Topics of Discussion

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

<table>
<thead>
<tr>
<th>Southeast Heating Plant</th>
<th>Main Energy Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newest Boilers Commissioned in 1999</td>
<td>Commissioned in 2017</td>
</tr>
<tr>
<td>Two Gas/Oil Fired Package Boilers</td>
<td>One Combustion Gas/Oil Turbine</td>
</tr>
<tr>
<td>One Circulating Fluidized Bed Boiler</td>
<td>One Heat Recovery Steam Generator</td>
</tr>
<tr>
<td>One Steam Turbine Generator</td>
<td>275 KPPH, 24 MW Plant Capacity</td>
</tr>
<tr>
<td>650 KPPH, 16 MW Plant Capacity</td>
<td></td>
</tr>
</tbody>
</table>
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
Project Challenges

- Lack of existing control panel drawings

- IO modules and terminal blocks on separate backplane within enclosure
# Project Challenges

Minimize Plant Outage with Phased Approach

<table>
<thead>
<tr>
<th>Phase</th>
<th>System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Water Treatment / Electrical Monitoring</td>
</tr>
<tr>
<td>2</td>
<td>Network and SCADA Infrastructure</td>
</tr>
<tr>
<td>3</td>
<td>Package Boilers</td>
</tr>
<tr>
<td>4</td>
<td>Balance of Plant</td>
</tr>
<tr>
<td>5</td>
<td>Circulating Fluidized Bed Boiler</td>
</tr>
</tbody>
</table>

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
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
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
End User Benefits

- Maintainability with common software interface
  - Programming standardization

- Vendor support options

- Spare part availability
  - Next day, off the shelf parts
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
Questions
THANK YOU!

Grant Selking
Engineering Manager
Thermo Systems LLC
Grant.selking@thermosystems.com

Mike Grimstad, P.E.
Principal Engineer
University of Minnesota
grims035@umn.edu