



Network Equipment Monitoring Programs

January 30, 2018

Bradley Kittrell
Distribution Engineering

Agenda

Con Edison System Overview

- 5 Minutes

Time-Based Inspections

- 10 Minutes

Remote Monitoring

- 10 Minutes

Q&A

- 10 Minutes

Con Edison Snapshot

- 28,000 network transformers
 - 500, 1000, 2500 kVA
 - Vault and subway (end-mount or side-mount) styles
 - Mineral oil and natural ester
- Physical installation
 - Primarily below sidewalks/streets
 - Some within buildings
- Predominantly N-2 network design



Time-Based Inspections

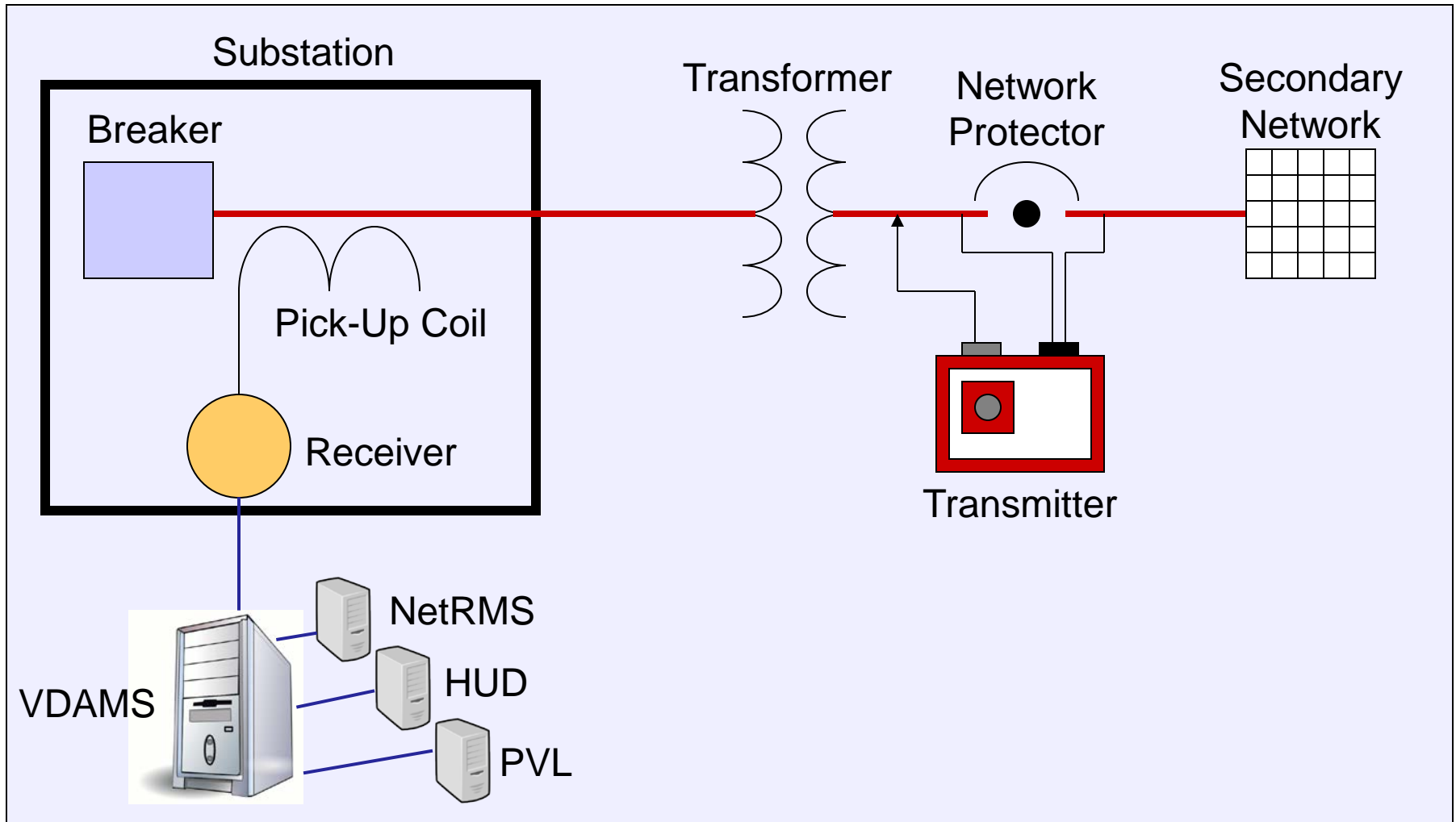
- Balance between company resources and risk
- Inspection categories vary due to...
 - Secondary voltages (120/208V or 277/480V)
 - N-1 design locations
 - Locations deemed as essential services (hospitals, government buildings, generation, etc.)
 - Installation of sensor technology

Population	Inspection Frequency
20,000 Transformers	8 years
8,000 Transformers	1-6 years (depending upon category)

Time-Based Inspections

- Information collected
 - Transformer pressure
 - Top-oil temperature
 - Dielectric fluid level
 - Corrosion severity (tank & cover, cooling panels, secondary throat)
 - Approximate percentage of anodes remaining
 - Ability of the network protector to operate properly
 - Dielectric fluid sampling
 - Strength, moisture, acidity, color, presence of contaminants
 - Dissolved gas-in-oil
- Information is electronically logged

Remote Monitoring System Overview



Pressure, Temperature, and Oil Sensors (P.T.O.)



- Pressure Sensor
- Temperature Sensor
- Oil Sensor



Other monitoring

- Load in %
- Voltage
- Network Protector Status (open/close)
- Low oil level flag
- Back-feed condition flag
- Oil minder status flag
- High water flag
- High temperature flag



conEdison

Questions?