Use of Diagnostics by Utilities on MV Cable Systems

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Background

• Cable System Diagnostics has been, and continues to be, a dynamic environment

• Common for Utilities to be interested in
  – what is being used
  – how others have been able to gain a benefit.

• Understanding the Use is difficult
  – Changes with time
  – Pilot Programs / Research Studies
  – Reporting of “Vintage” studies
  – Confirmation Bias

• NEETRAC decided to conduct some research (survey) into current practices – some work done in 2006
**Approach**

- Utilities only
- MV Cable Systems only
- Generation Plants excluded
- Defined time window: May 2014 to Dec 2014
- Users and Non Users
- Allow for multiple Test Techniques
- Approaches used within “normal operations” or “normal program”
What to Count? – an example

Purchase: unused

Pilot Program

Standard

2013 2014 2015
Unable to contact everyone, so is the sample representative?

Distributions are sufficiently close to be comfortable that the sampling is representative.
What is being used? (1)

Number of Utilities

- None
- Simple Withstand VLF
- Monitored Withstand VLF TD
- Withstand Simple DC
- PD VLF
- PD Res AC
- TD VLF
- Simple Withstand VLF

What is being used? (2)

Weighted by Size of Utilities

- None
- Withstand Simple DC
- PD VLF
- TD VLF
- PD Res AC
- Monitored Withstand VLF
- Withstand Simple VLF
What is being used? (3)
What is being used? (4)
Conclusions

- Use of withstand (Hipot) & diagnostic tests indistinguishable
- Estimates show VLF is most preferred voltage source
- Use of PD in the offline mode remains steady essentially static over time period in utility space
- Great evolution the areas of:
  - VLF sources
  - Tan δ measurement
  - Interpretation.
- Biggest change (from previous estimates) over is in area of Monitored Withstand: 8% in 2014.
- The drivers of the growth have been two-fold:
  - Miniaturization / simplification / availability of the equipment
  - Guidance & familiarity from IEEE Std 400 & IEEE Std 400.2
- Interesting utility perspective on why a particular solution was selected