Reverse Engineering/Obsolescence (with I&C focus)

Obsolescence and the ability to obtain qualified replacement and spare parts are primary concerns in the nuclear industry. In fact, approximately 35% of installed equipment is obsolete.

Westinghouse Parts Business (WPB) has over 50 years of experience replacing and upgrading systems for operating nuclear power plants with access to original design information as the original equipment manufacturer (OEM).

WPB provides innovative, cost-efficient solutions for Westinghouse and non-Westinghouse systems in order to increase reliability of I&C systems, including enhanced replacement components, repair and refurbishment services. Recently, WPB has supported numerous customers in obsolescence and Reverse Engineering (RE) services.

Westinghouse employee completing visual inspection of I&C part
Over time, obsolescence of piece parts and commercially purchased circuit boards has presented challenges in continuing to support these systems. Since the 1990s, Westinghouse has taken steps to minimize the impact of obsolescence. These include:

- Westinghouse redesign effort of thirteen 7300 boards and four system power supplies to address obsolescence and improve reliability.
- Westinghouse usually procures last time buy of components that were identified as no longer available.
- Westinghouse inventories many of the 7300 boards that are commonly ordered.

Westinghouse continues to be able to repair or provide replacement 7300 items. For example, if a customer returns an original design 7300 board, Westinghouse will evaluate the condition of the board and often recommends procuring the new style equivalent board. WPB maintains stock of most commonly used 7300 boards and system power supplies. Last time buys are made for components that Westinghouse has been made aware of going obsolete.

Westinghouse offers redesigned replacement power supplies (original are obsolete), which are designed/manufactured at WPB New Stanton and seismically and environmentally qualified.
PAMS Board Redesign

Westinghouse, along with the Pressurized Water Reactor Owners Group (PWROG), funded a multi-year effort to develop a Post Accident Monitoring System (PAMS) obsolescence solutions program. This was a cafeteria system project where utilities elected to fund the project applicable to Westinghouse Multibus/PAMS plants.

The Westinghouse Multibus I PAMS are based on Intel 8080/8085 and Intel 8086 technology, and are complex digital instrumentation and control systems required for plant operation as safety-related equipment. The Multibus I PAMS platform is challenging to repair and replace equipment due to obsolescence issues. Due to the age of the PAMS platform, it has become increasingly difficult to maintain knowledgeable technical resources, proactively manage component obsolescence and provide the appropriate level of technical support for emergent diagnostic and repair activities.

Maintaining the PAMS platform through end of plant life is a challenging objective that requires a close relationship between the system owner and Westinghouse. The PWR Owners Group Project Authorization Multibus I Post Accident Monitoring Systems (PAMS) Obsolescence Solutions Program is to focus effort on Equipment Sustainability/Obsolescence Management through the design and qualification of replacement components for the five obsolete cards.
**Resistance Temperature Detector**

Designed to meet the harsh requirements surrounding a nuclear reactor, specialized Reactor Temperature Detectors (RTDs) are utilized in containment primary loops to monitor and provide critical primary hot and cold leg coolant temperature input critical to safe plant operations. Such a crucial component requires exceptional performance to ensure accurate and timely readings.

WPB is introducing next generation RTDs. This newly designed RTD is more robust than previous designs, solving a performance issue of premature failures due to high frequency vibration while also addressing an obsolescence issue since the previous design was no longer available for purchase. This RTD replacement is designed to be installed directly into existing thermowells, minimizing outage schedule impact.

The newly designed **Westinghouse Narrow Range RTD** was developed to withstand high vibrations to mitigate premature failures experienced in the industry.

The **Westinghouse wide range response RTD** is designed to be installed in existing thermowells and will maintain the required detection of temperature changes in the hot and cold legs of the reactor coolant loops of PWRs.

**Obsolescence Summary**

Westinghouse is currently supporting a utility considering Long Term Operation (20 year plant life extension) through evaluation of maintenance strategies, obsolescence impact, and options for repair, replacement or upgrade for 40 of the utility’s I&C systems. In most instances, these systems are not Westinghouse OEM platforms, however Westinghouse is able to successfully apply its expertise and knowledge to supporting non-OEM systems.

Westinghouse consistently uses our nuclear industry expertise and continues to develop knowledge and experience to solve a variety of industry challenges, including obsolescence and RE solutions to support nuclear customers throughout the world.

To learn more about Westinghouse Parts Business and how we are looking to solve I&C obsolescence issues, please contact Dan Sadlon (sadlond@westinghouse.com) or Ashlyn Fornear (forneaam@westinghouse.com).

Westinghouse is excited to be working with the industry on solving this issue. For more information on Westinghouse Parts Solutions visit, www.info.westinghousenuclear.com/westinghouse-parts-business.