

# Electric Power Transmission Case Study



## Introduction

The Northwest Territories Power Corporation (NWTPC) (NWT Power Corp (NTPC)) is charged with supplying reliable electric power within the Northwest Territories of Canada. The utility's mandate includes the full responsibility of generation, transmission, and distribution of power to the communities that it serves.



**NTPC Power Plant in Yellowknife**

## 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 the Northland Utilities (Yellowknife) Limited. Additional power is supplied by two diesel generating plants located in Yellowknife.

## **Solution**

In 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).

In 1999, Willowglen was selected again to supply SCADACOM® 3.0 Master Station in order to add new features and new technology and to be Y2K compliant. More RTUs were added, including Willowglen's newer Model 1208 RTU and Model 8016 RTU.

In 2008, Willowglen installed a major system upgrade to SCADACOM® 3.1. The SCADA system currently consists of about 20 Willowglen Model 2000 RTUs, one Willowglen Model 2000 Master Communications Controller (MCC), a small number of Willowglen's newer RTU models, and the SCADACOM® 3.1 Master Station which consists of two servers, four workstations, and up to 15 PC based displays.

The Willowglen Model 2000 RTUs are located at the five hydro generating stations, two diesel generating plants, and at 11 substations. One Willowglen Model 1208 RTU is located at the Ingraham Trail facility and a Model 8016 RTU is operating at the Bluefish Hydro Electric Facility. Time tagging of information is supported for all status and analog inputs, control outputs and Sequence of Events (SOE) recordings. Report By Exception (RBE) communications provide efficient use of the lower speed communication channels.

The Model 2000 MCC is used to manage communications between the host computers 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 to reduce the load on the host computer.

The servers and workstations are located in the Hydro 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. The server/workstations each include high powered 64-bit processors and 24 inch colour monitors. The computers are equipped with 2 GB of RAM, a 1.5 GHz processor, and two 73 GB hard disk drives. All of the SCADACOM® computers are connected together using a dual Ethernet Local Area Network (LAN).

Automatic fault detection, distributed load handling, and redistribution of load functions offer a high degree of reliability while maximizing performance. A dial-up modem and software package has been added to allow remote terminal access of the SCADACOM® database.

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