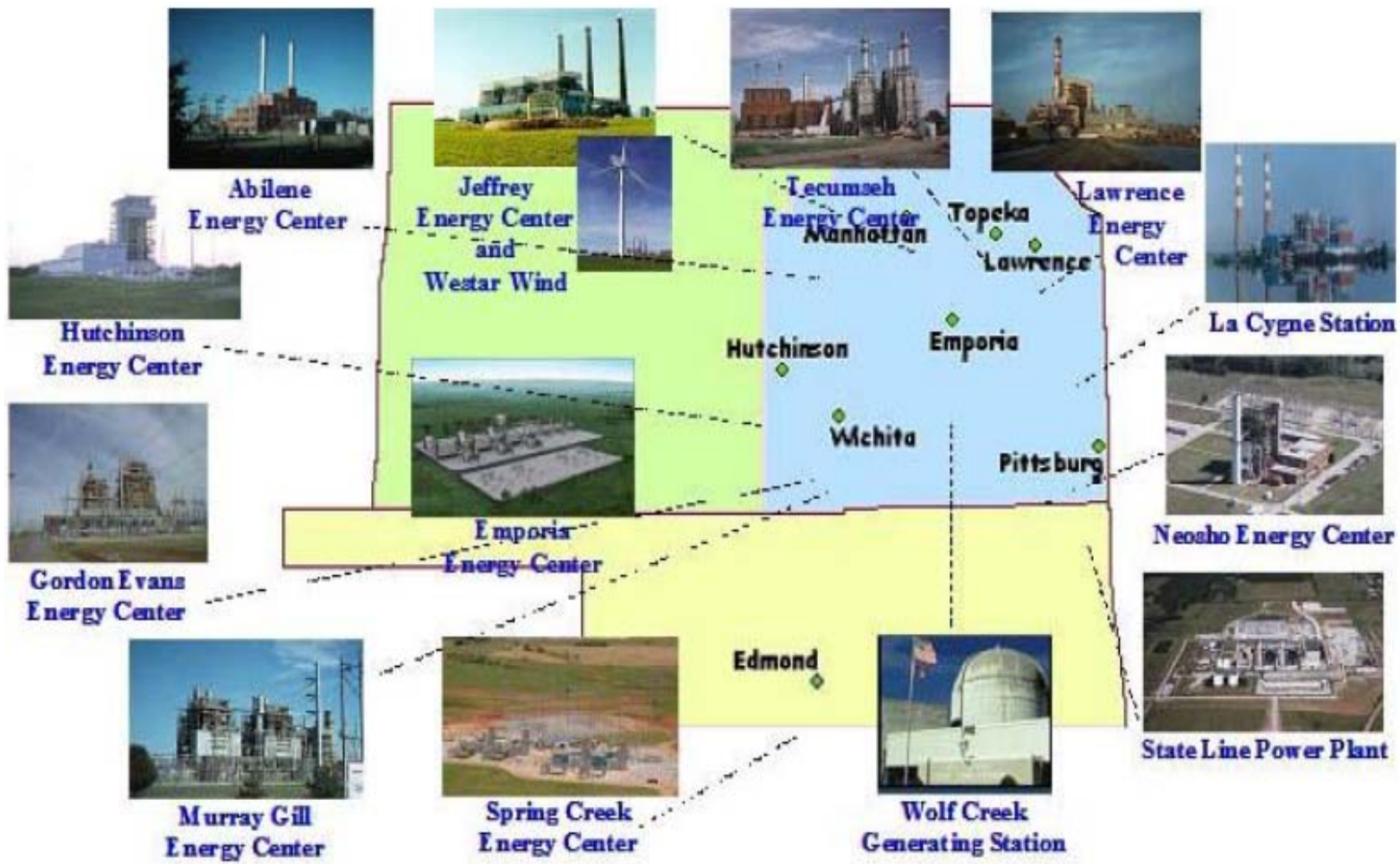




Westar Energy Lawrence Energy Center

PRB Plant Of The Year

2006









Lawrence Energy Center

- 600 MW Base Loaded PRB Coal Facility
- 117 Employees
- First Unit On-Line In 1938; Unit 1 & 2 Retired
- Unit 3 – 60 MW – Built In 1955
- Unit 4 – 130 MW – Built In 1960
- Unit 5 – 420 MW Built In 1971



2006 Milestones

- Net Generation – 3,250,000 MWHRS
- 18,172 Train Cars Unloaded
- 1,925,836 Tons Of Coal Burned
- Current Coal Inventory – 21 Days
- OSHA Recordable Incident Rate – 1.74



Lost Time Record

LEC reached 1,000,000 Manhours
Without a Lost Time Accident in
February, 2007



Expect
Believe It
ZERO Today
ZERO Tomorrow

Westar Energy™

THIS PLANT HAS WORKED
1,043,100 MANHOURS
WITHOUT A LOST TIME
ACCIDENT

PREVIOUS RECORD 601,100
INCIDENT RATE RECORD 0.86



Live It

Expect It

Believe It

ZERO  *Today*
ZERO  *Tomorrow*



PRB Conversion

1999 - Present



PRB Conversion Challenges

- Lower BTU Content requires a higher material handling rate
- Fuel is more volatile requiring improved fire protection
- Fuel is dustier requiring Dust Control improvements and clean up challenges
- Ash content is higher causing increased slagging and fouling



Unit 3 Modifications

\$600,000

- **Boiler Water Cannons**
 - control Waterwall Slagging

- **Additional Sootblowers**
 - control increased fouling

- **Loose Fill Rotary Air Heater Baskets**
 - reduce pressure drop from increased fouling

- **Electrostatic Precipitator Acoustic Horns**
 - handle increased ash load



Unit 3 Modifications

\$600,000

- **Coal Bunker Mods to Round Corners & Ledges**
 - prevent hideout
- **Coal Bunker CO Monitors**
 - early fire detection
- **L3/L4 Bunker Room Washdown System (Pending)**
 - aid clean up
- **Bunker Room Heat (Pending)**
 - prevent freezing during washdown



Unit 4 Modifications

\$1,300,000

- **Economizer Drag Chain**
 - handle increased ash
- **Additional Sootblowers**
 - convection surface cleaning
- **Loose Fill Rotary Air Heater Baskets**
 - reduce pressure drop from increased fouling
- **Bare Tube Design Scrubber Reheater**
 - decrease pressure drop



Unit 4 Modifications \$1,300,000

- Furnace Exit Gas Temp Probe
 - provide feedback for sootblowing in the furnace
- Coal Bunker CO Monitors
 - early fire detection
- Bunker Silo Washdown System With F500 Injection
 - Fire protection
- Coal Bunker Mods to Round Corners & Ledges
 - prevent hideout



Unit 5 Modifications \$11,000,000

- Bare Tube/Straight Thru Economizer
 - reduce pressure drop

- Modified Low Temp Superheater
 - added stainless steel sections to decrease fouling

- Modified Boiler Reheater
 - added stainless to decrease fouling

- Bare Tube Design Scrubber Reheater
 - reduce pressure drop



Unit 5 Modifications \$11,000,000

- Economizer Drag Chain
 - handle increased ash

- Additional Sootblowers
 - convection surface cleaning

- Loose Fill Rotary Air Heater Baskets
 - reduce pressure drop



Unit 5 Modifications

- **Furnace Exit Gas Temp Probes (2)**
 - provide feedback for furnace cleaning

- **Stack Silencer**
 - reduce noise from increased fan loading

- **Bunker Room Dust Collector with F500 Injection**
 - reduce dust



Unit 5 Modifications

- **Bunker Room Wash Down System**
 - clean up

- **Bunker Room Heat**
 - prevent freezing during washdown

- **Bunker Silo Washdown with F500 Injection**
 - Fire protection



Common Modifications \$9,500,000

- Coal Handling Capacity Increased From 450 TPH to 800 TPH
- Radial Stacker & Expanded the Coal Pile
- Upgraded all transfer points to Hood and Spoon Design – Dust control
- Railroad Track Extension



Common Modifications \$9,500,000

- Backup Bucket Conveyor
- New Fire Protection Panels
- Total Suspended Solids Chemical Control System
 - capture coal pile runoff to river
- 2 Additional Sootblowing Air Compressors

Old Crusher 450 TPH



New Coal Crusher 800 TPH



Original Number 5 Conveyor 450 TPH



New Number 5 Conveyor



Manual Coal Tripper



New Coal Tripper



Radial Stacker





Dust Control & Fire Prevention

- Wash Conveyor System & Bunker Rooms Twice Daily
- Conveying Equipment Inspections Weekly
- Fire Extinguisher & Fire Hose Reel Inspections Monthly
- Fire Protection Panels Tested Bi-Annually



Dust Control & Fire Prevention

- Fire Deluge Systems Trip Tested Monthly
- Coal Bunkers Emptied Bi-Monthly
- Engineered Hoods & Spoons at Transfer Points
- Stilling Curtains Inside Load Chutes

ELECTRICAL UPGRADES

Positive Pressure Switchgear Building





New Square D Model 6 MCC With Load Center Drawout to Handle Increased Load





Square D Masterpact Breakers With Tie Breaker in Drawn Out Position



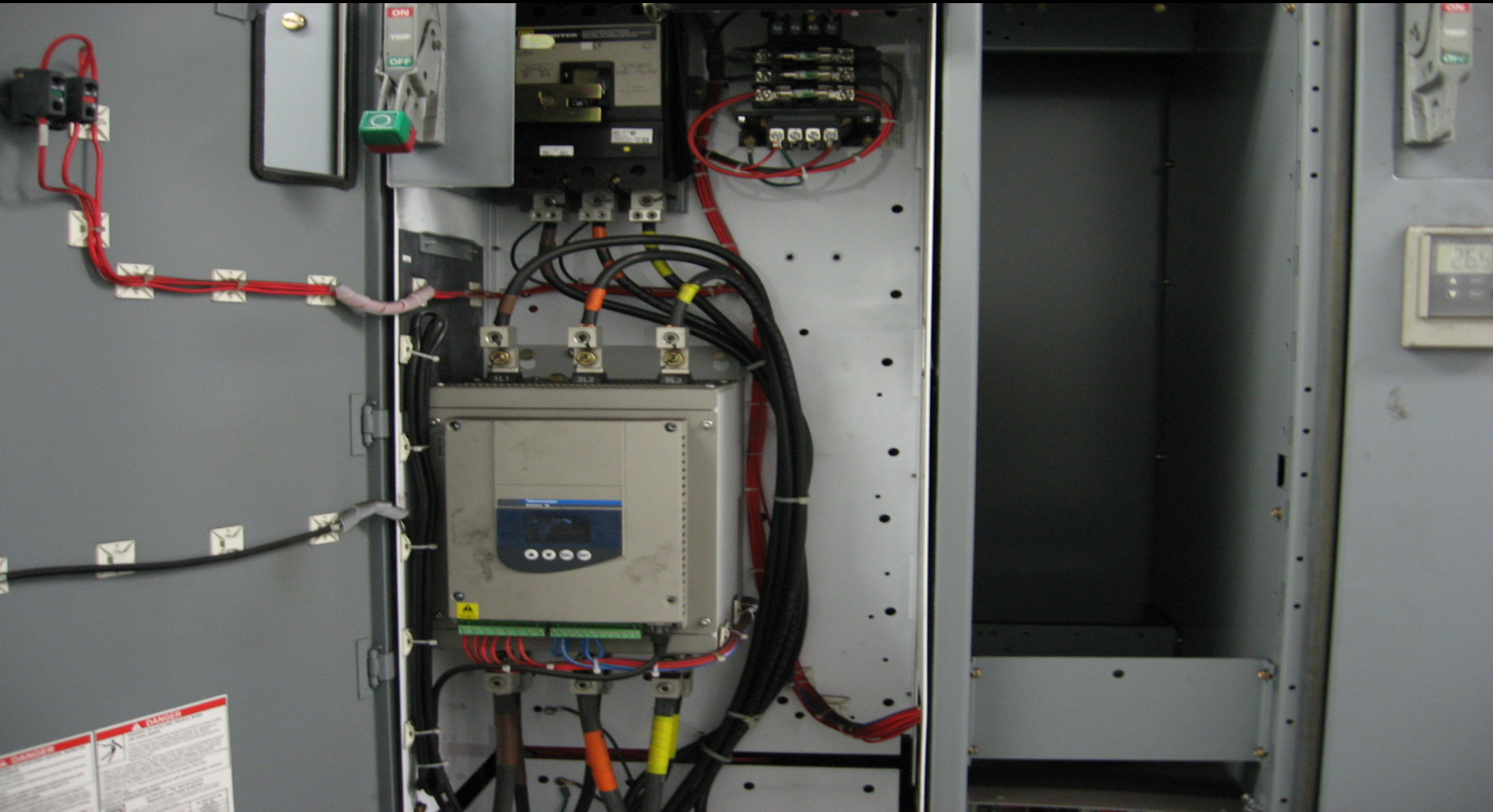


Typical Motor Control Center Bucket With Soft Start/Bypass Contactor and Cross The Line Starter





Telemecanique ® Altistart 48 Soft Start





Left - Cross The Line Starter With Overloads
Right - Soft Start Bypass Contactor





**Top Selector Switch Allows For Local or Remote Operation
Lower Selector Switch Allows Operator To Select
Soft Start Or The Cross The Line Starter**





Typical Feeder Belt Frequency Drive Bucket With Remote Control From DCS Or Local Speed Control From Bucket - Flex 58 Series Drive





Typical Self-Cleaning Belt Magnet 2 Installed ahead of the Crusher and 1 after the Crusher





Conduit Seal Offs Depicting Transition from Class 2 Division 2 To Class 1 Division 1 Hazardous Location Below Grade





Class 1 Division 1 Rated Phone Installed in all Underground Locations



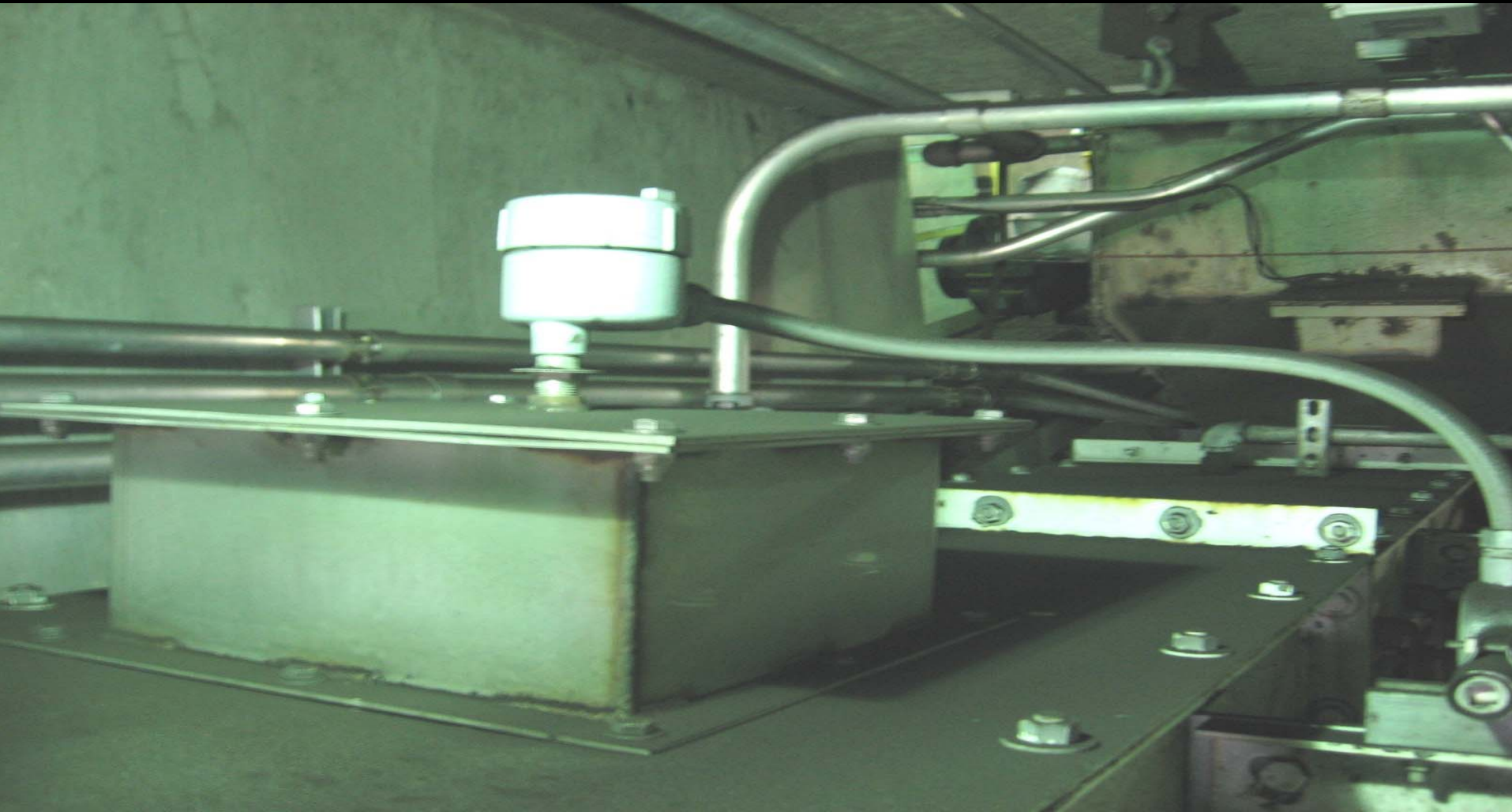


Protectowire ® Cabinet , LEC 30 Zones





Typical Fire Detection Spot Heat Detector Installed in all Transfer Points





Protectowire[®] Linear Heat Detection Cable



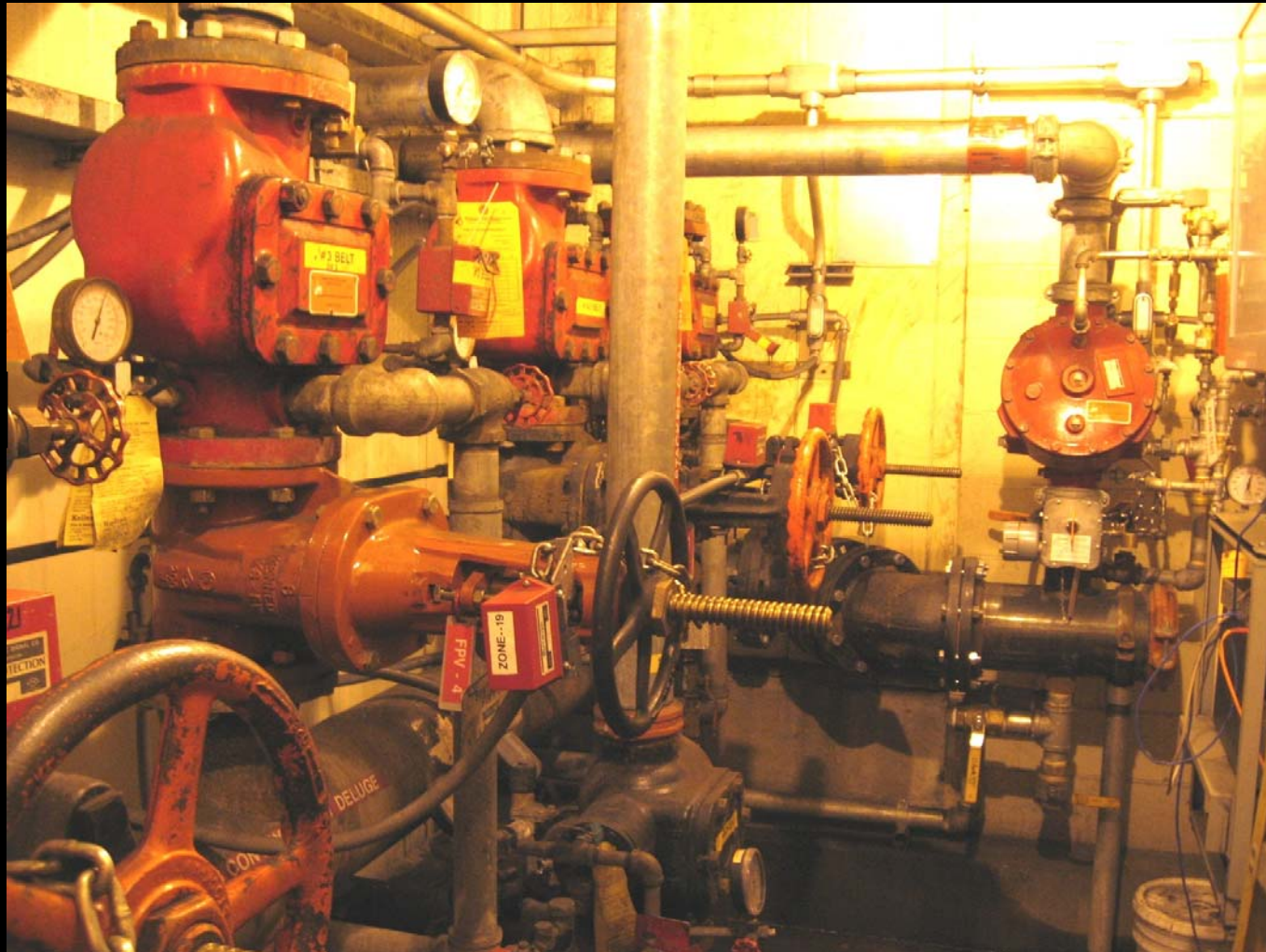


Protectowire® Linear Heat Detection Termination Box



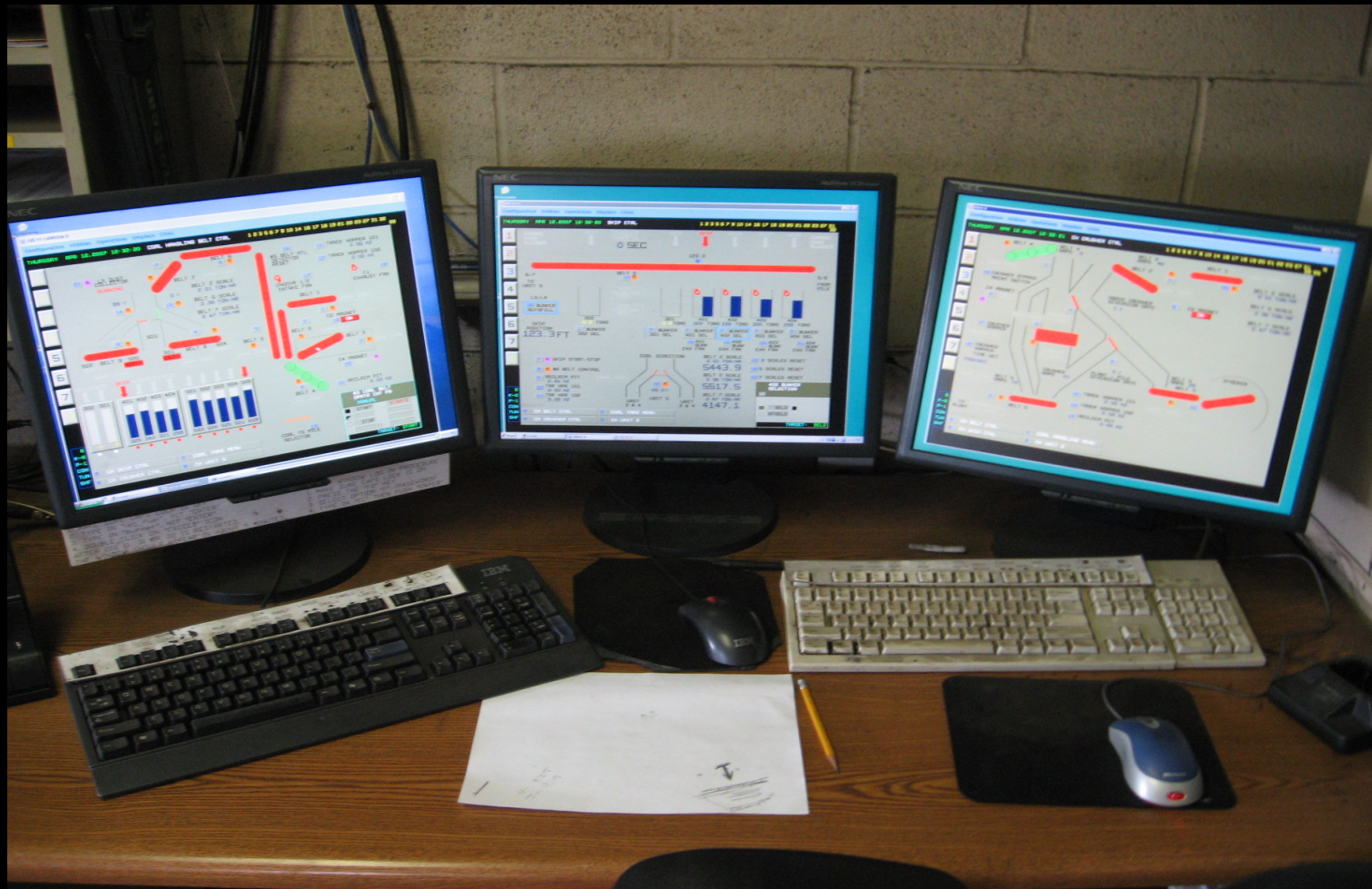


Multiple Zone Deluge Valves

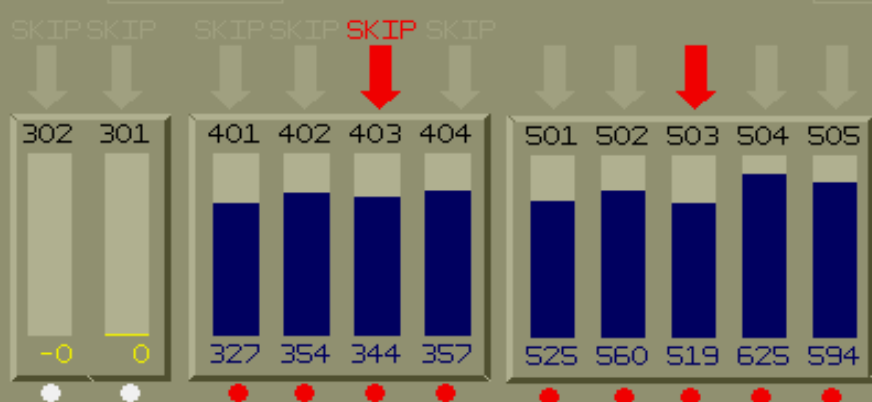
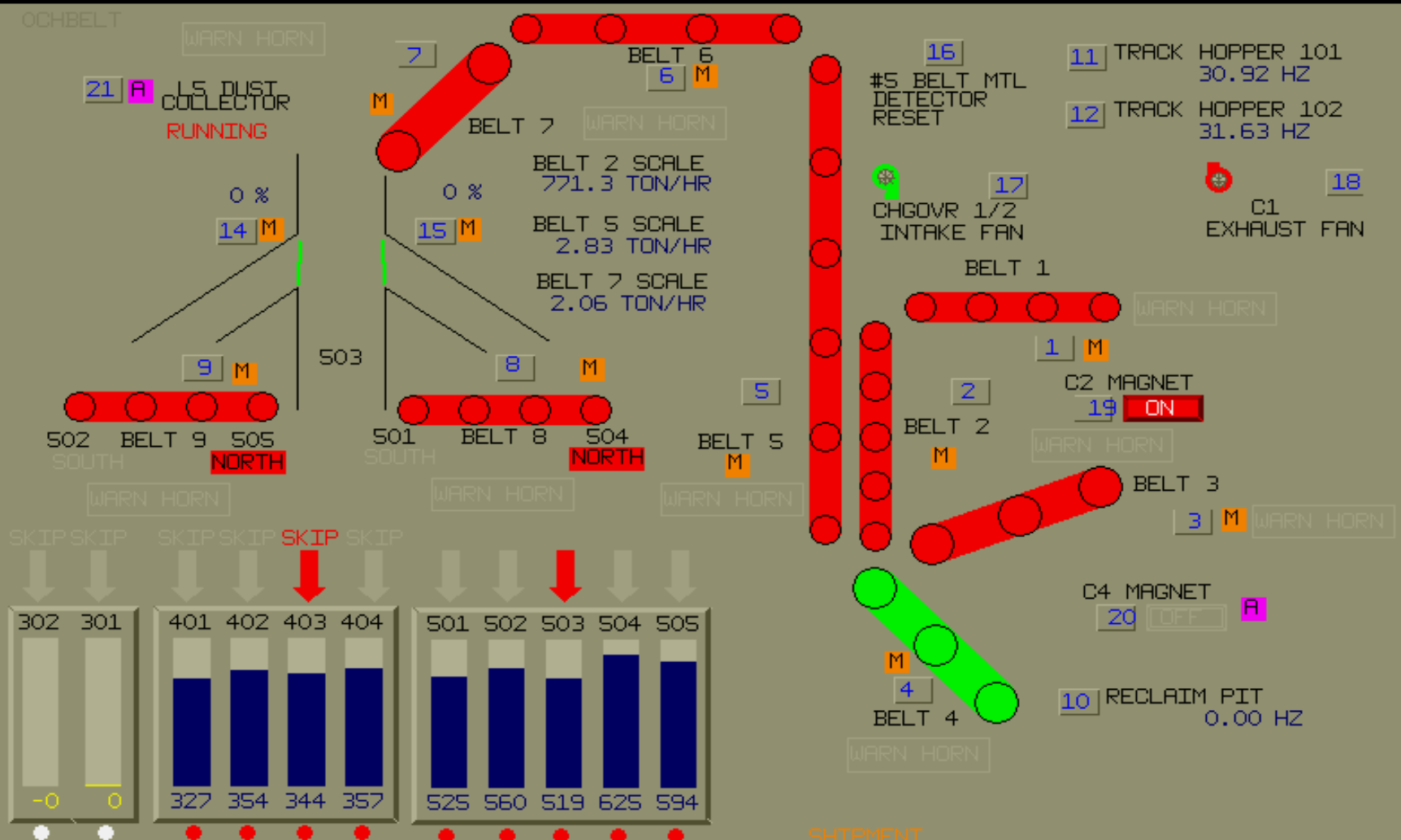




Operator Interface To Bailey DCS



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8



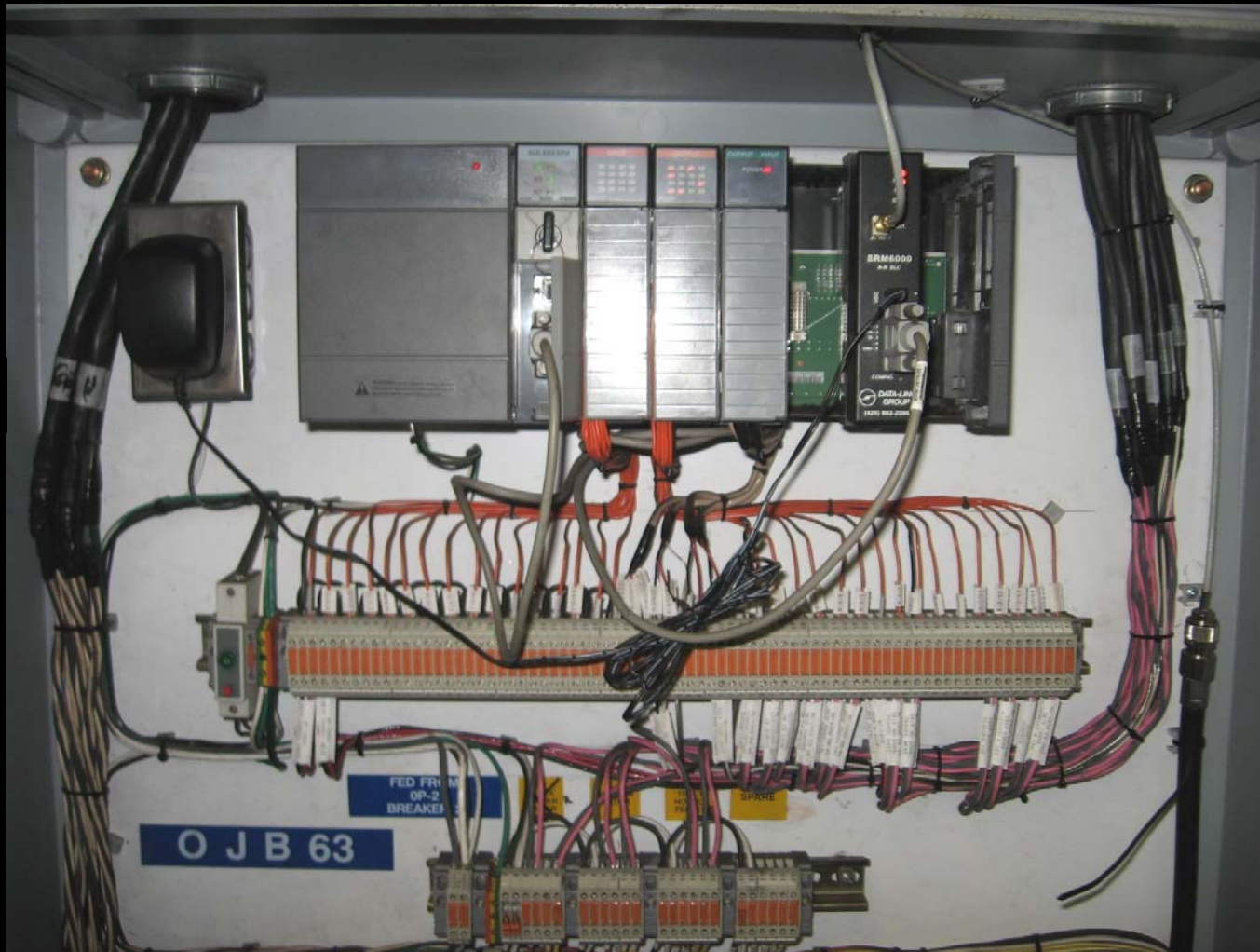
A	CH SKIP CTRL	C	COAL YARD MENU
B	CH CRUSHER CTRL	D	CH UNIT 5

SHIPMENT
COAL TO PILE SELECTOR (13)

S
K-5
P-1
CON
TUN
SHF



Allen Bradley® PLC With Wireless Data-linc® Modem for Tripper Control





Riegl Model LD90 – 450 Laser Distance Meter in Hazardous Enclosure Measuring Tripper Position





Conspec® CO Monitor 500 ppm Range Used Below Grade and In Coal Bunkers





**Mounted in Top of Coal Bunkers –
Conspic ® CO Monitor 500 ppm (Left)
Siemens Milltronics Radar Level Transmitter (Right)**





QUESTIONS?

