

PROJECT SUMMARY

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|----------------|--|-----------------|------------------------------------|
| DATE | 2001 to 2011 | LOCATION | Saudi Arabia, various sites |
| SUBJECT | RETROFIT OF CONTROL SYSTEMS FOR AVON MOBILE GENERATOR | | |

Overview

Saudi Electricity Company (SEC) operates a number of GEC RR Avon powered mobile gas generators at various locations within the Kingdom of Saudi Arabia. These are moved to locations where there is a power shortage and are used primarily during periods of peak demand in the summer months.

The Problem

The key requirements of the mobile generators are to reach full load in a short time and run reliably for the peak demand period.

The existing fuel control system fitted to the RR Avon mobile gas turbine consists of:-

- Analogue electronic governor interfacing with an on-engine hydro-mechanical fuel control unit.
- Relay based sequence control system.

The on-engine fuel control components are seen as major source of system unreliability. This equipment is built to aerospace standards and is very susceptible to the aggressive environment of an industrial application, particularly in terms of fuel quality. Hydro-mechanical equipment is also notoriously difficult to maintain and troubleshoot and being of an aero-space standard it



Figure 1 GEC RR Avon mobile generator

is also very expensive to repair.

The analogue electronic governor and relay based sequencer were also prone to frequent breakdown. The system has very limited diagnostics which has the effect of extending the fault finding process. The problems with the control and fuel system meant that the generators could not be relied on to generate when required.

SEC employed TCL to supply a replacement control system because of their past experience with the RR Avon and their ability to supply a tried and tested off-engine fuel system.



Figure 2 TCL Posiflow fuel pump

The Solution

Replace the gas turbine fuel governor system with modern state of the art equipment that is more suited to the requirements of an industrial application.

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The heart of the new control system is the Posiflow off engine liquid fuel which has been installed on numerous similar installations. This system uses a positive displacement gear pump driven at a variable speed by an electric motor and frequency converter. The gear pump is very rugged and ideally suited to an aggressive industrial environment.

The following equipment was removed:-

- Analogue electronic Governor
- On-engine fuel control system
- Batteries and battery charger



Figure 3 TC95-03 Governor & HMI

The following equipment was installed:-

- Turbine Controls TC95-03 micro-processor based governor
- TCL Posiflow fuel system
- Replacement batteries and battery charger

The equipment had to be compatible with retained equipment and adhere to the overall control system philosophy devised by Rolls-Royce and GEC.

TCL have modified four GEC mobile generators in Saudi Arabia at various locations including Ar-Ar and Al-Qurayat power stations.

Following successful installation and commissioning of the equipment the gas turbine start and operating reliability has significantly improved.

Note: - The TC95-03 Governor system has now been replaced with the TC41-GG gas turbine governor system