Anglo Coal Moranbah Nth Coal Mine (Qld)
Controls and Network System

Project Overview
i.Power Solutions provided development of functional specifications, programming of 54 PLCs including substations, mobile machinery and belt starters as well as redevelopment works on the SCADA system. Also included in our scope was the entire network design for this underground coal mine. The major requirement was to be able to see the mine site in its entirety from anywhere on the site wide system.

- Project Cost : $3M
- 18000+ Citect tags
- 54 GE Fanuc 90-30 PLC's
- Ethernet communications over fibre
- 25 Citect Nodes
- Redundant topologies
- Site testing and commissioning
- Training and post project support

Project team and implementation
As this project had tightly integrated teams, working together to achieve both mechanical, electrical and production outcomes, it was necessary to work directly out of the clients' offices. i. Power supplied both a Controls team leader and a technical team leader as well as up to 10 engineers at the projects peak. The entire job lasted over a 12 month period with extended site support being supplied for a further 12 month period.

Programmable Controllers
iPower supplied and implemented the majority of the 54 GE Fanuc 90-30 PLC systems at the Moranbah Underground Mine site. Each PLC was connected to the Mine SCADA Citect via ethernet. The PLC programmes was developed on GE Fanuc Cimplicity Control Software and i. Power Engineers were present for all on site testing and commissioning. Training and on going support were critical in the immediate post construction period, ensuring stability of operation and handover to operational personal.

The Network
This Switched network connecting 54 PLCs and 25 SCADA nodes underground enabled us to put this many devices on the network and still maintain maximum performance. Network traffic was designed to stay on the one segment, but with bridges between segments to enable access from anywhere on the site network if required.

The Ethernet LAN (Local Area Network) allows fully functional OIS stations (in this case Citect clients) anywhere on the network to display information from any other mine location. A high level of redundancy was incorporated into the network design to guard against inevitable cable breaks and loss of communications common in underground mines.

Automation and SCADA

i.Power Solutions
LV & MV Switchgear - Mining Substations
Switchrooms - Automation and Control
SCADA - Information Systems - Turnkey Solutions

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Ethernet allowed programming of any PLC either from the surface or from the local OIS.

Some other important features of the Ethernet LAN are:

- Non Proprietary.
- Off the shelf hardware and software.
- Cheap, easy and quick to source.
- Proven technology.
- High Speed network performance.

Fibre Optics

The use of fibre optic cable was relatively new to the underground coal yet it was used extensively at the Moranbah site. The network equipment proved much cheaper and simple to implement. Single mode fibre was used on longer runs to limit losses. This use of fibre now allows us to send huge amounts of data on a single run, at high speeds across distances up to 5 Km. as well as giving us 100Mb capabilities for future development of communication technologies.

Tight buffered tactical deployment fibre cable was used in areas were robustness and flexibility were required.

Cable Connections

With a total loss budget of 14 - 17 db, and the need to rapidly disconnect and reconnect, connections were a real issue. The connector we provided was a rugged tactical fibre optic connector for deployable fibre optic communication requirements. The hermaphroditic connectors allowed flexibility in allowing them to function as either a plug or receptacle to fit any system design. With these connectors, cable assemblies can be daisy chained together to provide the required length of cable for each specific deployment condition. With losses of less than 0.5 db per fibre connector, we chose to use multiple rolls of fibre on a cable reel mounted on a trolley device. Each reel, at 1 km weighs approximately 20-25 kg. These cables will extend and retract, connect together, as the mine is developed.

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