University of Minnesota
SE Heating Plant Controls Upgrade

THERMO SYSTEMS
INDUSTRIAL AUTOMATION & INFORMATION

Topics of Discussion

- Facilities Background
- Project Goals
- Challenges and Solutions
- End User Benefits
- Q&A

Facilities Background

Facilities Background

Southeast Heating Plant	Main Energy Plant
Newest Boilers Commissioned in 1999	Commissioned in 2017
Two Gas/Oil Fired Package Boilers	One Combustion Gas/Oil Turbine
One Circulating Fluidized Bed Boiler	One Heat Recovery Steam Generator
One Steam Turbine Generator	275 KPPH, 24 MW Plant Capacity
650 KPPH, 16 MW Plant Capacity	

Project Goals

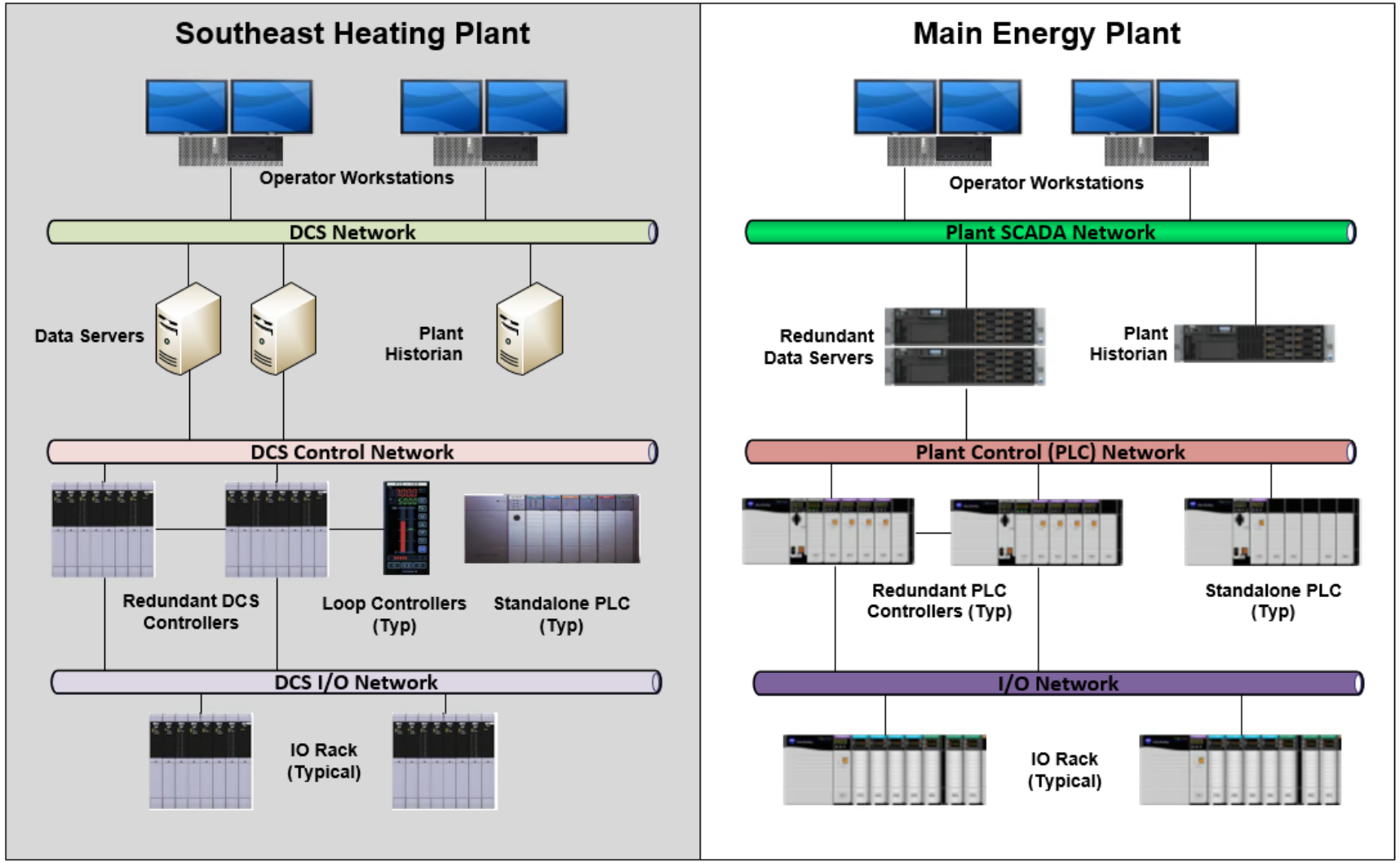
- Replace obsolete control systems
- Continue control system standardization from Main Energy Plant platform
- Provide common operator interface between plants
- Provide the ability to control and monitor both plants from either location
- Relocate the control room
- Integrate electrical system

Project Challenges

Budgeting Contingency

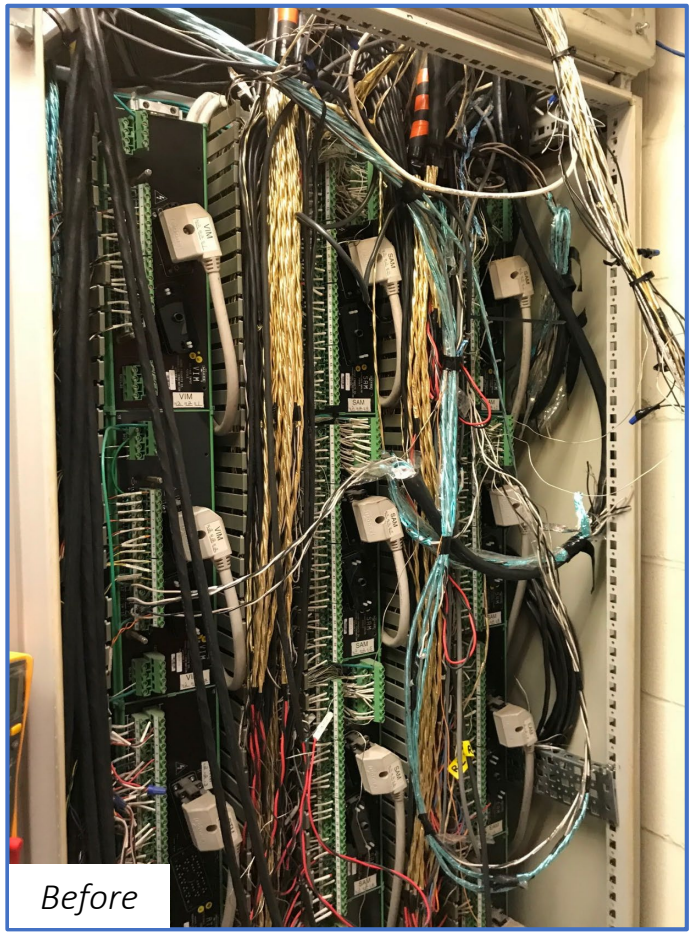
- Unforeseen Circumstances
- Post Budgeting System Enhancements
- Possible Instrumentation Additions or Replacements
- Constructability Roadblocks (Temporary systems or moving systems)
- "Oh, By The Way..." Add-on's

Control System Overview



Project Challenges

- Lack of existing control panel drawings
- IO modules and terminal blocks on separate backplane within enclosure



Before

After

Project Challenges

Minimize Plant Outage with Phased Approach

Phase	System
1	Water Treatment / Electrical Monitoring
2	Network and SCADA Infrastructure
3	Package Boilers
4	Balance of Plant
5	Circulating Fluidized Bed Boiler

Before


After

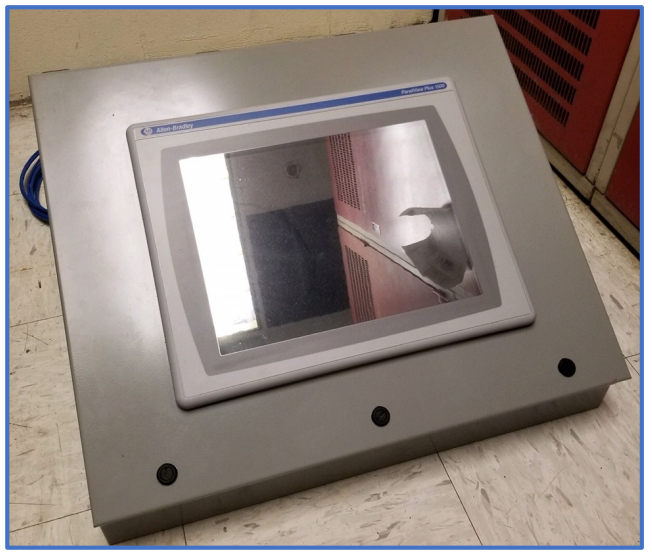
Project Challenges

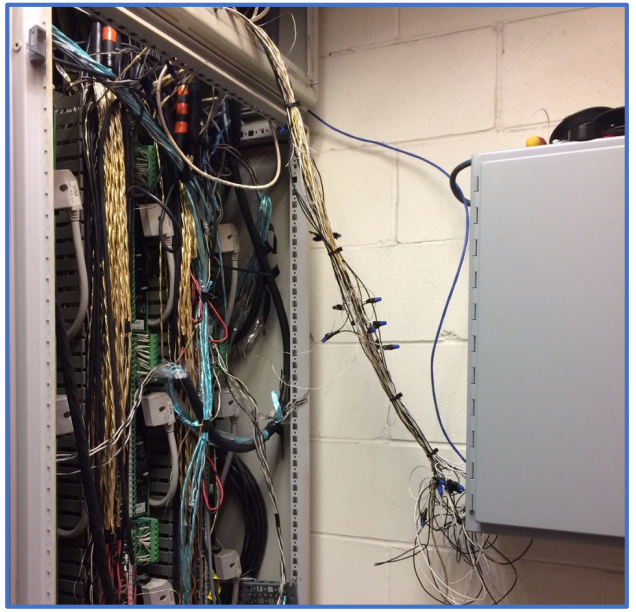
- Expanding Main Energy Plant network and SCADA without impacting operations
- Leverage planned outages at Main Energy Plant
- Used existing fiber optics cabling between plants to connect plants together. Isolated PLC, SCADA, and IO networks

Project Challenges

Temporary Controls for Balance of Plant

- Initial project oversight
- Small control panel built specifically to provide the plant automatic control of level and pressure
- Leveraged for future spare parts





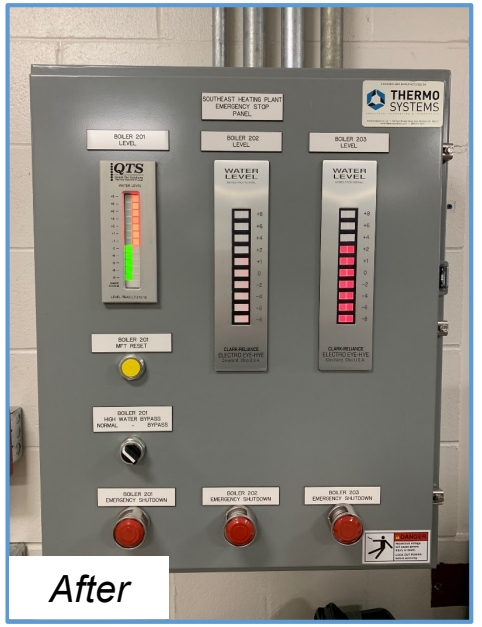
Project Challenges

Control Room Relocation

- Relocate Boiler Level Indicators and E-Stops
- Relocate Soot Blower Control Panel
- New Control Console


Before

After



After

Project Challenges

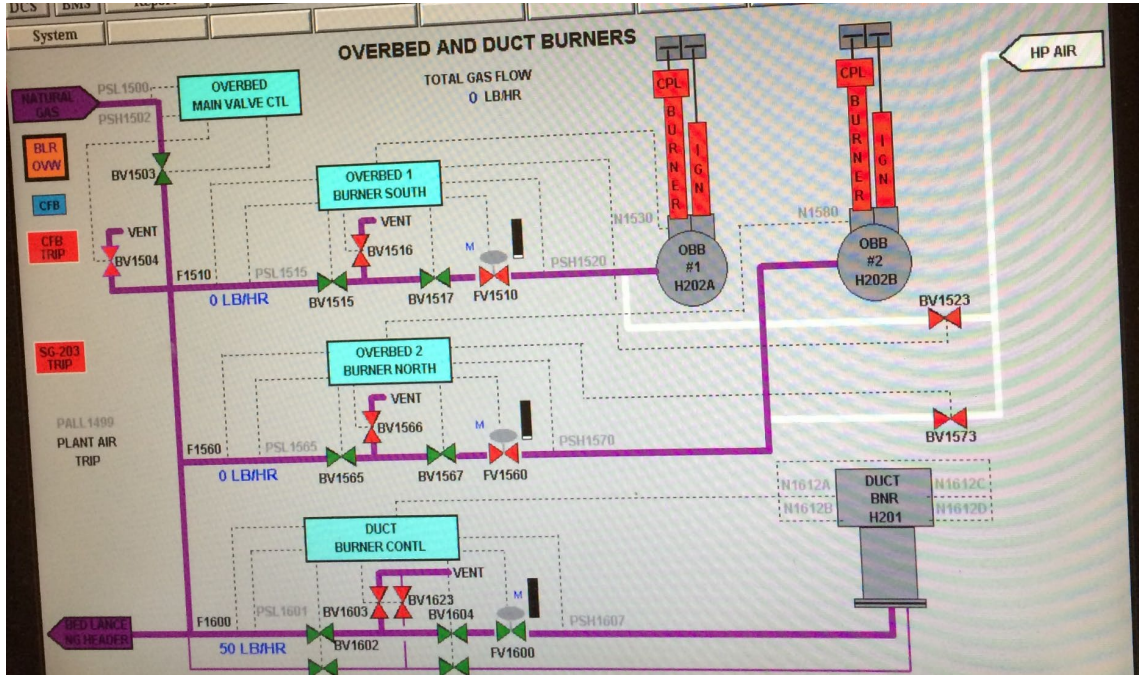
Plant Commissioning

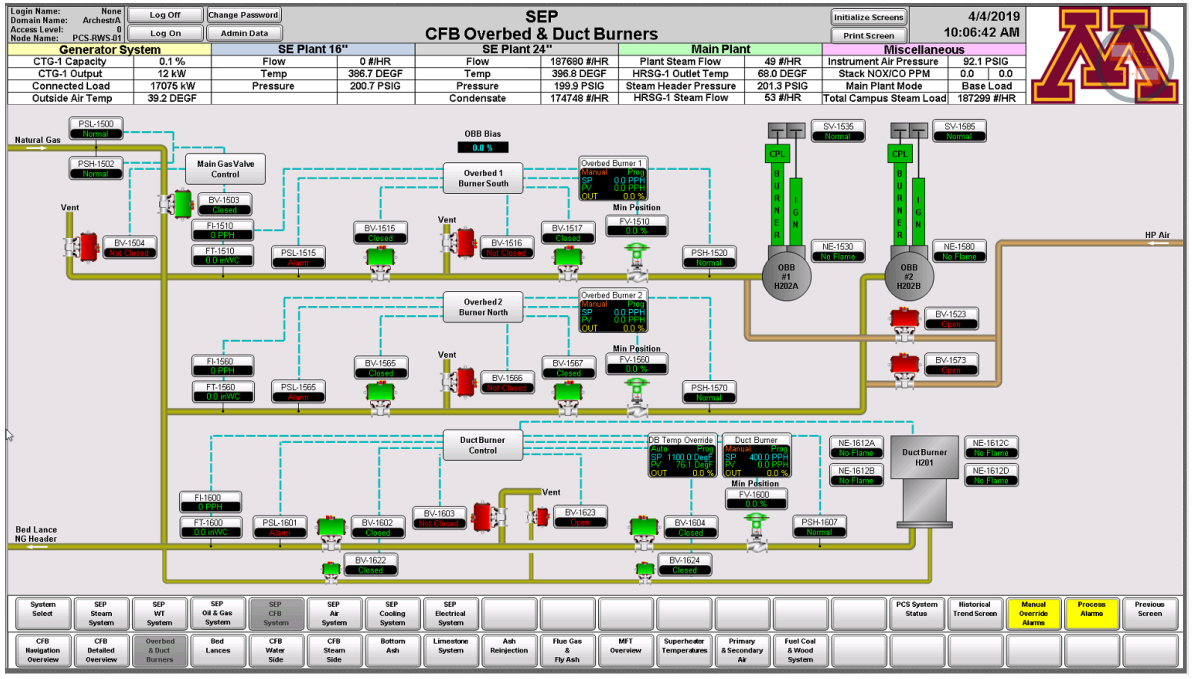
- Low steam periods
- Complete testing without interruption to campus
- Project team continuity

Project Challenges

New HMI Platform

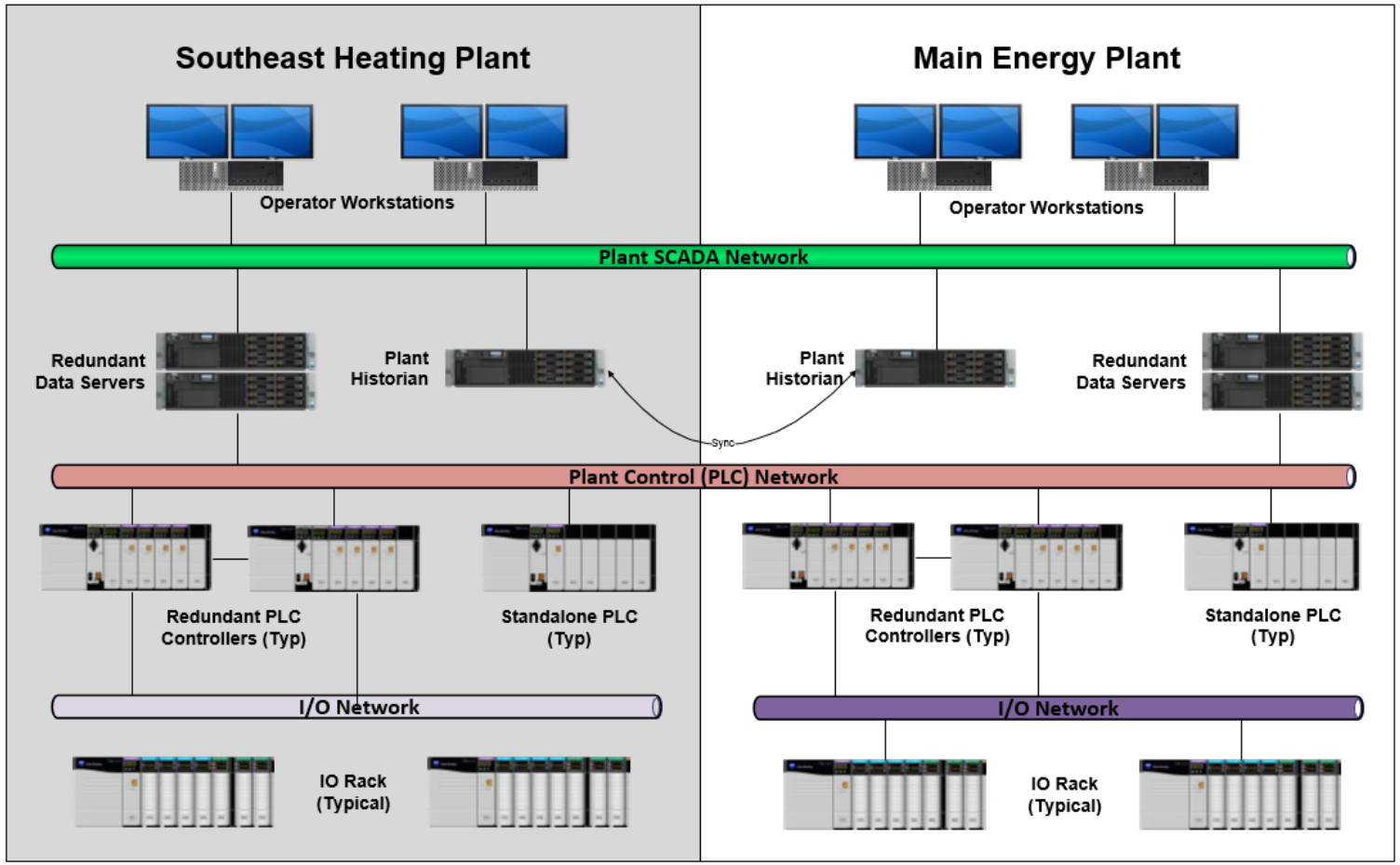
- Maintain familiarity with old system
- Early operator feedback





End User Benefits

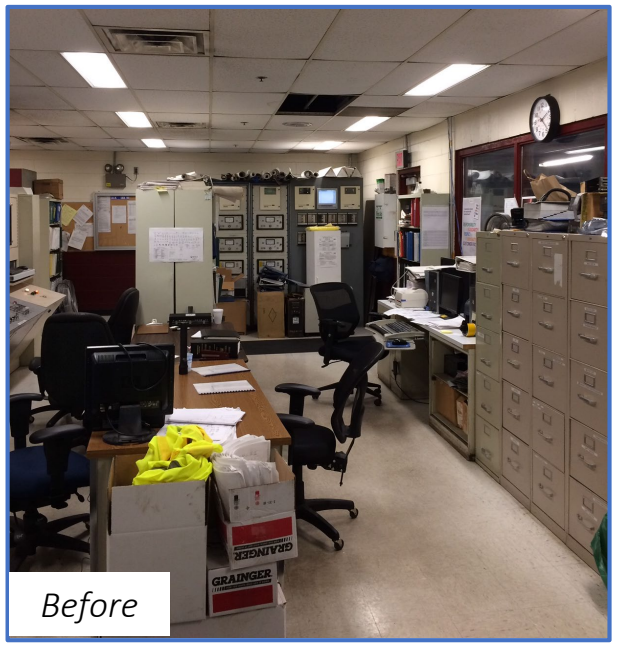
Multi-plant operability with common interface between plants



End User Benefits

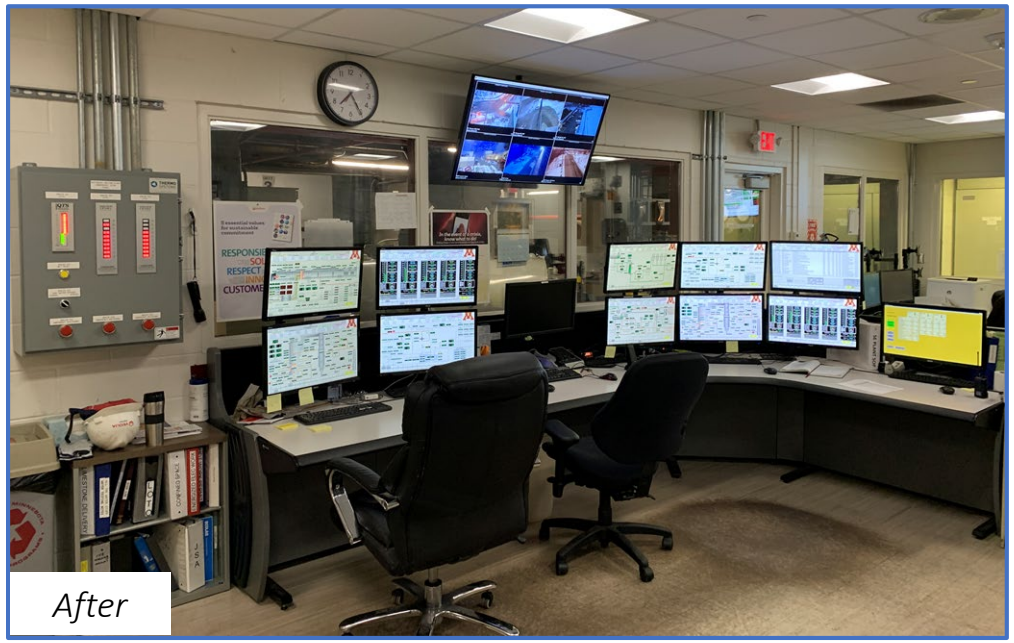
New Control Room

- More space for operators
- Additional and larger monitors



Before

During


After

End User Benefits

- Maintainability with common software interface
  - Programming standardization
- Vendor support options
- Spare part availability
  - Next day, off the shelf parts

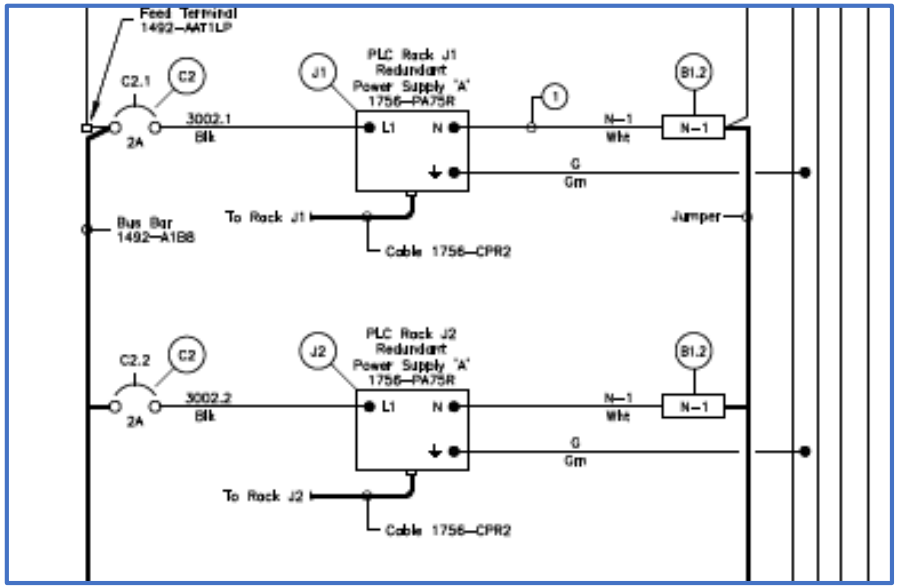

Before


After

End User Benefits

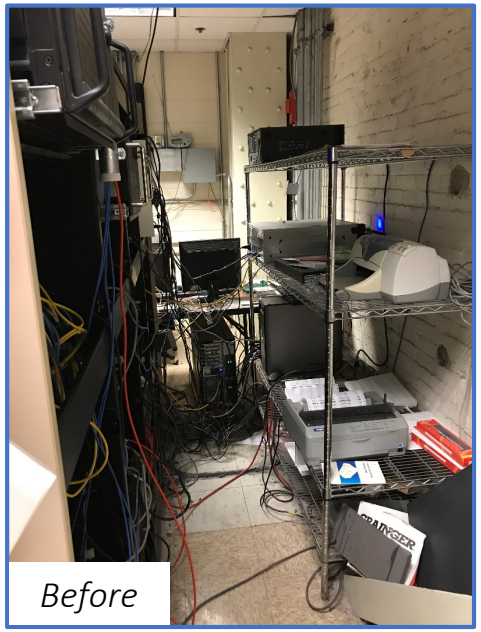
- Industry-wide protocols
  - Reliability
  - Expandability

- Trust in system documentation



End User Benefits

- More data, quicker, and organized
- Additional system data available to operators and staff
- Dedicated space for critical infrastructure
- Streamlined reporting



Before

After

Questions

THANK YOU!

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