Background

Most nuclear utilities installed their post-accident monitoring instrumentation using technology from the late 1970s and early 1980s, most of which is now obsolete and hard to repair or replace.

To resolve the increasing operations and maintenance (O&M) costs associated with this obsolescence, Westinghouse offers a post-accident monitoring system (PAMS) using its common qualified (Common Q™) platform.

Description

Common Qualified Platform

The Common Q™ platform is a single common platform designed with modular components that can be combined to solve most utility needs for Class 1E applications, including component replacements and complete system upgrades.

The Common Q platform is applicable to PAMS, core protection calculator systems, plant and reactor protection systems, engineered safety actuation systems and other Class 1E applications. The Common Q platform can duplicate current system functions, but also includes capacity for enhanced algorithms that offer the potential for increased operating margins and power uprate.

Applying the Common Q solution to all safety system applications will reduce a utility’s O&M costs, including technical support, training and spare parts logistics. In addition, Westinghouse has structured a long-term obsolescence management program as part of the Common Q solution that benefits all program participants. Obsolescence management will also be integrated with critical spare-parts stocking agreements between Westinghouse and the participating inventory and procurement managers.
Post-accident Monitoring System

The Common Q PAMS includes the following functions:

- Core exit thermocouple monitoring
- Reactor vessel level monitoring
- Subcooled margin monitoring
- Regulatory Guide 1.97 monitoring

By definition, Common Q is Class 1E; therefore, all of its building blocks are Class 1E. The Common Q platform consists of the following major building blocks that can be used to design a PAMS:

- ABB Advant® Controller 160 (AC160) with PM646A processor module input and output cards
- Power supply
- Flat panel display system (for operator’s module and maintenance/test panel)
- Advant fieldbus (AF100) communication

Benefits

Verification and Validation

The Westinghouse PAMS is qualified for Class 1E nuclear safety-related applications. This system is also in compliance with the U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.97. A verification and validation program, approved by the NRC, is used for any Common Q development activities. Westinghouse customers can reference the Common Q Safety Evaluation Report for any of their licensing submittals.

Obsolescence Management

Westinghouse has structured a long-term obsolescence management program as part of the Common Q solution. The Westinghouse Common Q design philosophy is to move away from the safety systems that involve custom designs, which are prone to obsolescence and are costly, and move to a standard design. Moving to standard designs will result in reducing the utilities overall life cycle cost for O&M. Westinghouse is employing this instrumentation and control design philosophy for the new nuclear power plants in Korea and for the operating power plants that it supports in the United States, Europe and Asia.

The Westinghouse Common Q obsolescence support plan is designed to provide configuration control for investment protection and management of the long-term obsolescence support goal. The elements of this plan are:

- Full production (for new systems) for an extended period without requalification cost to the utility
- Spare parts production for an additional period without requalification
- Westinghouse-pooled inventory spares stocking, as required, based upon usage history and expected plant life