Is your remote alarm unit reaching end-of-life?
Don’t be ALARMED!

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Dennis Olson, P.E.

- NDSU BSEE 1985
- Senior Telecommunications Engineer
- Information Technology/Infrastructure Services Group
- 29 years with GRE
- Responsibilities include:
  - Trunked Mobile Radio,
  - Load Management
  - Microwave Communications
  - Com Site Towers and Shelters
Great River Energy Introduction

- Great River Energy
  - 2nd largest utility in MN
  - 28 member cooperatives
    - 1.7 million people
- 794 employees (MN and ND)
- 3,000+ MW of owned generation
- 4,850 miles of transmission lines
- $3.9 billion total assets
- 99 monitored com sites
- 104 alarm RTUs
Current Badger Alarm System - Layout

- SchoRen TrapServer polling engine
- Badger Technology RTUs
  - 1785 - Analog
  - 1725 - Analog
  - E500 - Ethernet
- Analog 202T converted using Audio/Voice Adaptors (AVA)
Current Alarm Badger System - Points

- Contact closures
  - Security
  - Environmental
  - Power
  - Legacy communications gear
  - Tower lighting
Why change?

- Badger Technology stopped supporting or providing RTUs
- Analog sensor data needed for proactive maintenance
- Wanted derived alarms for improved diagnostic capability
- GRE network is evolving to ethernet only
- Some RTUs are 20 years old
Replacement System Requirements

- Native ethernet communication
- Remote firmware and password management of RTUs
- 64 point alarm capability
- Control contact closures
- Easy analog reading implementation
  - Propane levels
  - Air Temperatures
- Derived alarms
- Virtualizable polling engine
- Polling/reading existing Badger RTU alarms
New Alarm System – Contacts and Analogs

- Security - Contacts
- Environmental - Analogs
- Power – Contacts and Analog
- Legacy Com gear - Contacts
- Tower lighting - Contacts
Possible replacements

Polling engines:
- Megasys Telenium
- DPS Telecom T/Mon Master

RTUs:
- DPS Telecom NetGuardian 864 G5
- Quest Controls Telsec RM
Winning Bidders

- Polling Engine – Megasys Telenium
- RTU – DPS NetGuardian G5
Who I am: Zach Brom
Hardware Solutions
DPS Telecom Netguardian 864A

- High Density Alarm inputs
  - 64 Discrete Inputs (expandable)
  - 8-32 Analog Alarms
  - 8-32 Control Relays
  - 8 Serial Ports
- SNMPv1, SNMPv2c, SNMPv3, DCPX, or DNP3
- Integrated 4 port 10/100 switch (useful for Video Surveillance)
- Web based configuring and monitoring available
- Terminal Server
Discrete Inputs

- Important for Legacy Hardware that only have contact closures
No Dry Contacts for your device?

- Use an AC Current Sensor
  - Clamps around existing power cable
  - Create a contact closure when current is sensed

- Where we use them:
  - Baseboard heaters
  - Generator engine block heaters
  - HVAC compressor
  - HVAC heating element
PROPANE AND PROPANE ACCESSORIES
Analog Inputs

- Propane Sensors
- Temperature Sensors
Hall Effect Propane Tank Dials

1.875
[47, 6] Jr screw-on mount

Remote Dust Cap

Remote Ready Dial, R°D°, with dust cap removed and Hall Effect Module installed.

9701-00014 Hall Effect Module

Hall Effect Module Kit

Potting Cap

POWER IN RED
GROUND BLACK
OUTPUT WHITE
Analog D-Wire Sensors

- Plug and Play
- Easy Cabling
- Available modules:
  - Internal Temp
  - Internal Temp/Humidity
  - External Temp Probe
  - Airflow
  - Analog Voltages
  - Propane
- Daisy-chain up to 16 sensors
Programming of Netguardian RTU

- Desktop Application for creating configuration files
- Web based configuration and monitoring
- Telnet/command prompt
Wade Miller

- IT Systems Analyst
- 14 years at Great River Energy
- Network Monitoring Tools focus
Network Management System Selection

- Other management tool considerations
  - Current environmental monitoring NMS
    - (Very) small company
    - Did not meet derived alarm or graphing requirements
  - DPS NMS did not meet derived alarm requirements
  - Initially purchased another NMS
    - Total cost of ownership high
    - Sometimes less is more
Why Solarwinds Orion?

- Familiarity with Orion
- Recent customization experience with 700 MHz network
- Single Pane of Glass
- Use existing tech
- Very customizable
Protocol Decision

- DPS supports DCPX and SNMP
- NMS Vendor support limited for DCPX
- SNMP traps – no guaranteed delivery
- Combine Traps and Polls to ensure accurate status
RTU Details
RTU Details

DPS NetGuardian Node Details - brookstonng864 - Summary

Environmental Monitoring Links
EDIT HELP

Node Details
EDIT HELP

Polling IP Address 192.168.1.14
Dynamic IP
Machine Type DPS Inc.
Node Category Other
DPS Name brookstonng864
Node Description: brookstonng864
Location Brooklyn
Contact 718.463.6508
Deployed 1.36.1.1.2662
Last Boot Thursday, June 26, 2023 9:11 AM

Software Image Unknown
Hardware Physical
No OS Type
TID 69,701.1.32.12

Health Summary
EDIT HELP

EDU Status 1

Polling Details
EDIT HELP

Propane Level
% Full

Chassis Temp
Degrees F

Equipment Room Temp
Degrees F

HVAC 1 Temp
Degrees F

HVAC 2 Temp
Degrees F

Active Alerts on This Node (0)

Events History

Last 25 Traps

GREAT RIVER ENERGY
History empowers teams to make better decisions!
RTU Details
Analog Graphs View
HVAC – Troubleshooting
Derived Alarms

- Fire
  - Smoke + High Temp

- HVAC
  - Has heat been running for 5 minutes?
  - Is output temp at least 10 degrees higher than ambient temp?

- Tower Light Monitoring
  - Tower Light Status
  - Expected Status
Tower Light Monitoring

The Problem: Sunrise/sunset variation by location and by date for tower sites

Solution: Incorporate site-specific sunrise/sunset data
Get Sunrise and Sunset for each site

Tower Light Monitoring

Orion

Site Coordinates

sunrise-sunset.org

Sunrise & Sunset
Tower Light Monitoring

Alert Script (5m)

Current Status = OFF & Expected Status = ON

Alarm!
Thank you!