Electric Power Transmission Case Study

Introduction
The Northwest Territories Power Corporation (NWTPC) (NWT Power Corp (NTPC)) is responsible for supplying reliable electric power in the Northwest Territories, Canada. The utility's mandate includes generation, transmission, and distribution of electric power to the communities it serves.

Problem
One of the communities served by NWTPC is Yellowknife, the capital of the Northwest Territories. The major power source for this northern city is five, normally unattended, hydro electric generating stations. The generating stations are located along a 30 kilometer stretch of the Snare River, 170 kilometers northwest of Yellowknife. Power transmission lines from the hydro generating stations terminate at the Yellowknife Substation, where the power is distributed to seven smaller substations owned by Northland Utilities (Yellowknife) Limited. Additional power is supplied by two diesel generating plants located in Yellowknife.
Solution

1988
Willowglen Systems was selected, by public tender, to design and manufacture a complete Supervisory Control and Data Acquisition (SCADA) system using the SCADACOM® 2.0 Master Station and Model 2000 Remote Terminal Units (RTU).

1999
A major system upgrade with the SCADACOM® 2.0 software being replaced with the SCADACOM® 3.0 software. Willowglen Model 1208 RTUs and Model 8016 RTUs were also installed.

2008
Another system upgrade occurred with the SCADACOM® 3.0 software being replaced with the SCADACOM® 3.1 software.

The SCADA system currently consists of Willowglen Model 2000 RTUs, Model 2000 Master Communications Controller (MCC), Model 1208 RTUs, Model 8016 RTUs, and the SCADACOM® 3.1 Master Station which consists of two servers, four workstations, and up to 15 PC based displays.

The Model 2000 Master Communications Controller (MCC) is used to manage communications between the master station and the RTUs. The MCC polls the RTUs and converts Willowglen's high security 18-bit VNET message format to and from an ASCII format.

Time tagging of information is supported for all status and analog inputs, control outputs and Sequence of Events (SOE) recordings. Report By Exception (RBE) communication provides an efficient use of the lower speed communication channels.

The servers and workstations are located in the control room, the configuring workstation is located in the Engineer's office and the PC based displays are in various offices and in the diesel plant. All of the SCADACOM® computers are connected together using a dual Ethernet Local Area Network (LAN).

The SCADACOM® software communicates with a number of Programmable Logic Controllers (PLC) which are controlled by the workstation in the diesel plant.