UG Network Monitoring and Control System

By Derrick Harris
Portland General Electric Co.
Introduction

• Derrick Harris
• Distribution Engineer (EIT) at Portland General Electric Co.
• 4 ½ years experience
• Project Manager of Distribution Monitoring and Control System for Core/Downtown area at PGE
Network Monitoring and Control

• Canyon Network #1 – 31 units, 15 MVA
  – Monitoring system installed

• Canyon Network #2 – 43 units, 15 MVA
  – Monitoring system to be installed 2006

• Canyon Network #3 – 68 units, 30 MVA
  – Monitoring system to be installed 2007

• Stephens Network – 76 units, 25 MVA
  – Monitoring system to be installed 2008
Network Monitoring and Control

• System Objective

  – To provide a Distribution Monitoring and Control System on the Low Voltage Secondary Network System which provides service to the Downtown Core Area.
Network Monitoring and Control
Network Monitoring and Control

• NWP Relay is a device used to control the Network Protector operation under various conditions
• Monitoring attributes includes the following:
  – Protector Status
  – Transformer Voltages
  – Network Voltages
  – Phase Currents
  – Power
  – Reactance
  – Temperature
  – Power factor
  – Three auxiliary positions
Network Monitoring and Control

• Master Incom Network Translator
  – Translates Incom (relay) protocol to ASCII encoded hex messages
Network Monitoring and Control

• H&L Fiber Transceivers
  – Used to transmit data over long distances via RS-232 ports and fiber optic cable
Network Monitoring and Control
Network Monitoring and Control

• Powernet PC
  – Polls data from relays via media previously discussed.
## Current & Energy

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<th>I(B)</th>
<th>I(C)</th>
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<th>Vars</th>
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Network Monitoring and Control

• Clients/Users
  – Uses HMI software to model system/alarms
  – 5 clients using HMI software over secure network
Network Monitoring and Control

• PI node added
  – PI is a program used to monitor and trend substation data via SCADA and MV-90
• Gives read-only rights of network system to engineers throughout PGE
• Allows trending of selected relay attributes
Network Monitoring and Control

- SYSTEM BENEFITS
  - Economical
    - Extends Routine Maintenance Period
      - Protector Cycling can now be monitored
  - Eliminates Extra Trips During Outages
    - Protector Closed status is now visible
  - Reduction of Rebuilds
    - Problems will be caught before they occur
Network Monitoring and Control

• SYSTEM BENEFITS
  – Economical cont.
    • Reduces Field time gathering load/current info
      – Relay settings can be viewed
    • Reduces time in troubleshooting
      – Now able to see which protectors hang up during feeder outages
      – Now able to better determine existing problems with network protectors based on given data (phase currents, voltages, etc.)
Network Monitoring and Control

• System Benefits
  – Better System Design
    • With real-time data, system can be modeled more accurately, and apparent problems can be fixed
  • More accurate study in system loading will keep system from being overbuilt
Network Monitoring and Control

• System Benefits
  – Safety
    • Remote control can de-energize spot network collector busses
    • Back-feeding network protectors can be easily detected
    • Potential hazards can be detected
Questions?