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# *Automation IT responds to dated Ron Goodin Power Station with an upgrade for Alice Springs*


Alice Springs is one of Australia's most remotely located townships. Due to it's location, the town is completely dependant on it's own power generation and distribution network.

The power generation for Alice Springs and it's surrounding regions is supplied by four separate sites:

- Ron Goodin Power Station (Alice Springs)
- Yulara Power Station
- Tennant Creek Power Station
- Kings Canyon Power Station

The main upgrade work took place at Ron Goodin Power Station which is responsible for the electricity supply to the township of Alice Springs.

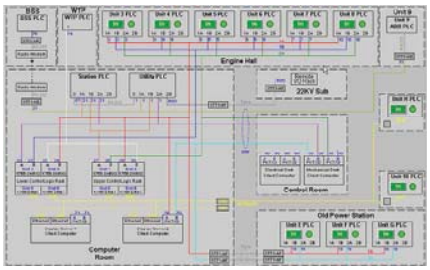
## THE PROBLEM

The Ron Goodin power station has been responsible for meeting the ever increasing needs of the Alice Springs community for a number of years. The existing PLC 5 based control system had become dated and was beginning to reach the point where future operations could be threatened. Similar situations were developing across each of the other remote stations and a major control system upgrade was due.

## THE CHALLENGE

The Ron Goodin Power Station (RGPS) forms the central core of the Alice Springs regional power supply system. This plant is fully automated and networked by an Integrated Services Digital Network (ISDN) link to Yulara Power Station (YPS), Tennant Creek Power Station (TCPS) and via a Virtual Private Network (VPN) to Kings Canyon Power Station (KCPS). A distributed Citect SCADA system is used to relay information and controls amongst the sites.

Due to ageing equipment and years of temporary "fixes", the Ron Goodin power station was in desperate need of a major upgrade. At the same time the essential loads and requirements of such an isolated community needed to be considered. AIT's challenge was to provide each of the upgrades while ensuring that the power network for the Alice Springs region remained stable.




## THE SOLUTION

Using the Allen Bradley ControlLogix 5000 platform and Citect SCADA HMI, Automation IT supplied a new hardware platform and integrated a number of both software and network improvements to provide a reliable control system for the years to come.

## CONTROL SYSTEM OVERVIEW

The total control system consists of various Allen-Bradley unit PLC's and a ControlLogix5000 Master PLC totalling 5000+ I/O and 3500+ SCADA points controlling generators, pumps, valves and fans.

The main functions of the Generator Module PLC's are:

- Generator start / stop
- Generator kW load control from the Station PLC
- Alarm annunciation
- Sequencing of generator - radiator fans, ventilation fans and gas/diesel fuel isolation valve

The main functions of the Station PLC are:

- Generator start / stop
- Determine kW load set-point for the Generator PLC's
- Determine Voltage set-point for the Generator PLC's
- Fuel gas monitoring
- Alarm annunciation
- Control of power station auxiliaries

## SEQUENCE OF WORKS

1) Firstly the existing networks were fully investigated and modified to provide a stable network for both PLC and Citect communications. Preliminary investigations revealed vulnerable points of failure and incorrect installation of hardware.

2) Citect was then upgraded from v5.42 to v6.10 and placed as a redundant system running in parallel with the existing system. Citect was tested for the ability to easily revert back to the older system. On successful Citect upgrade the existing three Ethernet networks were audited and reduced to two networks ensuring adequate redundancy in the event of fault finding and maintenance.

3) Finally it was time to replace the existing Station PLC5 with the ControlLogix 5000 processor. Prior to site testing the existing code had been upgraded for use with ControlLogix 5000 and all major works tested at Automation IT's office. Testing included communication with the site PLC5 I/O racks and other existing hardware.

4) On site it was necessary for the Operators to go to full manual control of the station. Once this had been confirmed a carefully planned procedure commenced

   (i) Installation of new communication modules to ControlLogix 5000 rack. Both modules are capable of being installed hot.

   (ii) Download of new ControlLogix software and disabling of station control.

   (iii) Modification of Ethernet addresses for new network communications.

   (iv) Power down of old station PLC5.

   (v) Removal of PLC5 processor.

   (vi) Installation and configuration of spare RIO card in PLC5 rack.

   (vii) Powerup remote I/O rack (old PLC5 processor).

   (viii) Enable ControlLogic software and check operation.

   (ix) Initiate new Citect screens to communicate to new station PLC.

## SEQUENCE OF WORKS - continued...

   (x) Modification to individual unit PLC's to communicate with new station PLC

   (xi) Progressively return station to automatic control.

The main changeover on site was achieved in one day. A further 10 days was spent systematically testing all control functions to a site acceptance standard.

The replacement of the PLC5 processor in the rack with a remote I/O adaptor card allows communications to the ControlLogix 5000 processor. Due to good planning this changeover was a great success, with a roll back facility maintained at all times.

## DOCUMENTATION

On completion of site acceptance a detailed functional specification document was updated to "As Built". The document outlined the Station PLC control functions from an Operator perspective

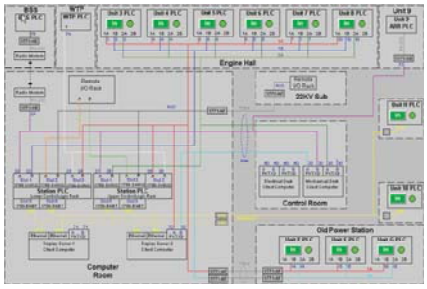
- Unit commitment
- Time correction and frequency control
- Load shedding
- Governor control
- Voltage and VAR control
- AVR control
- Gas system and fuel control
- Reports & data logging

## REPORTS

The system logs some data to the hard disk of the server in a CSV file format. With the CSV file type it is intended to be able to be imported directly into Microsoft Excel or Access, as this data is intended for performance monitoring and other syntactical purposes. All of this data logging happens automatically and no operator function is required.

## CONCLUSION

The upgraded network.




The final result of this project provides a more reliable station control system and power distribution network for the Alice Springs region. There is an increase in confidence from the station as a result of a reduction in down time.

Due to the success of this upgrade AIT has been awarded further works from the NT Power & Water Corporation to upgrade some of the Remote I/O for the generator units.

The result is an AIT move into the Northern Territory and well…the rest is history.


**Ask how we can rationalise your control systems**