

**Turbine Controls Limited**

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## Project Summary

Date: 22 <sup>nd</sup> June 2005	Location	Leman 27 Alpha - Perenco
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Subject:- RB211 Compressor Control System Upgrade
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### 1. Overview

Leman 27A platform in the southern section of the North Sea had recently been acquired by Perenco from BP. There are two Cooper Coberra 6456 gas turbines (powered by a gas fuelled RB211-24C Gas Generator with Cooper RT-58C power turbine) each driving two Delaval Stork Compressors in series. The control system was an ENTRONIC FT100

Under the BP ownership unit A had been deemed sufficient for operational requirements. The B unit had been mothballed for several years.

### 2. The Problem

**Reliability** is absolutely essential for Perenco to maintain nominations.

The reliability of the A train had become a problem. The FT100 had become obsolete. There was little vendor support, and spares were no longer manufactured.

### 3. The Solution

The new owners decided to bring the mothballed B unit back into service with an extensive renovation program including Control System upgrade.

The client was looking for readily serviceable, reliable control system equipment competitively priced.

Turbine Controls Ltd was consulted for its experience in the field of the retrofit of control systems to gas and steam turbines.

### 4. Control System Upgrade Project Scope

The major control equipment supply consisted of an Allen Bradley PLC and Bently Nevada Vibration Monitor.

#### 4.1. THE REMOVED EQUIPMENT

Woodward Electronic Governor

Bently Vibration Monitor

Entronic FT100 consisting of Speed monitor, Temperature Monitor, Two stage Recycle Valve Control, Sequence, Alarm and Trip System, Multi-way Alarm Annunciator.

RR Oil flow protection unit

#### 4.2. RETAINED EQUIPMENT

Unit Control Panel (UCP) metal work

MCC's and all plant devices

RS232 Platform SCADA interface gateway

Terminals within the panel

#### 4.3. THE NEW EQUIPMENT

Allen Bradley Programmable Logic Controller (PLC)

PLC functions:

Governor and interface with Gas Throttle Sequencer

Oil flow protection unit

Temperature Monitor

Alarm and trip monitoring system



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Two stage Surge Control based on head and flow  
Suction and discharge process capacity control  
Unit valve sequencing

Vibration monitor

Overspeed trip unit

PC/Screen based HMI

PC, 15" TFT flat screen display HMI using RSView

- Viewing of all analogue inputs graphical and trend
- Viewing of all digital inputs.
- View alarm/trips with time stamp
- Ability to view and adjust control limits\setpoints.

#### 4.4. SITE WORKS

TCL performed all destruct and install of the new control taking nominally 8 days.

The B unit was upgraded first in parallel with the renovation work. There was considerable engine testing and monitoring to be performed as could be expected with a unit that had been out of service for several years, however the new Control System paid for itself immediately in identifying trends requiring remedial mechanical work. Time from start of Project to Commissioning was less than two months.

On the A unit, commissioning the unit and start up check occurred within two weeks including surge line determination.

## 5. OUTCOME

The project aim of reliability has been fully achieved with the added benefit of enhanced operational performance.

#### Customer Quotes

The OIM reports he had never seen any unit start so reliably and repeatedly – excellent- Starts first time every time.

OIM commented "He was amazed at the speed the unit was commissioned. Never seen a controls retrofit completed so quickly".