

## PROJECT SUMMARY

<b>Project Name:</b>	Ethanol Powerhouse Software
<b>Total Value:</b>	\$50,000
<b>Hours:</b>	Over 700
<b>Engineers:</b>	Two (2) – Software Design
<b>Market:</b>	Building
<b>Manufacturing/Process:</b>	Utilities
<b>PLC:</b>	Rockwell – CompactLogix
<b>SCADA:</b>	Rockwell – FactoryTalk View Supervisory Edition




---

**Introduction:** This project was to provide sequence of operations development, PLC software design, SCADA software design, and software bench-testing for two (2) Ethanol Powerhouse systems.

---

**Objectives:** OTI provided the following services:

- Sequence of operations design engineering
- SCADA software design engineering
- PLC software design engineering

---

The function of the system is to control Powerhouse equipment and supervise various subsystems. The software also interfaces with an upper-level DCS which provides additional monitoring and control. OTI used customer-provided P&IDs and consulted with their engineers to write sequence of operations.

---

**Solution:** The master control panel contained Rockwell Automation CompactLogix I/O to monitor and control the following equipment:

- Chilled Water Equipment
- Filtered Water
- Steam Header
- Deaerator / Boiler Feed Water
- Condensate
- Intermittent Blowdown
- Water Treatment

- 
- Soft Water Equipment (Brine Water)
  - Safety Shower Flow Monitoring
  - Sump
  - Building Exhaust

The master control panel communicated via Ethernet to the following subsystems:

- Boiler #1 Control Panel
- Boiler #2 Control Panel
- Boiler #3 Control Panel
- Boiler #4 Control Panel
- Chiller #1 Control Panel
- Chiller #2 Control Panel
- Air Compressor #1 Control Panel
- Air Compressor #2 Control Panel
- RO Control Panel
- Air Dryer Control Panel
- Boiler Chemical Feed Skid Controller
- Cooling Tower Chemical Feed Skid

The systems, aside from the boilers, were provided by other subcontractors. Time was spent gathering information (drawings, PLC programs, interface documents, etc.) and analyzing this documentation. Based on the findings, the communication protocol for each piece of equipment was specified. The Chillers utilized BacNet IP, while the Chemical Feed Skid Controllers communicated via Modicon IP. Kepware communication drivers were utilized to interface with these systems.

---

**Process**

**Documentation:**

The following is a list of documentation provided by Outbound Technologies in order to exceed the required industry standards:

- Software (PLC, HMI)
- Sequence of Operations / Operations Manual / Training Manual
- Check-Out Forms

---

**Industry**

**Standards:**

- NEC
- NFPA

---

**Project**

**Outcome:**

OTI provided all necessary documentation and software per the project schedule. OTI was awarded an additional contract to perform in-house factory acceptance testing of the systems and the corresponding commissioning activities at the end-user's facility.

---