Background

Westinghouse is an industry leader in providing equipment qualification services to the nuclear industry. The Nuclear Automation facility located in New Stanton, Pennsylvania (USA) provides a direct source for nuclear-grade equipment and safety-related qualification services.

Westinghouse complies with the requirements of 10CFR50, Appendix B, 10CFR21, International Standards Organization (ISO) 9001, ISO 9000-3, American Society of Mechanical Engineers (ASME) NQA-1 and International Atomic Energy Agency 50-C-QA.

Environmental qualification is required to provide evidence that safety-related equipment can perform its intended safety function(s) during and/or after specified normal, abnormal and accident environmental conditions.

This qualification is performed in accordance with regulations and standards such as:

- U.S. Nuclear Regulatory Commission Regulatory Guides and requirements
- Institute of Electrical and Electronics Engineers (IEEE) Std. 323 and supporting standards
- International codes and standards
- ASME and other industry codes

Description

Westinghouse’s environmental qualification services provide critical support to customers by supplying safety-related assemblies and parts that are qualified to plant-specific requirements and customer requirements.

The highly experienced personnel at Westinghouse perform these qualification services, allowing Westinghouse to be a single source for supplying virtually any part for safety-related applications. Westinghouse offers a full range of programs that are tailored to the customer’s specifications.

DBA cable splice and hydrogen sensor testing
These programs include:

- Abnormal environment performance testing and analysis
- Full-sequence design basis accident (DBA)
- Environment simulation loss-of-coolant accident/high-energy line break (LOCA/HELB)
- Life extension analysis
- Material testing and analysis
- Condition monitoring

**Environmental Qualification Testing**

Environmental qualification testing is conducted in accordance with 10CFR50.49, IEEE Std. 323 and other support standards. A typical DBA environmental test would include the following sequence:

- Baseline functional tests
- Thermal aging
- Radiation aging
- Thermal stress cycling (as applicable)
- Mechanical and electrical pre-conditioning (as applicable)
- Vibration aging and seismic testing (as applicable)
- LOCA/HELB steam transient simulation
- Post-LOCA/HELB aging
- Post-test inspection and functional testing

Equipment not subjected to LOCA/HELB steam environments is qualified for normal and abnormal conditions.

This equipment is subjected to a cyclic test sequence performed in Westinghouse’s new walk-in chamber that confirms that the equipment meets the performance requirements through temperature, humidity, voltage and frequency extremes. State-of-the-art data acquisition systems are used to record critical test parameters and equipment functions during 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.

These in-house capabilities enable Westinghouse to offer customers:

- Lower costs
- Plant-specific qualification services
- Fast turn-around
- Single-source dedication and qualification services
- Multi-item testing economies with no minimum-quantity requirements
- State-of-the-art digitally controlled environmental test chamber and data acquisition

**Chamber Specifications**

**Size:** 12 ft x 12 ft x 11 ft

**Capability:** -40 to 185°F, 20 to 98 percent relative humidity, 16-channel temperature monitoring
Benefits
Westinghouse has a long history of performing environmental qualification of equipment. Over this time period, an extensive database of test and analysis results has been developed. This wealth of information can be used to provide environmental qualification services such as:

Third-party qualification – Integrated in-house qualification and commercial dedication services implemented by highly experienced personnel allow Westinghouse to be a single source for supplying virtually any part for safety-related applications.

Equipment life extension – The extension of the qualified life of equipment can be evaluated using past qualification and material testing for plant-specific environmental parameters. Westinghouse can also offer the patented Equipment LIFETIME™ Monitor that provides a passive means to continuously monitor the temperature and radiation environment of equipment located throughout the plant. The data collected can then be used to extend the equipment’s qualified life.

Materials evaluation – Westinghouse has a broad materials database developed through material testing and research on organic and inorganic materials. These data can be used to support plant life extension, equipment life extension, increased maintenance intervals and replacement of obsolete parts.

Upgrade of qualification certifications – Manufacturing records for safety-related equipment originally supplied by Westinghouse can be researched to determine materials and the manufacturing process. Westinghouse uses these data to determine if the equipment (such as safety-related motors, switchgear and motor control centers) can be certified to the latest industry requirements to support plant licensing renewal.

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 35 years.