



A Rockwell Automation Company

Luscar Ltd. Control System Configuration

The Client:

Luscar Limited is one of the largest coal suppliers in North America. Luscar operates 11 surface mines in Saskatchewan, Alberta and B.C. Luscar produces approximately 40 million metric tons of coal annually for both domestic and international markets.

One of the mines owned by Luscar is the Obed Mountain Mine located 30 km east of Hinton, Alberta. The Obed

Mountain Mine produces about 1.8 million metric tons of thermal coal annually. The mine was first opened in 1984, and later purchased by Luscar in 1989. The plant processes the coal stripped from the mine. The coal is washed, crushed, dried and then shipped via rail to the West Coast terminals for shipment overseas.

The Requirement:

A PLC 3 based control system was installed at the Obed mine in 1984 when the mine was opened. This system consisted of 2 redundant PLC 3 processors, 28 racks of remote I/O and 4 advisor graphic stations. There were also 4 PLC 2's which are located various distances from the main plant. Over the years the Advisor graphics stations were replaced by InTouch Wonderware HMI stations, which read

data from the PLC 3's via data highway.

The requirement was for replacement of all PLC 2 and PLC 3 processors in the plant, moving the PID loop control into the PLC and removing the 1771-PD modules that controlled the loops and making the Wonderware graphics system easier to maintain.

The Design Solution:

The original design allowed the PLC control system to be split into two parts – the Wash plant and the Dry plant. The redundant PLC 3's were then replaced with two non-redundant PLC 5/60's. The old 1771-PD modules were replaced with analog input (1771-IFE) and analog output (1771-OFE) modules. Logic for the PID loops was then added to the PLC program. This solution allowed the use of the rest of the existing I/O so that re-wiring was limited to the replacement of the PD modules. This allowed for the change-out of the control system without any extra down time.

The PLC 3 program was converted to take advantage of the PLC 5 program structure, while maintaining a similar look to the PLC 3 program for maintenance. The PLC programs use a subroutine format for detecting motor alarms that minimizes redundant logic and PLC scan time.

The PLC 2's were replaced with PLC 5/11's and PLC 5/20's. The programs were converted and the existing I/O was used.

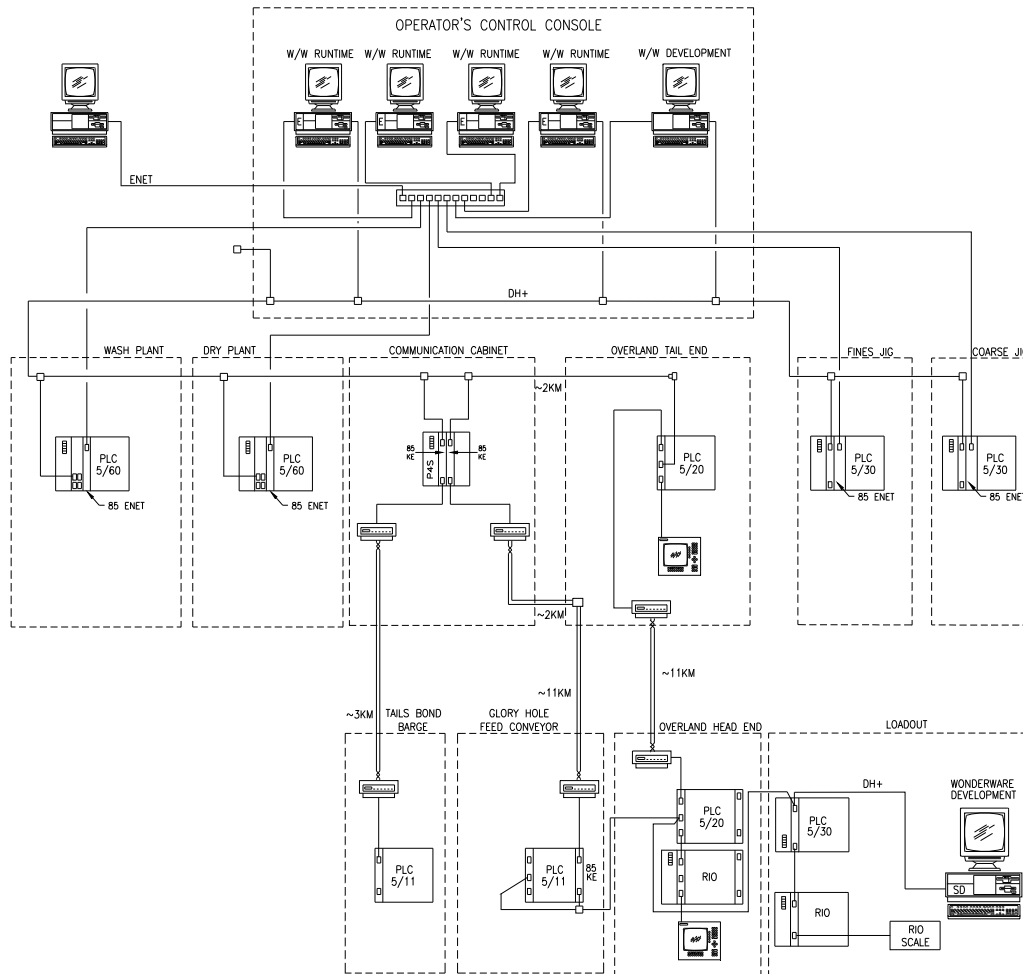
The PLC programming software is the same for all processors on site, which was an important consideration to site personnel. All of the PLCs are connected on a DH+ link that makes all PLCs available for programming from the control room.

The Wonderware graphics system was modified to accommodate the new PLC 5's. An Ethernet module was added to the Wash plant and Dry plant PLCs for communication to the Wonderware graphics. This provided a very high-speed link to the graphics. The existing Wonderware system was modified to take advantage of the client-server architecture. This means that a single Wonderware workstation contains the database and operator screens and all other workstations take a copy from this application server. All changes to the database and screens are then made from the application server and are copied to the other workstations. This was an improvement over the old system because the Wonderware application is the same on all workstations. The Wonderware system was modified further that only one station polled the PLCs for data. All other stations read their data from the polling workstation. If the polling workstation fails, another station takes over polling the PLC's. All of the PLC's are polled directly from Wonderware, as opposed to the data being concentrated in one PLC, which was formerly the case. This provided some simplification as well.



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System Specifications:

- 2 PLC 5/60 processors
- 2 PLC 5/20 processors
- 2 PLC 5/11 processors
- 29 racks of I/O (excluding off site I/O)
- 2100 Digital Inputs
- 375 Digital Outputs
- 280 Analog Inputs
- 6 Wonderware nodes

For further information or to contact a Hinz office near you, please check our website at:

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