

Westinghouse Common Q Post Accident Monitoring System (PAMS) Solution

Background

Many nuclear utilities installed their post-accident monitoring instrumentation using technology from the late 1970s and early 1980s. In this rapidly changing technological environment, component obsolescence and ever increasing operations and maintenance (O&M) costs are a growing concern. To address this, Westinghouse is pleased to offer a modernized PAMS using its common qualified (Common Q™) platform.

Description

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.

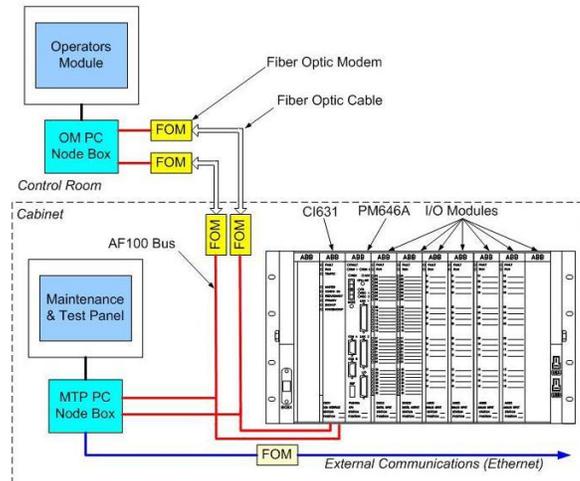
The Common Q™ PAMS includes the following functions:

- 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 modernized PAMS:

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

The Common Q™ PAMS includes built-in self-diagnostic and automated test features designed to reduce manual surveillance test labor. The system is also equipped with a variety of communications interfaces including UDP and isolated TCP/IP links designed to provide an interface to the unit's existing plant computer.



Typical Common Q™ PAMS Architecture

Benefits

Reliability

Common Q™ has a proven history of reliability and availability.

- Availability of System 99.9999%
- Mean Time between Failures (MTBF) of AC160 > 70 years
- Mean Time to Repair (MTTR) Components < 6 hours

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 Common Q™ development activities. Westinghouse customers can directly reference the Common Q™ Safety Evaluation Report for any of their licensing submittals to ease the licensing process.

Obsolescence Management

Westinghouse has structured a long-term obsolescence management program as part of its Common Q™ solution. The Westinghouse Common Q™ design philosophy is focused on engineering that supports standard designs and reusability, thereby reducing overall O&M lifecycle costs. Westinghouse is employing this design philosophy for all new nuclear power plants and operating power plants that it supports around the world.

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

Experience

Westinghouse's Common Q™ Platform has one of the largest safety-related installed bases in nuclear power plants in the world including:

- 1,300+ Cabinets
- 2,500+ AC160 rack
- 800+ Flat Panel Displays
- 4,000+ Controllers

As the technology of choice for all new plant safety systems and operating plant safety system upgrades, Westinghouse is committed to long term support of the Common Q™ product line with contractual support commitments to 2055 and beyond.



Common Q™ AC160 Processor

O&M Savings

The Westinghouse Common Q™ PAMS is designed to reduce Operating and Maintenance costs through technology, high reliability, and integration.

- The online surveillance and automated test features have been reviewed and approved by the NRC as described in the Common Q™ safety evaluation report. This provides the potential to extend the interval of calibration checks and manual tests.
- As a fully digital system, the AC160 does not require ongoing calibration like legacy analog systems.
- Common Q™ technology promotes synergistic data integration with other I&C systems such as a Plant Computer, other Common Q™ systems, or an Ovation™ control system.



Common Q™ PAMS (shown with factory test carts)

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