

Natural Gas Measurement Case Study



Introduction

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



Problem

PowerGas manufactures natural gas at the Kallang Gasworks and then transports and distributes the gas to residential, commercial, and industrial users. A new gas 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 International 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 pipeline provides two separate routes so that the gas supply is not disrupted when one section of the pipeline has to be shut down. Gas regulator stations are used to maintain the pressure in the medium and low pressure gas systems.

A new Supervisory Control and Data Acquisition (SCADA) system was needed to monitor and control the new transmission pipeline and the existing distribution system. 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, at fringe (low pressure) points, and at temporary locations.

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. Single display consoles are needed for the Visitor Center and Service Operations Center. Remote access to operator displays by portable terminals is also required.

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

Solution

1995

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® 3.0 master station provides a true multi-tasking, open systems, UNIX based solution. The SCADACOM® software 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 its own real-time database, thus ensuring optimum system response and optimum communication bandwidth usage. Because Willowglen designs, manufactures and develops the software for the Front End Processors (FEP) and 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.

2002

A system upgrade of the Front End Processors (FEP) and Remote Terminal Units took place.

2005

A system upgrade occurred with the SCADACOM® 3.0 software being replaced with the SCADACOM® 3.1 software.

2009

A system upgrade of the Remote Terminal Units took place.