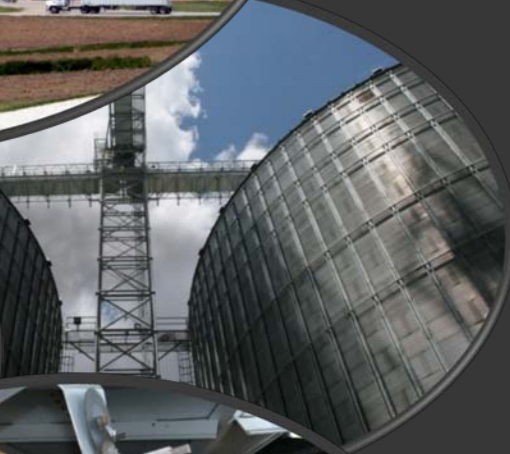


PLC Control with Computer HMI -
Material Handling System

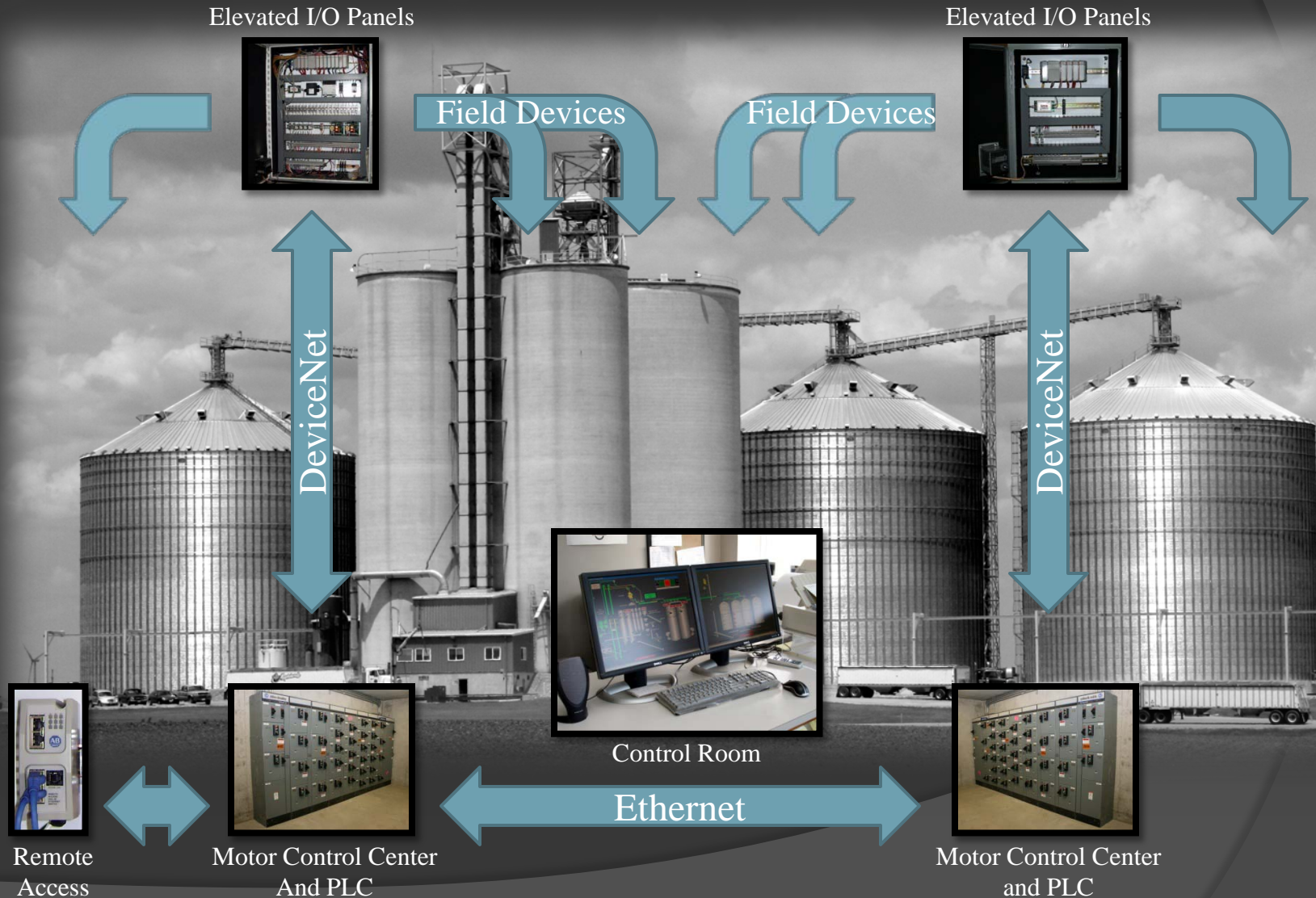
MATERIAL HANDLING SYSTEM



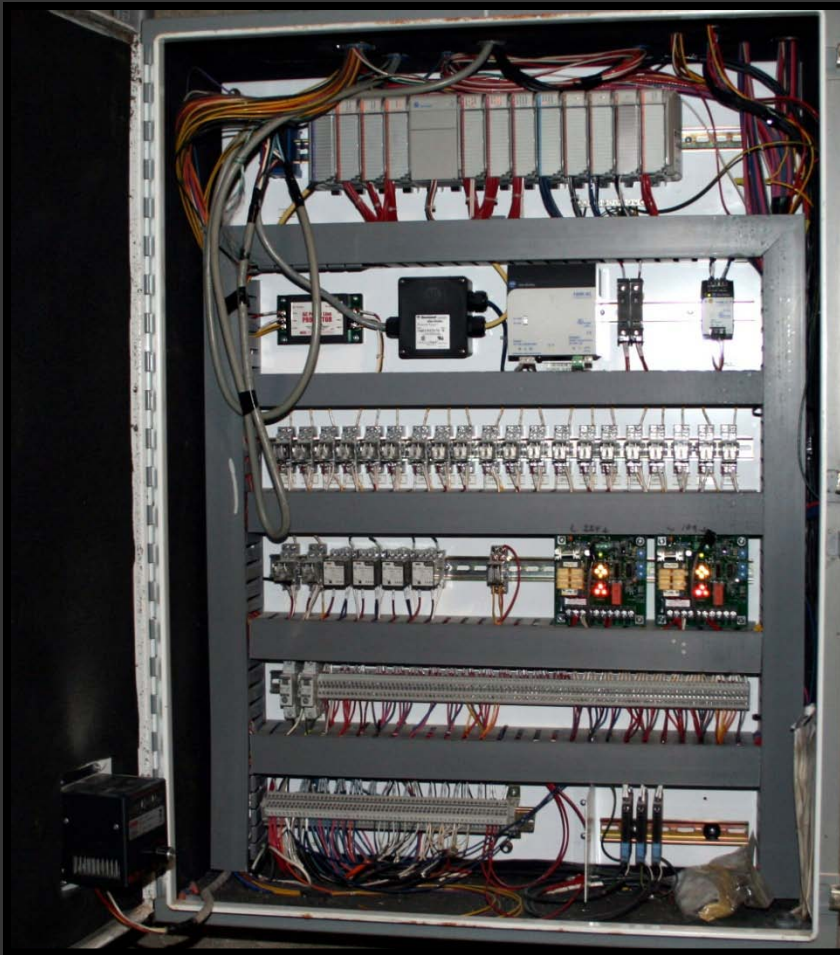
PROJECT OBJECTIVES

- Provide control system for a new facility which will be receiving by truck, storing, and unloading by train.
- New motor control centers, sensors, gate actuators , and conveying / distribution systems using networked communications whenever possible.
- Distribute concentrations of I/O to various points in the facility to minimize the length of wiring runs.
- Link PLCs and HMI computers together with a high speed communications network .
- Provide a distributed HMI system that includes detailed alarming.
- Secure remote access for troubleshooting and program updates.

Process Communications Networks



Distributed I/O Panels and Field Devices



Distributed I/O Panel



Field Devices

Panels containing Allen Bradley CompactLogix I/O are strategically located around the facility. These panels concentrate the connections of the field devices in their area into a single DeviceNet communications cable to the associated motor control center PLC. This eliminates or minimizes the need for long, individual wiring runs from each device to the PLC.

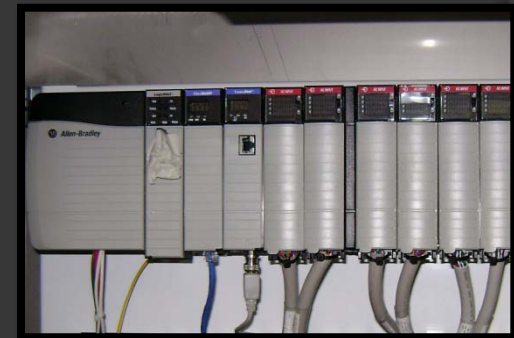
Motor Control Centers with PLCs



Motor Control Center



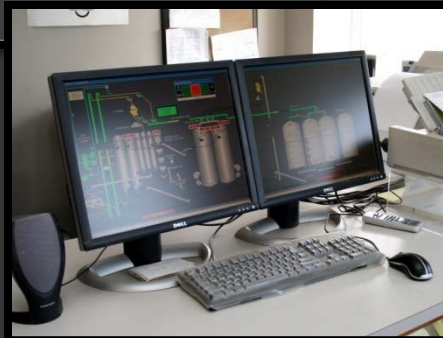
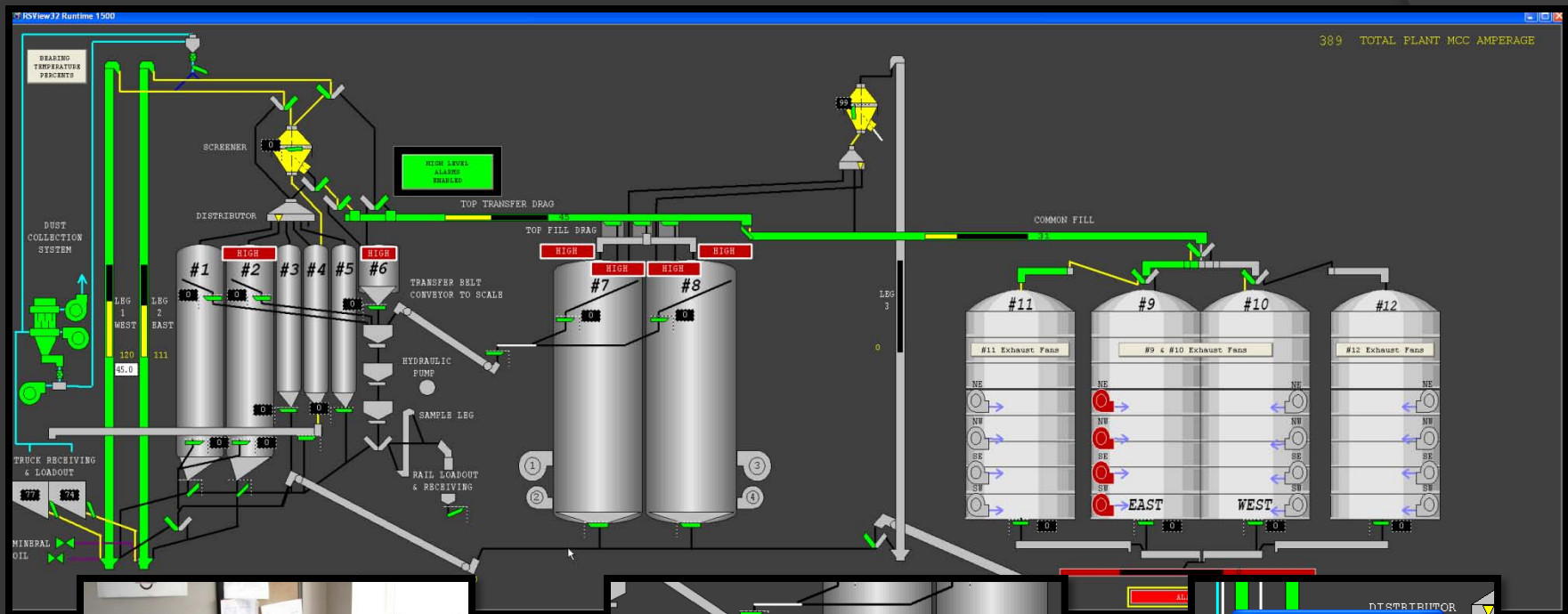
CompactLogix and I/O



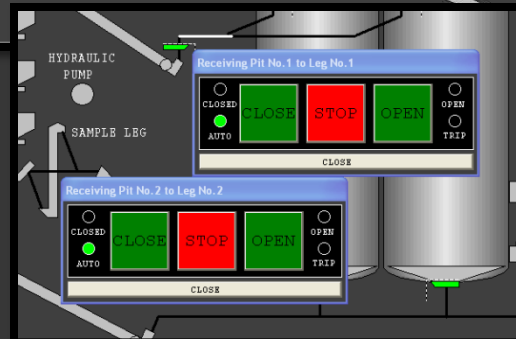
ControlLogix and I/O

Motor control centers containing Allen Bradley ControlLogix and CompactLogix processors with I/O are located to serve specific areas of the facility. The MCC PLCs and the control room computer systems are networked together by Ethernet. Many field devices in the area being controlled by the MCC are accessed by DeviceNet communications to the associated Distributed I/O panel.

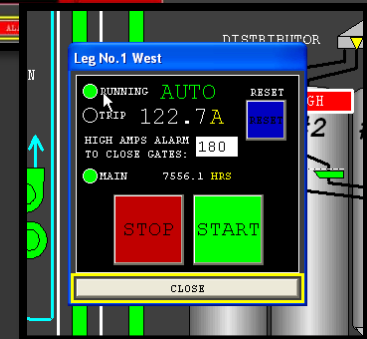
Control Room HMI



Dual Screen HMI in Control Room



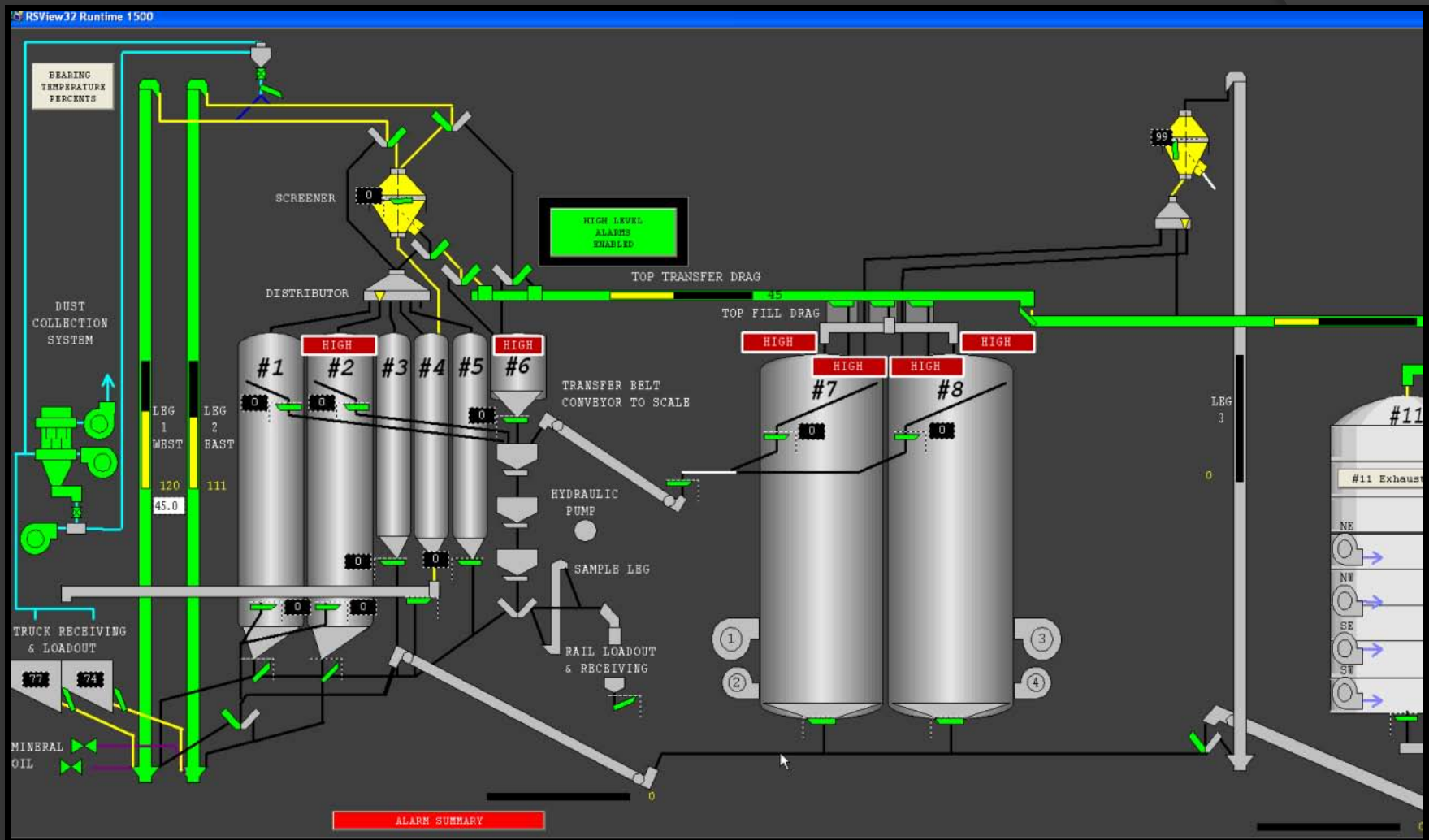
Gate Position Controls



Elevator Leg Controls

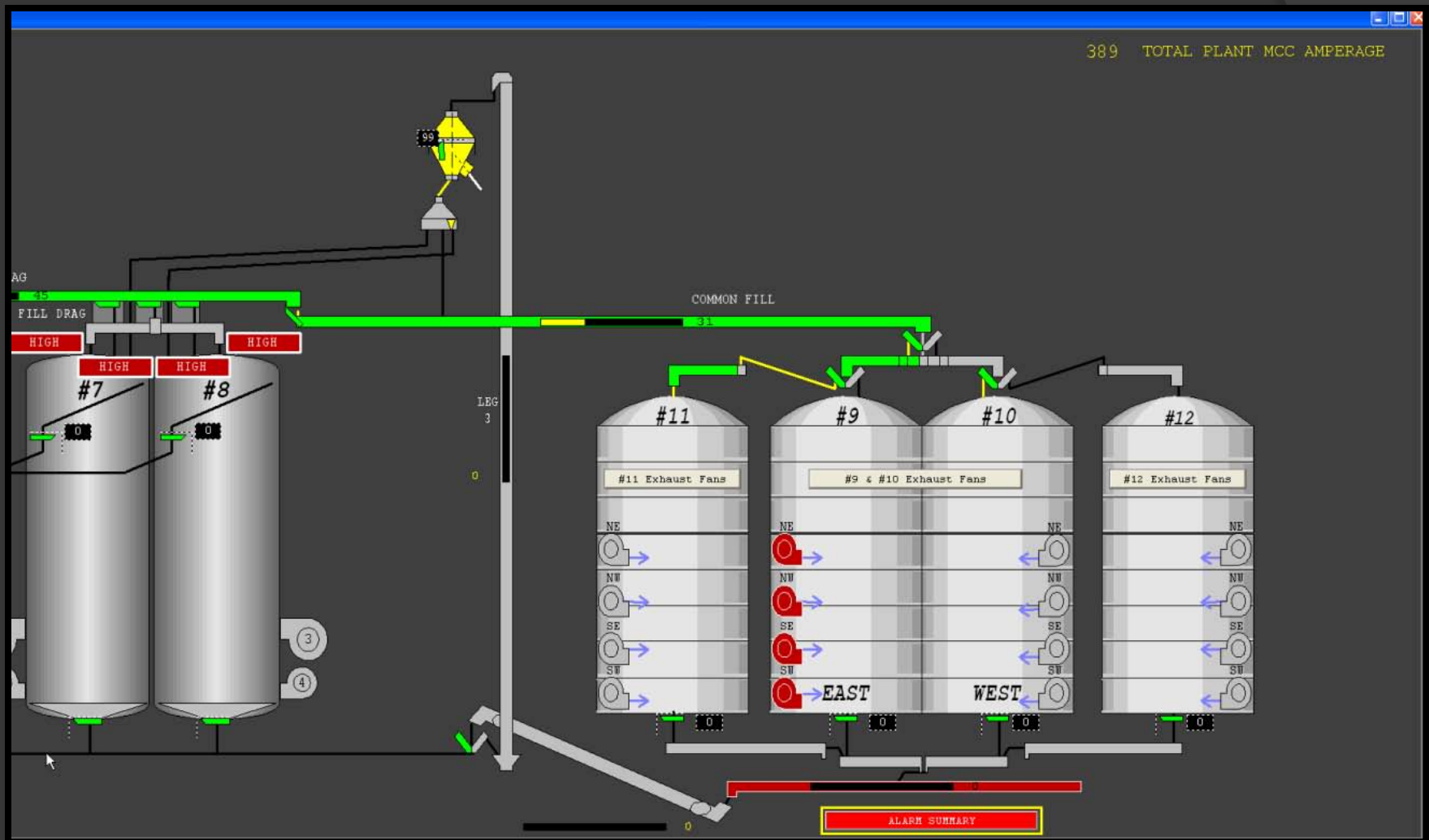
The truck unload control room HMI is displayed on a dual widescreen monitor system. This format allows a full graphic overview of the entire facility to be seen at a glance. Operational controls can be displayed by clicking on the item.

Control Room HMI – Left Screen



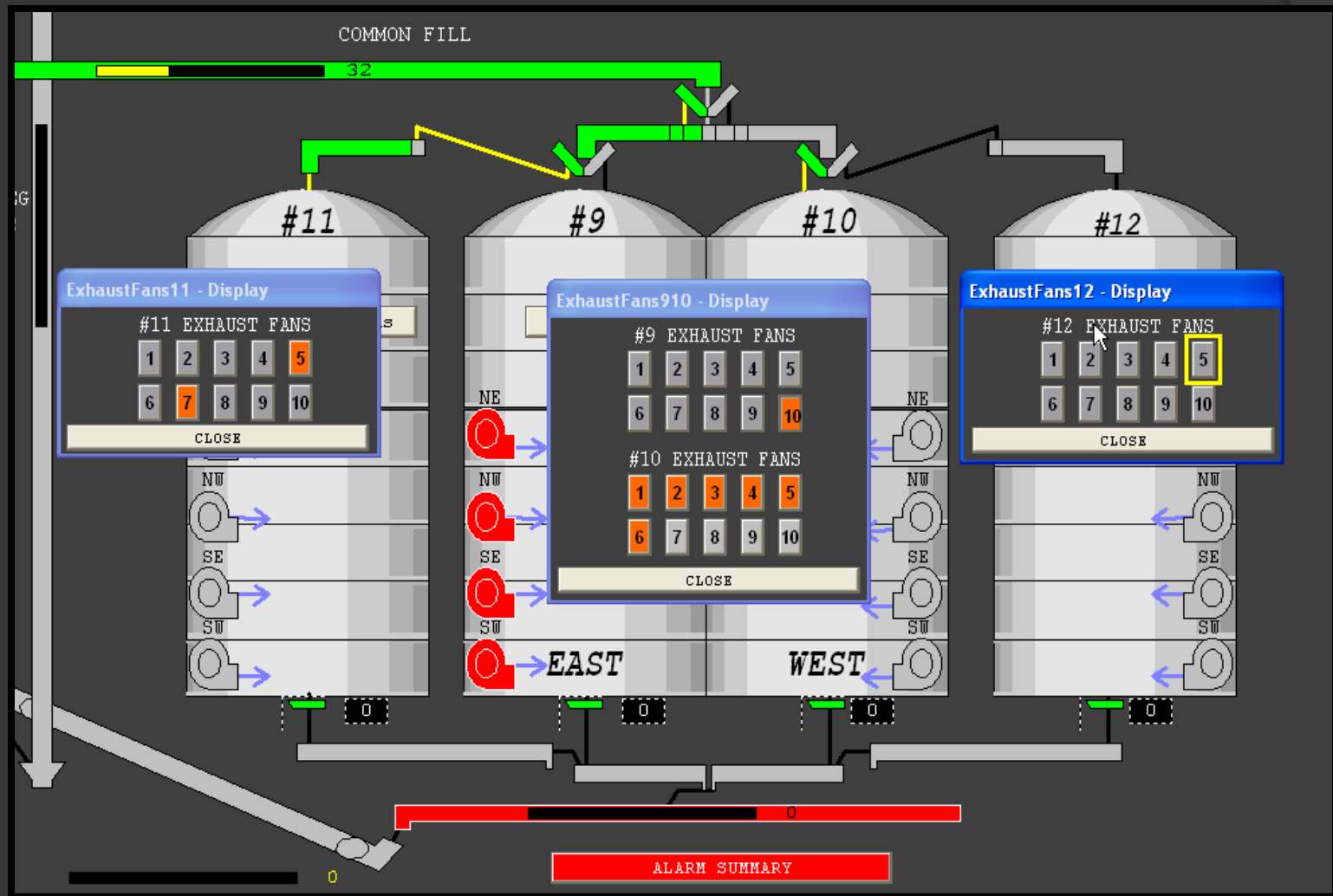
This is a closer look at the display on the left monitor of the dual monitor system. Routing of the material flow is clearly displayed with the use of color. Likewise, operational status is displayed by varying the color of an item. Amperages and gate positions are displayed using digital numeric indicators as well as bargraphs and rotational position.

Control Room HMI – Right Screen



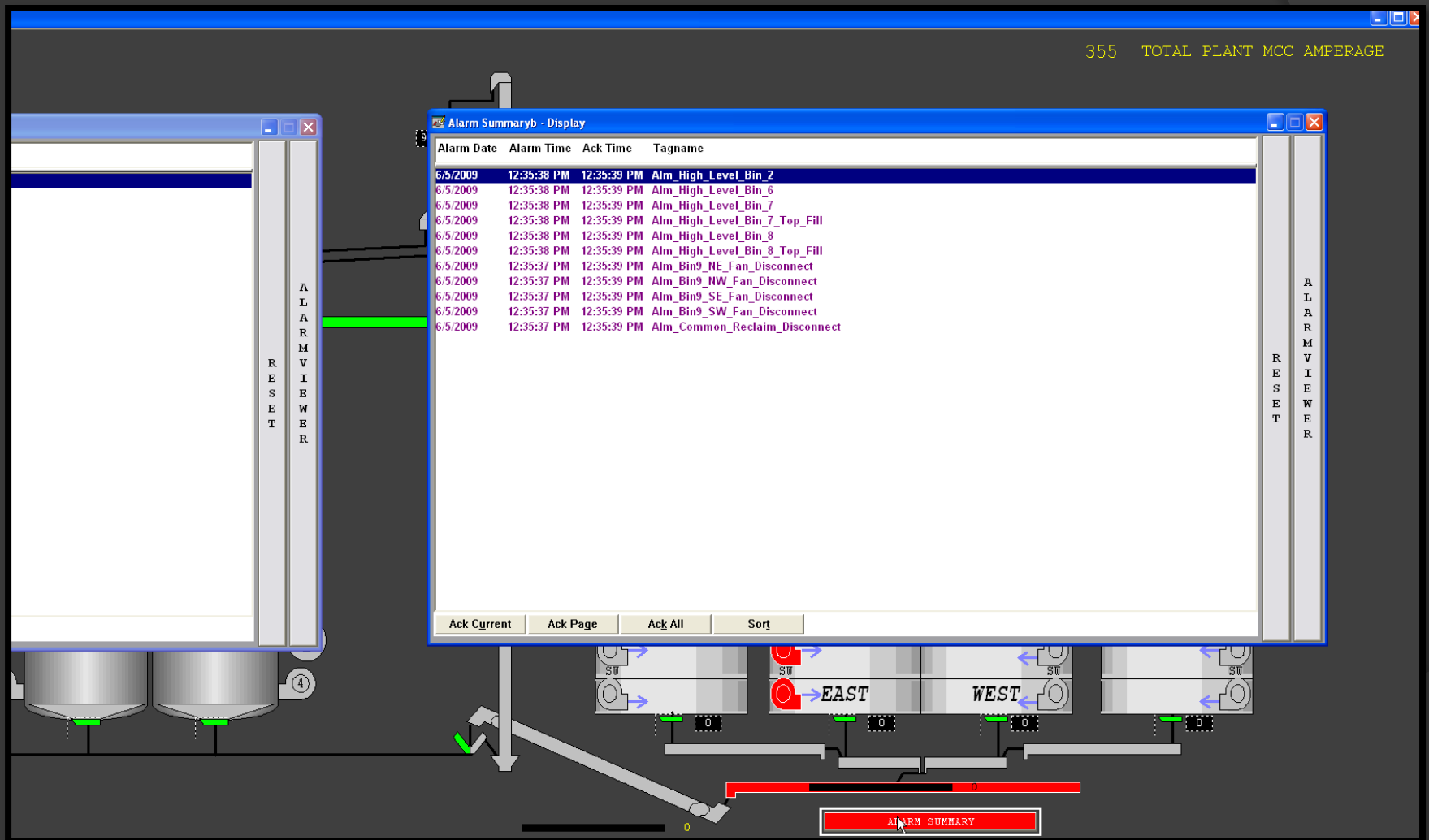
The overview from the left monitor is continued on the right monitor shown here. Together they form a large, ultra-wide display of the entire process. Note the MCC amperage displayed in the upper right corner of this screen. This total is possible because the motor control center has electronic overloads networked on DeviceNet that provide amperage readings for all motors in the system.

Control Room HMI – Fan Control



Fan control on the bins is provided by these pop-ups. Clicking on a fan displays the controls for that fan group.

Control Room HMI – Alarm Summary

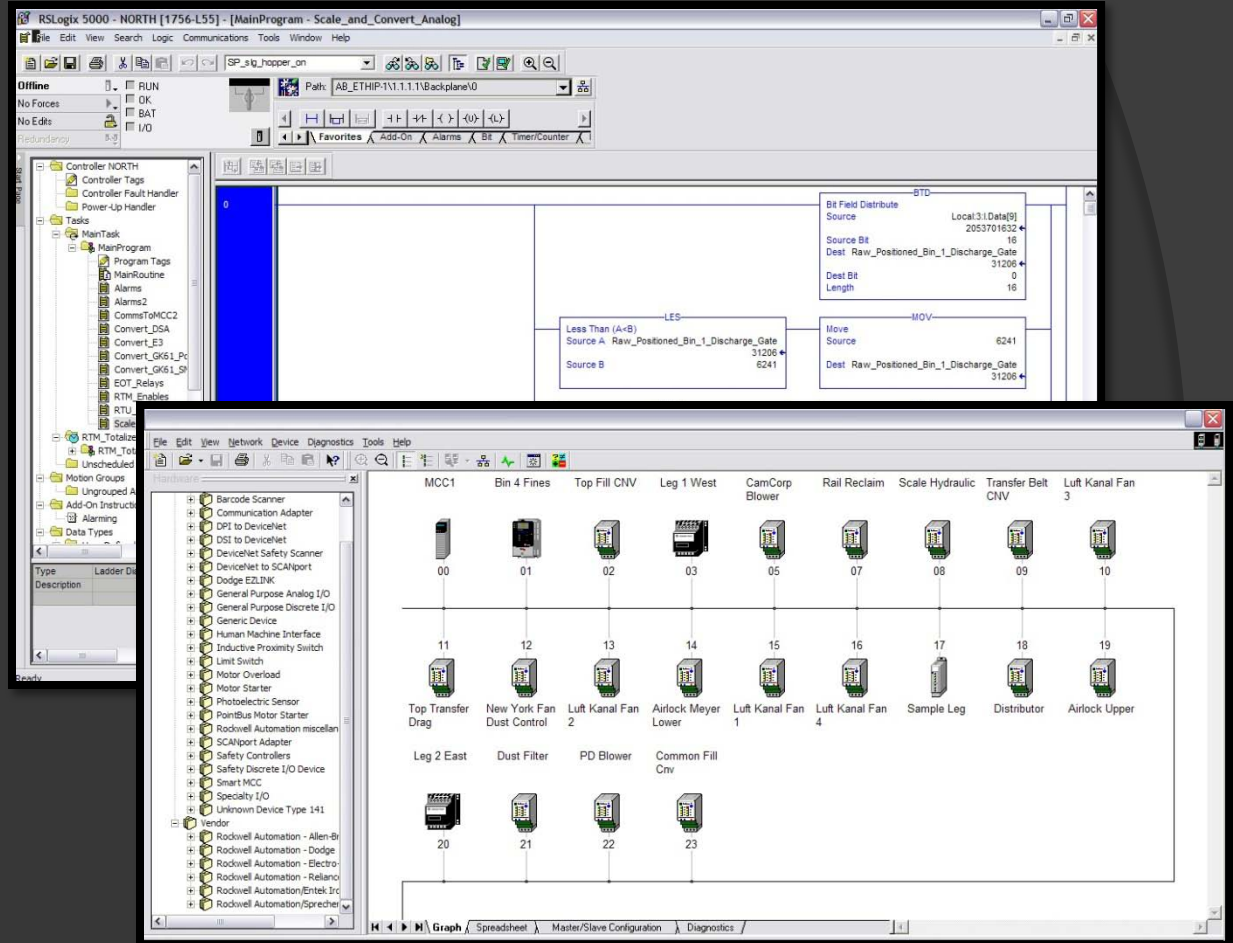


Active alarms in the system are displayed on the Alarm Summary screen. The [ALARM SUMMARY] button on the bottom of each monitor's display will pop-up the Alarm Summary on that monitor. The operator can select which screen the summary will display on using this method. An Alarm History viewer is used to review historical alarm logs.

Secure Remote Access



9300-RADES



Using Allen Bradley's 9300-RADES (Remote Access Dial-In Ethernet Modem) we can dial-in with a password protected, secure connection, and go online with the PLCs to provide remote troubleshooting and diagnostic assistance. In addition to the PLC programs, items on any of the DeviceNet networks can be examined for proper operation. That includes motor starters, VFDs, SoftStarts, and more.

PROJECT OBJECTIVES ACHIEVED and RESULTING BENEFITS

- *Provide control system for a new facility which will be receiving by truck, storing, and unloading by train.*

New motor controls, distributed I/O panels, and communication networks provide the foundation of this system. HMI and PLC software was custom designed for the operation of this facility.

- *New motor control centers, sensors, gate actuators , and conveying / distribution systems using networked communications whenever possible.*

DeviceNet in the motor control centers, between distributed I/O panels, and to some field devices, maximized the amount of status and control in the system.

- *Distribute concentrations of I/O to various points in the facility to minimize the length of wiring runs.*

By locating distributed I/O panels strategically throughout the facility, field devices could be connected to the nearby panel instead of making much longer wiring runs to the PLC / MCC.

PROJECT OBJECTIVES ACHIEVED and RESULTING BENEFITS

- *Link PLCs and HMI computers together with a high speed communications network .*

A local area network using Ethernet connects all the PLCs and the HMI computers together.

- *Provide a distributed HMI system that includes detailed alarming.*

Two HMI computer systems were provided, one in the main control room for truck unloading , and the other in the train loading area. Both systems share the same HMI screens but can be used independently. In addition to being able to monitor the entire facility from two locations, this provides an operational backup. Detailed alarm summary and alarm historical logging is included.

- *Secure remote access for troubleshooting and program updates.*

All remote access to the system is by secure dial-up connection. Once connected via the Remote Access Dial-In Ethernet Modem, the PLCs and their connected I/O devices can be accessed over the local area network.

This presentation of a case study in
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