

Tank Gauging System Case Study



Introduction

Imperial Oil Limited is one of Canada's largest producers of crude oil and natural gas, it is the country's largest petroleum refiner, and has retail outlets through out Canada.

Imperial Oil operates a large oil refinery in Strathcona County, Alberta. The refinery takes in crude oil and refines it into gasoline, diesel fuel, aviation fuel, propane, butane, lubricating oils, sulphur, asphalt and heavy fuel oil. The refinery has a large tank farm to inventory the crude, components, and finished products. The farm consists of over 200 tanks distributed over 100 hectares.



Strathcona Refinery

Problem

Imperial Oil needed a new tank gauging system with high reliability and the ability to interface to other plant systems. The previous system was unable to communicate with their tank level equipment as the wiring runs were long and the wiring had deteriorated to a point where the signal from the tank head devices could not be read accurately. Beyond a simple data collection and control system, Imperial Oil also needed to be able to interface the tank gauging system to a number of other systems in their refinery including:

- IBM® Advanced Control System (ACS) mainframes (dual redundant communications)
- Rosemount Division (Emerson Electric Co.) product blending system (using the Modbus Communication Protocol on Limited Distance Modems)
- Datek Industries Limited Single Point Displays (for tank transfer control purposes)
- Spectrum Multi-Station Host
- Existing tank Remote Terminal Units (RTU)

Solution

1995

Willowglen was selected to provide a dual redundant system that included two VISTA host computers, Model 8016 RTUs and a Changeover Switch. Willowglen also provided the TGS-11 Tank Gauging System RTU.

The Willowglen system is tied to the existing Advanced Control System (ACS) using two communication lines, but only one communication line is in use at any time. The communication lines are channeled through the Changeover Switch so that both host computers are connected to the ACS.

The TGS RTUs communicate with the existing tank gauging system using modem communication links. The TGS RTUs are connected to a modem card in the Model 8016 RTUs. The host computers poll the tanks as fast as they can.

Serial concentrators are used by the host computer to communicate with a large number of RS-232 serial communication devices. Each concentrator can take up to 16 individually programmed communication lines. There are two concentrators grouped together for each side of the dual redundant system thus allowing up to 32 communication lines to be connected to each host computer.

2005

A system upgrade with the VISTA host computers being replaced newer host computers.