

## PROJECT SUMMARY

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| <b>DATE</b>    | 6 August 2002                                      | <b>LOCATION</b> | <b>Ratcliffe on Soar Power Station, Nottingham, UK.</b> |
| <b>SUBJECT</b> | <b>OLYMPUS GAS TURBINE CONTROL SYSTEM RETROFIT</b> |                 |   |

Ratcliffe Power Station operate two 17.5 MW diesel fired simple cycle Olympus gas turbines for peak load and black start duties. The units were originally installed in 1966. Reliability had deteriorated to as low as 50%. The power station contract requires a 95% start reliability over a 12-month period and so something had to be done or the GT's would be non-viable.

In addition to reliability issues the installed control equipment was obsolete and the skills and knowledge required to maintain the system were in short supply.

### The Problem

Reliability is a result of the combination of the original design based on technology of the time and the ageing process. The main sources of unreliability were readily identified as:

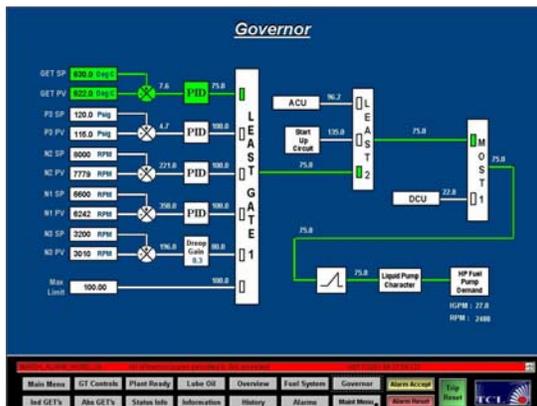
- The hydro-mechanical fuel control system and on engine fuel system.
- Electro-mechanical automatic voltage regulator and the automatic synchronising units,
- Automatic sequencing control.



### The Solution

Turbine Controls Ltd were contracted to provide a solution that would meet the required start reliability of > 95%. The control system retrofit consisted of: -

- The fuel control governor and automatic sequencer control systems were implemented using a PLC based system using Allen Bradley ControlLogix 5000 PLC.
- The Olympus on engine fuel control system and associated hydro-electrical power speed controller were removed and replaced with the TCL Posiflow off engine liquid fuel system, using a variable speed electrically driven gear fuel pump to modulate the fuel to the Olympus engine.
- The automatic voltage regulator was replaced with a new thyristor controlled voltage regulator. The automatic synchronising unit was replaced with a system capable of controlling the long closing times of the 11 kV air circuit breaker.
- SCADA system providing local control and remote monitoring. The SCADA was implemented using Ethernet communications via the plant wide fibre optic link. SCADA system also provide detailed alarm reporting and diagnostic tools to aid in fault finding.



TCL were responsible for the design, manufacture, installation and commissioning for all equipment supplied under the two contracts. The installation and commissioning of the new equipment on the first unit was completed in September 2001 and the customer placed a repeat order for the second unit, which was completed in May 2002. All software for the PLC and SCADA systems was written and tested by TCL engineers at our Leicester HQ. The equipment was installed and commissioned on schedule and to budget, meeting all necessary contractual requirements.

TCL continue to provide technical assistance and support to our customer at Ratcliffe Power Station.