

## **Secure NUMAC PRNM System Interface Project**

C3-ilex, LLC has recently been awarded a contract from a US Electric Utility for a General Electric Hitachi (GEH) NUMAC Power Range Neutron Monitor (PRNM) Interface System at their Nuclear Generating Station (an 1100 MWe BWR). The secure PRNM Interface System to be supplied is based on the use of C3-ilex's DASie (Data Acquisition System importer/exporter) product. The C3-ilex DASie solution provides for PRNM data acquisition, PRNM Service application software, and a PRNM data Interface to other plant computer systems via a one-way UDP broadcast in accordance with newly implemented cyber-security requirements. These requirements preclude the use of traditional two-way communication methods between the Level 3 Plant Computer Systems and Level 4 PRNM system components for the acquisition, processing and display of PRNM data. To address this issue, C3-ilex reconfigured our standard DASie and Core Monitoring Services application software platform to conform to the new cyber-security requirements.

The DASie is a 19 inch rack mountable chassis consisting of multi-port input/output and data processing cards that can communicate with a variety of data acquisition system sources and translate the incoming data streams to ones that can be accessed by network addressable computers. Per project requirements, the DASie chassis will be located in a Level 4 security zone as defined by the evolving NRC cyber-security program. It will consist of; 1) a DASie five port fiber-optic I/O card that connects to the PRNM Rod Block Monitor A and Rod Block Monitor B devices via fiber optic cables for data acquisition and 2) a DASie Data Diode (DD) processor module that provides the User Interface, the PRNM Services application software functions, and one-way communication to Level 3 processors. The PRNM DASie DD communicates with the PRNM hardware via the DASie I/O card which handles the GEH protocol translation. PRNM DASie DD actions include the collection of PRNM data (e.g., LPRM, APRM, and OPRM) and the downloading of LPRM Gain Adjustment Factors (GAFTs) and percent Core Thermal Power (%CTP).

C3-ilex can also provide NUMAC interface systems for NUMAC WRNM, RWM, and ATIP applications.

## **Project Background**

An ongoing Power Uprate Program calls for replacement of the Nuclear Station's existing neutron monitoring system with a General Electric Hitachi (GEH) Power Range Neutron Monitoring (PRNM) system. In order to meet the required system design, a digital computer interface package to the PRNM system is required. This system will consist of hardware, software, and support through the installation of the PRNM system. The GEH PRNM system is a digital I&C upgrade from the currently installed Average Power Range Monitor (APRM), Oscillation Power Range Monitor (OPRM), and Rod Block Monitor (RBM) systems. Due to the nature of digital systems, all interaction must be done through a digital computer interface. The C3-ilex supplied PRNM interface hardware and software package will provide a digital data flow path from the PRNM system to the plant process computer. The software will also provide a user interface to specified digital components of the PRNM system.

## **About C3-ilex**

C3-ilex specializes in the delivery of high quality products and services for the power generation, power transmission and distribution, and process industries. C3-ilex develops, manufactures, and markets state-of-the-art, real-time monitoring and control products and systems for industrial, commercial and government applications. C3-ilex also provides a wide range of complementary engineering and consulting services.