

Global Instrumentation and Control

Environmental Qualification Testing and Analysis Services

Background

Westinghouse's Qualification Operations has been an industry leader in providing equipment qualification services to the nuclear industry for over 40 years and is headquartered in New Stanton, Pennsylvania (USA) with global operations.

Environmental qualification provides evidence that safety-related equipment can perform its intended safety function(s) during and/or after specified normal, abnormal, and accident environmental conditions. This is performed by test, analysis, or a combination of test and analysis.

Qualification is performed in accordance with regulations and standards such as:

- U.S. NRC Regulatory Guides and CFR requirements
- IEEE Std. 323 / IEC 60780 and supporting standards
- International codes and standards
- ASME (NQA-1), EN ISO and other industry codes

Description

Westinghouse's environmental qualification services provides documentation that the components meet or exceed the environmental requirements.

The highly experienced and qualified personnel at Westinghouse perform these qualification services, allowing Westinghouse to be a single source for supplying virtually any part for safety-related applications.

Westinghouse backs its programs with full licensing and technical support for the life of the qualified equipment and beyond.

Benefits

Westinghouse has a long history of qualification that started with the first Pressurized Water Reactors in the early 1970's. Westinghouse has built on this experience and lessons learned from the industry to provide the most comprehensive Equipment Qualification Program for all reactor types. Westinghouse provides:

- Methodology endorsed by the U.S. NRC
- Westinghouse Licensing Support
- Turn-key qualification analysis
- Equipment/plant life extension analysis
- Materials evaluation
- Qualification certification upgrades
- In-house thermal aging, EMC testing, and seismic testing
- More cost-effective solution than replacing parts, with a shorter lead time

Experience

Westinghouse is a global leader and supplier of environmental qualifications services for utilities and has been providing equipment qualification services to the nuclear industry for more than 40 years.

Westinghouse environmental qualification is equipped to support all reactor types, including DOE, PWRs, BWRs, and Candu.

Successes which demonstrate the capabilities of the Westinghouse equipment qualification services include:

- AP1000® Components
- APR1400 Components
- Motor Extended Life
- N9004 RTDs
- NRC - Component Operability
- Limited Condition Operations (LCO)

Environmental Qualification by Test

Environmental qualification testing is conducted in accordance with 10CFR50.49, IEEE Std. 323, and other support standards. Activities include:

- Materials testing
- Thermal and radiation aging
- Thermal, mechanical, & electrical cycling
- Abnormal environment performance testing
- Full-sequence design basis accident (DBA)
- LOCA/HELB steam transient simulation
- Post-LOCA/HELB aging
- Inspection, monitoring, & functional testing
(See separate sheet for vibration and seismic testing.)

Westinghouse's walk-in environmental chamber is designed to conduct temperature and humidity testing of instrumentation and control systems, electrical equipment, as well as nuclear steam supply system and balance-of-plant safety-related parts, components, and assemblies. The large capacity chamber provides room for fully integrated system-level testing.

In-house capabilities enable Westinghouse to offer customers:

- Comprehensive Westinghouse expertise from design through qualification
- Plant-specific qualification services
- Fast turn-around for services
- Single-source dedication and qualification services
- State-of-the-art digitally controlled environmental test chamber and data acquisition calibrated to NIST

Chamber Specifications

Size: 12 ft x 12 ft x 11 ft
Capability: -40 – 185°F [-40 – 85°C]
20 – 98 % Relative Humidity



Walk-in environmental chamber

Environmental Qualification by Analysis

When testing is not practical, an analysis, per IEEE-323, can be performed. These techniques include:

- Thermal life calculations using the Arrhenius equation and the activation energy
- Actual plant operation data for radiation and temperature
- Pressure and temperature analysis for LOCA/HELB transients

Documentation

With each qualification program, Westinghouse provides:

- Detailed report of testing/analysis
- Certificate of Qualification
- Equipment Qualification Data Sheet (EQDS)

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