



A Rockwell Automation Company

## Endako Mines Inpit Crusher Automation

### The Client:

Endako Mines is active molybdenum mine located at the geographical center of British Columbia near the town of Fraser Lake. It is a joint venture operation between Thompson creek Mining and Nissho Iwai

Moly Resources Inc. The Endako ore deposit is mined in 3 separate pits and as a result of expansions over the years and improved production methods; mill throughput is 27,000 metric tons per day.

### The Requirement:

In an effort to reduce operating costs, operations purchased a semi-portable Inpit Crusher to be located in the bottom of their main pit. The Inpit Crusher was purchased complete with a one-kilometer long conveyor system used to transport ore from the Inpit

Crusher up to their processing facility. Hinz was retained to provide automation for the modernization and implementation of the Inpit Crusher and Conveyor(s), as well as further automating their existing Primary Crushing operation.

### The Design Solution:

This project was completed in two phases. The first phase consists of the automation of the existing Primary Crusher Circuit, while the second phase commissions the new Inpit Crusher and conveyor system that transports the ore to the Primary Crusher.

The new control system consists of Modicon Quantum PLCs coupled with GE Cimplicity HMI. Cimplicity is presently implemented throughout different areas of the plant, while the Modicon Quantum's are new to Endako. All system programming for the PLC 's was done with Concept Software, incorporating the use of the IEC compliant Block Programming Language. The PLC equipment is located in four separate locations with two PLC Controllers and two remote I/O racks.

The main controller is a Quantum 534-14 CPU located in the Secondary Crushing Building MCC Room. This controller has been oversized to allow for the automation of the rest of the mill with this controller sometime in the near future. The two remote I/O racks are linked to this main controller, one located at the Primary Crushing MCC Room and the other at the Drive Station Electrical Room.

The other smaller controller is a Quantum 113-04 CPU located in the bottom of the pit with the Inpit Crusher. It is linked to the Plant Control System via a 100 Mbps Ethernet Link through fiber optic cabling. Having the smaller controller in the Inpit Crusher ensures that operation can still take place in the event communication is disrupted.

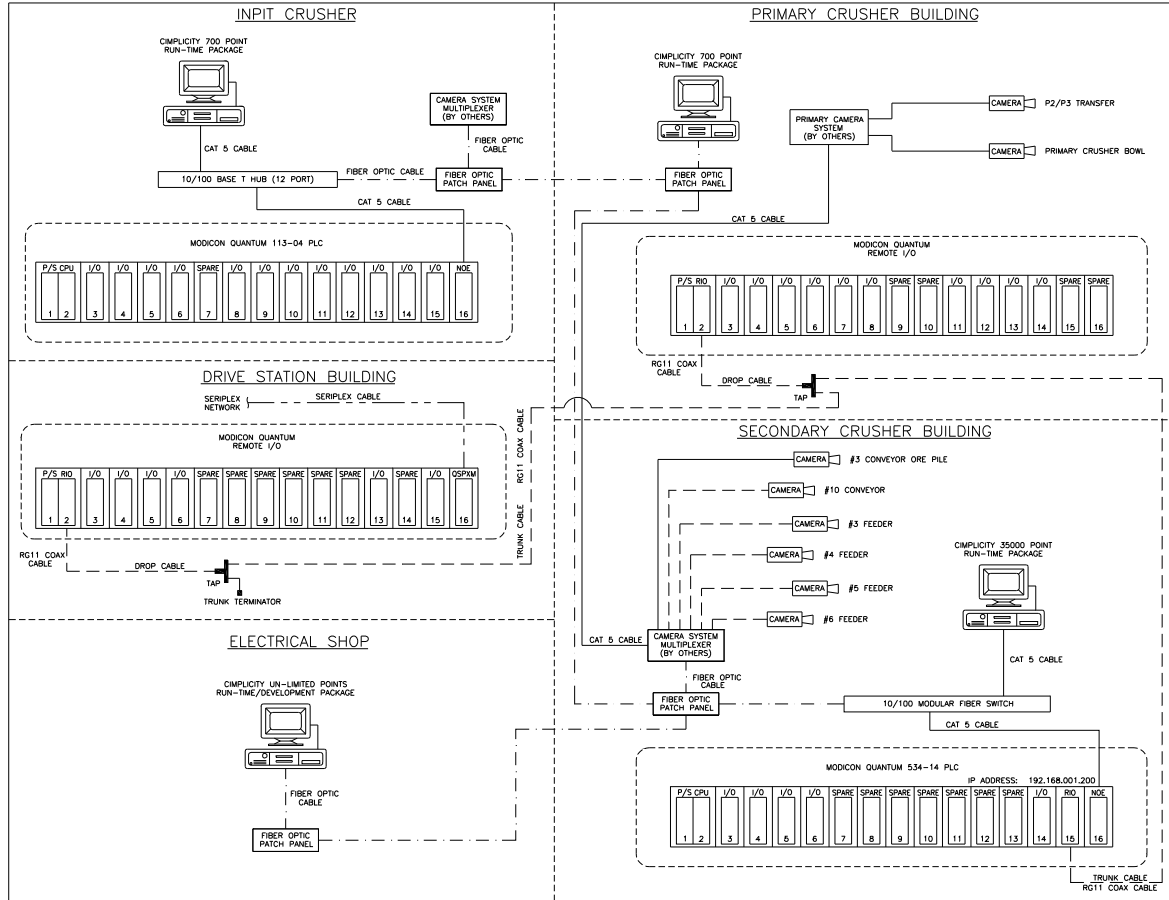
There are four HMI stations on a 100 Mbps Ethernet LAN, all based on a NT Server/Workstation computer platform. The NT server with the Cimplicity Development package is installed in the electrical/maintenance shop. Through the use of NT Policy Editor the server manages the security and accessibility of the NT Workstations (operator stations) installed throughout the plant. The main communications bridge is an Ethernet layer 2 switch that accepts both Fiber Optic and Copper (TWP) communication cables. The fiber optic transmission media was utilized for this project due to the lengths of some of the communication paths, and the high bandwidths used (100 Mbps for both Quantum PLCs and all the HMIs). All fiber installed for this project was 62.5 multimode incorporating SC type connectors at equipment interfaces and fiber patch panels.

Also installed with this project was a Seriplex communications network for the pull cord and belt alignment switch statuses on the long conveyor from the bottom of the pit to the Primary Crusher (approx. 1 km). The Seriplex communications bus is a deterministic bus that has the ability to interconnect up to 255 devices on one bus. The low power 4-wire cable can supply both communications and device power, thereby eliminating the need for external power supplies for the individual field devices. The bus terminates directly into the Quantum PLC through the use of a third party interface, the Niobrara QSPXM module, which is rack mounted with the other PLC cards.



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## System Specifications:

- Modicon Quantum 534-14 PLC
- Modicon Quantum 113-04 PLC
- Modicon Concept software Ver 2.2
- Cimplicity HMI Development Package Ver 4.01
- Cimplicity HMI Runtime Packages Ver 4.01 (3 copies)
- Four (4) Dell Pentium III Personal Computers
- NT Server and Three (3) copies of Workstation
- 10/100 Mbps Ethernet Layer 2 Switch
- 10/100 Mbps Ethernet hub (with fiber out)
- Novatech Seriplex Communication Network

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

[www.hinz.com](http://www.hinz.com)