 5 year average; however, all historical years are saved.