



Environmental Qualification of Mechanical Equipment

James Strnisha
Division of Engineering
NRC Office of New Reactors

EPR Design Center Working Group

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Regulatory Requirements

- GDC 4 requires that components important to safety be designed to accommodate the effects of, and be compatible with, the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents

NRC Guidance

- RG 1.206 Paragraph C.III.3.11.6 and SRP Section 3.11 provide guidance for meeting GDC 4

Regulatory Guide 1.206

(Section C.III.3.11.6, Qualification of Mechanical Equipment)

The applicant should identify the following:

- Safety related mechanical equipment located in harsh environments
- Non-metallics of such equipment
- Conditions for which this equipment must be qualified
- Non-metallic material capabilities
- Environmental effects of this equipment

Document successful completion of qualification tests/analysis for each component

SRP Section 3.11

Environmental Qualification of Mechanical and Electrical Equipment

- Review Areas for Mechanical Equipment:
 - Components designed to be compatible with environment
 - Qualification of nonmetallic components located in harsh environment by test/analysis
 - Components in mild environment demonstrated by design/purchase specs
 - Maintenance/surveillance/replacement program will be developed to ensure equipment qualification is maintained
 - Equipment records are maintained
 - License condition for operational program implementation

EPR Proposed Approach for Mechanical EQ

- EPR proposed approach for EQ is based on methods approved for South Texas Project, Units 1 and 2 (operating plant)
- Not considered appropriate for a new reactor design to use an approach for initial component qualification that was accepted at an operating nuclear power plant for maintaining qualification.
- EPR approach does not address design process for environmental qualification of mechanical equipment.
- EPR approach does not demonstrate that safety-related mechanical equipment will satisfy its qualification performance requirements or establish the design life and replacement intervals for safety-related mechanical equipment.
- EPR approach does not meet SRP Section 3.11 or comply with the NRC regulations for mechanical equipment EQ.

Typical Mechanical EQ Approach

Design Certification Application

- Provide EQ methodology (framework)
- Provide design criteria for Mechanical EQ
- Satisfy SRP 3.11 for Design Certification

COL Applicant

- Fully describe EQ program (mechanical /electrical)
- Translate design criteria into procurement documents (or COL holder)
- Establish design life of non-metallic components (or COL holder)

Plant Inspection (NRC)

- Inspect EQ Operational program after COL issuance
- Review component life and replacement schedules
- Evaluate program implementation