

### **3.11 Environmental Qualification of Safety-Related Mechanical and Electrical Equipment**

The information in this section of the reference ABWR DCD, including all subsections, is incorporated by reference with the following departure and supplements.

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#### **3.11.2 Qualification Tests and Analyses**

*For equipment located in a mild environment, certificate of compliance shall be submitted certifying that the equipment has been qualified to assure its required safety-related function in its applicable environment. This equipment is qualified for dynamic loads as addressed in Sections 3.9 and 3.10. Further, a surveillance and maintenance program will be developed to ensure equipment operability during its designed life (Subsection 3.11.6).*

The information described in this section is also documented in the STP 3&4 Equipment Qualification Program (EQP) document (Reference 3.11-4). The requirements in the STP 3&4 EQP meet or exceed the requirements in Reference 3.11-2, as documented in the Equivalency Evaluation Report (Reference 3.11-5).

#### **3.11.6 COL License Information**

##### **3.11.6.1 Environmental Qualification Document (EQD)**

The following standard supplement addresses COL License Information Item 3.40.

The EQD will be prepared summarizing the qualification results for all safety-related electrical and mechanical equipment located in harsh environments. The EQD will include the following:

- (1) The test environmental parameters and the methodology used to qualify the equipment located in mild and harsh environments will be identified.
- (2) A summary of environmental conditions and qualified conditions for the safety-related equipment located in a harsh environment zone will be presented in the system component evaluation work sheets.

The EQD will be available for NRC review as part of the ITAAC for basic configuration of systems, as provided in the reference ABWR DCD Tier 1 Section 1.2.

There are no harsh environments outside the scope of the certified ABWR design. Therefore, no additional site-specific equipment needs inclusion in the EQD.

##### **3.11.6.2 Environmental Qualification Records**

The following standard supplement addresses COL License Information Item 3.41.

The results of the qualification tests for safety-related electrical equipment will be recorded and maintained in accordance with the requirements of 10 CFR 50.49(b). The

records will be available for NRC review as part of the ITAAC for basic configuration of systems, as provided in the reference ABWR DCD Tier 1 Section 1.2.

### **3.11.6.3 Surveillance, Maintenance and Experience Information**

The following standard supplement addresses COL License Information Item 3.42.

The equipment certificates of qualification compliance will be required. A surveillance and maintenance program will be developed to ensure equipment operability during its designed life. More detail about surveillance program is in Chapter 16, Technical Specification. More detail about the maintenance program is in Chapter 17.06S as per 10 CFR 50.65.

A list of non-safety-related control systems subject to adverse environments will be evaluated for the safety implications as identified in IE Information Notice 79-22, Qualification of Control Systems. These are design related considerations that will be factored into the detailed design. The records of evaluation will be available for NRC review as part of the ITAAC for basic configuration of systems, as provided in the reference ABWR DCD Tier 1 Section 1.2.

Issues related to equipment wetting and flooding above the flood level as identified in IE Information Notice 89-63, Possible Submergence of Electrical Circuits Located Above the Flood Level Because of Water Intrusion and Lack of Drainage, are design related considerations that will be factored into the detailed design. The records of evaluation will be available for NRC review as part of the ITAAC for basic configuration of systems, as provided in the reference ABWR DCD Tier 1 Section 1.2.

### **3.11.6S Qualification of Mechanical Equipment**

To respond to RG 1.206 the following supplemental information is being provided. The process for determining the suitability of environmentally sensitive soft parts in mechanical equipment has been established for all commodities and sub-components of mechanical equipment that perform a safety-related function by adherence to the requirements of NEDE-24326-1-P "General Electric Environmental Qualification Program." This specification invokes the requirements of the applicable IEEE standards (e.g. 323 and 344), which will ensure that any elastomer, seal or lubricant used in mechanical equipment will be capable of performing the respective safety function under the environmental conditions to which it is subjected. Additionally, non-metallic subcomponents of mechanical equipment will be qualified in accordance with QME-1-2007, Appendix QR-B.

As stated in DCD Chapter 3.11.1, safety-related mechanical equipment are defined and specified in DCD Chapter 3.2. Specifically, for mechanical components, the requirements of DCD Chapter 3.9 ensure that any safety-related function is capable of being performed, including passive functions such as pressure boundary integrity. The documentation requirements of DCD Chapter 3.2.6 and 10CFR50 Appendix B ensure that the materials used will be capable of performing the safety-related functions defined for mechanical equipment and components. These requirements ensure that the constituent parts of a safety-related assembly or component is capable of

performing its required function during normal, abnormal, test, design basis accident and post-accident environmental conditions.

### **3.11.7 Operational Information**

The following site-specific supplement provides an operational program description of the STP 3 & 4 Environmental Qualification (EQ) Program.

Equipment qualification activities for the STP 3&4 project that affect safety-related equipment will be conducted by detailed, written, and approved procedures and instructions. These procedures and instructions include the Operating Equipment Qualification Program (OEQP) in the Operation, Emergency Response, Maintenance, Test, Inspection, and Surveillance activities in the plant.

The EQ process verifies that each safety-related structure, system and component is appropriately qualified for use in the STP 3&4 project. EQ files are maintained for all safety-related equipment and non-safety-related post-accident monitoring devices that are subject to a harsh environment. The records generated by this program form the basis for the STP 3&4 equipment qualification operational program. The files are maintained for the operational life of the plant. Central to the EQ Program is the EQ Equipment List. The EQ Equipment List identifies the electrical, mechanical, and I&C equipment or components that must be environmentally qualified for use in a harsh environment.

EQ data packages are developed in accordance with industry standard practices. During construction, the Constructor will be responsible for ensuring that mounting, support, and connection configurations established during EQ are maintained in the installed condition. Deviations from the qualified configuration must be evaluated and documentation of the evaluations maintained in the EQ record files as Quality Assurance records in auditable form for the life of the plant. Upon completion of construction and beginning with the first system startup activities, EQ document packages are turned over to STPNOC as systems are completed and accepted by STPNOC. Field changes will be reviewed to ensure that parameters established during EQ are maintained. Deviations will be evaluated and documented in the EQ record files.

The program is responsible for all aspects of the continuing EQ program such as:

- Maintenance of the EQ Equipment List
- Plant procedures for control and maintenance of the EQ documentation
- Evaluation of design and qualified life to support continued operation
- Addressing programmatic aspects of the OEQP such as aging of non-metallic parts
- Evaluating engineering and design questions as they arise such as synergistic effects during long term power operations while allowing for considerations like available operating life with a margin for fulfilling important to safety functions during a DBA or other analyzed accident

- Surveillance and maintenance activities of safety-related equipment based on the equipment qualification program results and manufacture recommendations
- Procurement of replacement safety-related parts

These programs are implemented, documented and controlled by appropriate plant operating and maintenance procedures and are administered by the plant staff.

### **3.11.8 ~~3.11.7~~ References**

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- 3.11-1 Code of Federal Regulations, Title 10, Chapter I, Part 50, Paragraph 50.49, Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plant.
- 3.11-2 [*“General Electric Environmental Qualification Program”, NEDE-24326-1-P, Proprietary Document, January 1983.*]\*
- 3.11-3 Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment, NUREG-0588.
- 3.11-4 U7-PROJ-K-PRD-0025 “Project Requirements Document: Equipment Qualification Program,” Latest Revision.
- 3.11-5 U7-PROJ-L-EVAL-LIC-0001 “Equivalency Evaluation Report for Equipment Qualification Program,” Revision 5.

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\* See Section 3.10 and Appendix 3K. This reference is same as Reference 3.9-6 (Subsection 3.9.8).