BVPS I/O System Replacement

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Topics

- What we upgraded & how we scheduled
- I/O upgrade
  - Challenges
  - Unique interfaces
- Future challenges
Upgraded Components

- DRPI interface replaced with Arduino module
Upgraded Components

- Power Supplies
BVPS I/O Upgrade

- Replaced RTP I/O with CTI CAN I/O
- Approximately 22 gateways per unit
- Each gateway supports serial extension
BVPS I/O Upgrade

Special thanks to Arkansas Nuclear One

Denver Walker
Darrell Jones
And, yes, that is Dave O’Farrell doing **actual WORK**

➢ We let him work on our stuff…

…but
Upgraded Components

- **Simulation computer**
  - Dell Precision Tower 7910
  - Windows 7 64-bit OS
  - Previous Simulation computers were limited by the I/O interface
Installation Challenges

- **XtremeView & JADE graphics not functional**
  - Database modifications required

- **Gateways overloaded with too many Analog Outputs**
  - Lacked enough energy to provide all DOs
  - Split out those gateways

- **Stray voltages from I/O cards cycle recorder power**
  - Traced to dip switch settings on cards
Upgrading DRPI display
➢ Not standard I/O…uses Graycode packets decoded by DRPI boards

Difference in RTP (old I/O) output voltage (~15v) and CTI CAN I/O output (24v)
➢ Thought it always was 24v
➢ Relay failed for Rod Control Reset Pushbutton (digital step counters)
➢ Overdriving DRPI (caused "ghost" lights)
Installation Challenges

- Identified 2 legacy issues
  - Floating grounds
    - Original installation: Westinghouse terminal strips
    - Original I/O was not as precise
    - Controller operation was biased
      - ground affected -5v to +5v zero point
Installation Challenges

➢ SR Audio Count Rate Drawer
  • Not integrating and pulsing properly

• Pre-existing issue not identified before testing

• 2 integrated circuit chips were swapped inside
Future Challenges

- **Electrical and Thermohydraulic Model upgrades**

- **Network administration**
  - Ovation DCS incorporated in Unit 1
  - Future Arduino Modules
  - How to configure and monitor traffic
Thanks!

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Questions?