

Natural Gas Measurement Case Study



Introduction

PowerGas Ltd., member of Singapore Power Group, owns the gas transmission and distribution networks in Singapore which includes two onshore receiving facilities for natural gas from Sumatra and Malaysia, and 2,900 km of underground pipelines.



Problem

Power Gas manufactures gas at Kallang Gasworks and then transports and distributes the gas to residential, commercial, and industrial users. A new plant is being constructed at Senoko at the northern extremity of the island. The distribution network extends as far north as Teachers Housing Estates, west to Boon Lay Garden, and east to Changi Airport. A new 67 km transmission pipeline is also being constructed to deliver gas to the existing distribution system at multiple locations. The loop design of the high pressure mains pipeline provides two separate routes so that the gas supply is not disrupted if any one section of the pipeline has to be shut down. The Singapore gas system is composed of low, medium, and high pressure gas facilities. Gas regulator stations are used to maintain the pressures in the medium and low pressure gas systems.

A new Supervisory Control and Data Acquisition (SCADA) system was needed to monitor and control both the new transmission pipeline and the existing distribution system. New Remote Terminal Units (RTU) are needed at the offtake regulator station, main line valve stations, and cathodic protection sites along the transmission pipeline, at distribution regulator stations where they will replace existing Willowglen RTUs, at fringe (low pressure) points, and at temporary locations (portable RTUs).

A new dual redundant SCADA master station is required at the Senoko Gasworks. In addition to a two position operator's console, a one position supervisor's console and an array of rear projection display screens needed to present an overview of the gas system and other real-time displays to the operators and visitors. Single display consoles are needed for the Visitor's and Service Operations Centre. Remote access to operator displays by portable terminals is also required.

An Emergency Backup System, located at the PowerGas office is needed to provide additional master control room capabilities which is able to take complete control of the SCADA system if a disaster

should hit the main control centre.

Solution

In an international competitive bid, the Singapore Public Utilities Board (now Singapore Power Group) selected Willowglen to provide a state-of-the-art SCADA system. Willowglen's advanced SCADACOM® master station software provides a true multi-tasking, open systems, UNIX based solution with many years of field experience. SCADACOM® has one of the most advanced Man Machine Interfaces (MMI) available in the SCADA industry.

Powerful multiprocessor servers integrate a powerful object oriented real-time database and the industry standard Sybase® relational database. Each operator station has abundant disk storage and maintains its own real-time database, thus ensuring optimum system response and optimum communication bandwidth usage. X Windows/VNC support is available for local PCs and remote dial-up laptop computers. And, because Willowglen designs, manufactures and develops software for the Front End Processors (FEP) and the 83 Remote Terminal Units, a highly integrated system has been developed with levels of functionality not otherwise possible. Fully integrated Pipeline Applications software from Stoner Associates, Inc. is used to provide Linepack, Survival Time and Pipeline Trainer capabilities. Willowglen's SCADACOM® MMI is also used as the graphical user interface for the Pipeline Trainer.

After ten years of service, Willowglen has recently upgraded this system with powerful new computing hardware and the latest version of SCADACOM® software.