Chapter 6 Engineered Safety Features

6.0 General

This section of the referenced DCD is incorporated by reference with no departures or supplements.

6.1 Design Basis Accident Engineered Safety Feature Materials

This section of the referenced DCD is incorporated by reference with no departures or supplements.

6.2 Containment Systems

This section of the referenced DCD is incorporated by reference with no departures or supplements.

6.3 Emergency Core Cooling Systems

This section of the referenced DCD is incorporated by reference with no departures or supplements.

6.4 Control Room Habitability Systems

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

6.4.4 System Operation Procedures

STD COL 6.4-1-A Replace the second paragraph with the following.

Operators are provided with training and procedures for control room habitability that address the applicable aspects of NRC Generic Letter 2003-01 and are consistent with the intent of Generic Issue 83. Training and procedures are developed and implemented in accordance with Sections 13.2 and 13.5, respectively. The implementation milestones for training and procedures are provided in Sections 13.4 and 13.5, respectively.

6.4.5 Design Evaluations

System Safety Evaluation

Add the following after the second paragraph.

EF3 SUP 6.4-1

The impact of a postulated design basis accident (DBA) in Fermi 2 on the Fermi 3 control room was evaluated. The evaluation was performed as follows:

- Atmospheric dispersion factors, X/Qs, at the Fermi 3 MCR intakes were conservatively calculated assuming a point source, a distance of 350 m (1148 ft), and a release height of 10 m (32.8 ft). Meteorological data used for cross-unit impact is consistent with that used for the X/Q values presented in Section 2.3. A nominal “receptor to source” direction of 228° was assumed (with respect to “true north”). To ensure all potential release points from Fermi 2 were considered, a safety factor of 1.5 was applied to the nominal results. The X/Q values are presented in Table 2.3-302.
- The Fermi 2 LOCA as described in Section 15.6.5 of the Fermi 2 UFSAR was reviewed. The resultant dose to the Fermi 3 Control Room operators was determined to be within the regulatory limits by comparing the Fermi 2 and Fermi 3 X/Q values and control room filtration design parameters. Detailed modeling of the Fermi 3 control room was not performed because the doses are bounded by a postulated Fermi 3 LOCA.

Based on this conservative analysis, the resultant dose is bounded by the control room operator dose from a postulated Fermi 3 DBA, and is less than GDC 19 limits.

Replace DCD Table 6.4-2 with Table 2.2-203, replace the third paragraph with the following, and delete the last paragraph.

EF3 COL 6.4-2-A

Potential toxic gas sources are evaluated to confirm that an external release of hazardous chemicals does not impact control room habitability. These sources include: 1) off-site industrial facilities and transportation routes; 2) Fermi 2; and 3) Fermi 3.

Evaluation of potentially hazardous off-site chemicals within 8 km (5 mi) of the control room is addressed in Section 2.2. As described therein, there are no significant impacts to the Fermi 3 control room from a postulated release of hazardous chemicals used or stored off-site within 8 km (5 mi) of the control room, including those in oil or gas pipe-lines. There are also no significant control room habitability impacts due to chemicals being transported along off-site routes within 8 km (5 mi) of the plant.

Toxic gas analysis for potentially hazardous chemicals stored on site is performed in accordance with the guidelines of RG 1.78 and on the basis of no action being taken by the control room operator. The results of the analysis, when compared to the toxicity limits given in RG 1.78, show hazardous concentrations of toxic gas in the control room are not reached.

On-site locations with potentially toxic chemicals are identified in Table 2.2-203.

Hydrogen and oxygen storage facilities are in excess of 229 m (750 ft) from the control room. This distance is acceptable for toxic gas concerns per RG 1.78 based on hazards of postulated instantaneous release followed by vapor cloud explosion or intake of a flammable vapor concentration into a safety-related intake. The hazard for the oxygen supply was a postulated release with an increased concentration at a safety-related intake. Calculations performed to evaluate the habitability of the control room for accidental releases of hydrogen or oxygen from the hydrogen water chemistry system indicate control room personnel are not subject to the hazard of breathing air with insufficient oxygen inside the control room due to a release of hydrogen. Other identified chemicals are stored in amounts and locations that are adequately separated from the control room intakes such that detection and/or control room isolation is not required.

The maximum concentrations for on-site chemicals, as calculated for Fermi 2, are based on the equations provided in NUREG-0570. This evaluation is bounding for the Fermi 3 control room intake on the basis of a greater separation distance from Fermi 3 control room than the Fermi 2 control room. The relative locations for the chemical storage areas, as well as the control room intakes and refresh rates for Fermi 2 and Fermi 3 were considered in the analysis along with the properties of the stored chemicals. The maximum concentrations determined for the room intakes were evaluated for safety in comparison with the toxicity limits from RG 1.78. The analysis performed shows that the control room concentration for a given chemical does not exceed the applicable toxicity limit. Based on this analysis, Seismic Category I Class safety-related toxic gas monitoring instrumentation is not required.

6.4.9 COL Information

6.4-1-A CRHA Procedures and Training

EF3 COL 6.4-1-A This COL item addressed in Subsection 6.4.4.

6.4-2-A Toxic Gas Analysis

EF3 COL 6.4-2-A This COL item addressed in Subsection 6.4.5 and Table 2.2-203.

6.5 Atmosphere Cleanup Systems

This section of the referenced DCD is incorporated by reference with no departures or supplements.

6.6 Preservice and Inservice Inspection and Testing of Class 2 and 3 Components and Piping

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

STD COL 6.6-2-A Delete the second sentence in the third paragraph

Replace the last three sentences and the parenthetical statement of the fourth paragraph with the following.

STD COL 6.6-1-A The PSI/ISI program description for Class 2 and 3 components and piping is provided in DCD Section 6.6.

6.6.2 Accessibility

Replace the last sentence in the second paragraph with the following.

STD COL 6.6-2-A All Class 2 or 3 austenitic or dissimilar metal welds are included in the referenced certified design.

During the construction phase of the project, anomalies and construction issues are addressed using change control procedures. Procedures require that changes to approved design documents, including field changes and modifications, are subject to the same review and approval process as the original design.

Accessibility and inspectability are key components of the design process. Control of accessibility for inspectability and testing during licensee design activities affecting Class 2 and 3 components is provided via procedures for design control and plant modifications.

UT will be the preferred NDE method for all PSI and ISI volumetric examinations; RT will be used as a last resort only if UT cannot achieve the necessary coverage. The same NDE method used during PSI will be used for ISI to the extent possible to assure a baseline point of reference.

If a different NDE method is used for ISI than was used for PSI, equivalent coverage will be achieved as required by code.

6.6.6 System Pressure Tests

Revise the second sentence of the first paragraph as follows.

STD COL 5.2-1-A

Regardless of which test method is chosen, system leakage and hydrostatic pressure tests will meet all applicable requirements of ASME Code Section XI, IWA-5000 and IWC-5000 for Class 2 components; and IWD-5000 for Class 3 components, including the limitations of 10 CFR 50.55a(b)(2)(xx) and 10 CFR 50.55a(b)(2)(xxvi).

6.6.7 Augmented Inservice Inspection

STD COL 6.6-1-A

6.6.7.1 Flow Accelerated Corrosion Program Description

The flow accelerated corrosion (FAC) monitoring program analyzes,inspects, monitors, and trends nuclear power plant piping and components that are susceptible to FAC damage. The FAC program isbased on EPRI NSAC-202L (Reference 6.6-201).

Prior to start-up, a comprehensive FAC-susceptibility screening will be performed to identify any plant systems that may be susceptible to FAC degradation. Should any plant systems remain susceptible, a FAC program w i l l be implemented as described below. Program implementation milestones are provided in Section 13.4. Pre-service baseline nondestructive examination (NDE) inspections will be performed and material constituency identified for each as-fabricated piping component in the susceptible systems.

6.6.7.1.1 **Analysis**

A program similar to that described in EPRI NSAC-202L is used to identify the most susceptible components and to evaluate the rate of wall thinning for components and piping potentially susceptible to FAC. Each susceptible component is tracked in a database and is inspected, based on susceptibility. For each piping component, the program predicts the wear, and the estimated time until it must be re-inspected, repaired, or replaced.

6.6.7.1.2 **Industry Experience**

Industry experience provides a valuable supplement to plant analysis and associated inspections. Reviews of industry experience are performed to identify generic plant problem areas and determine differences in similar types of components. This information is used to update the FAC program.

6.6.7.1.3 **Inspections**

Wall thickness measurements establish the extent of wear in a given component, provide data to help evaluate trends, and provide data to refine the predictive model. Components are inspected for wear using ultrasonic techniques (UT), radiography techniques (RT), or by visual observation. The preservice inspections are used as a baseline for later inspections. Therefore, the preservice inspections use grid locations and measurement methods most likely to be used for inservice inspections according to industry guidelines. Each subsequent inspection determines the wear rate for the piping and components and the need for inspection frequency adjustment for those components.

6.6.7.1.4 **Training and Engineering Judgement**

The FAC program is administered by trained and experienced personnel Task-specific training is provided for plant personnel that implement the monitoring program. Specific NDE is carried out by personnel qualified in the given NDE method. Inspection data is analyzed by engineers or other experienced personnel to determine the overall effect on the system or component.

6.6.7.1.5 **Long-Term Strategy**

The FAC program includes a long-term strategy that focuses on reducing wear rates, using improved water chemistry, and optimizing the inspection planning process.

6.6.7.1.6 FAC Program Documentation

A procedure documents the overall program description and its implementation.

Governing Program Description

A governing program description defines the overall program and associated responsibilities. This program description addresses the following elements:

- A corporate commitment to monitor and control FAC.
- Identification of the tasks to be performed (including implementing procedures) and associated responsibilities.
- Identification of the position that has overall responsibility for the FAC program.
- Communication requirements between the lead position and other departments that have responsibility for performing support tasks.
- Quality assurance requirements.
- Identification of long-term goals and strategies for reducing high FAC wear.
- A method for evaluating plant performance against long-term goals.

Program Implementation

The implementation of each specific task conducted as part of the FAC program is described in one or more procedures, including:

- Identifying susceptible systems
- Developing FAC inspection drawings
- Developing a FAC inspection database
- Performing FAC analysis
- Selecting and scheduling components for initial inspection
- Performing inspections
- Evaluating inspection data
- Evaluating worn components
- Identifying components for repair and replacement when necessary

- Selecting and scheduling locations for follow-on inspections

6.6.7.1.7 **Documentation**

The results of inspections are documented in accordance with the requirements of the implementing documents. Periodically, reports are prepared that identify the components inspected, justify the basis for their selection (i.e., predictive ranking, industry experience, engineering judgment), document the results of the inspections, and evaluate and disposition worn components.

6.6.10 Plant Specific PSI/ISI Program Information

6.6.10.1 Relief Requests

Add the following at the end of this section.

STD COL 6.6-1-A No relief requests for the PSI/ISI program have been identified.

6.6.10.2 Code Edition

Replace the second sentence of this section with the following.

STD COL 6.6-1-A The initial ISI program incorporates the latest edition and addenda of the ASME Code approved in 10 CFR 50.55a(b) on the date 12 months before initial fuel load.

STD COL 6.6-1-A

6.6.10.3 Program Implementation

The milestones for preservice and inservice inspection program implementation are provided in Section 13.4.

6.6.11 COL Information

6.6-1-A PSI/ISI Program Description

STD COL 6.6-1-A This COL item is addressed in Section 6.6.

6.6-2-A PSI/ISI NDE Accessibility Plan Description

STD COL 6.6-2-A This COL item is addressed in Subsection 6.6.2.

6.6.12 References

6.6-201 Electric Power Research Institute, “Recommendations for an Effective Flow-Accelerated Corrosion Program, ” NSAC-202L-R2.

Appendix 6A TRACG Application for Containment Analysis

This section of the referenced DCD is incorporated by reference with no departures or supplements.

Appendix 6B Evaluation of the TRACG Nodalization for the ESBWR Licensing Analysis

This section of the referenced DCD is incorporated by reference with no departures or supplements.

Appendix 6C Evaluation of the Impact of Containment Back Pressure on the ECCS Performance

This section of the referenced DCD is incorporated by reference with no departures or supplements.

Appendix 6D Containment Passive Heat Sink Details

This section of the referenced DCD is incorporated by reference with no departures or supplements.

Appendix 6E TRACG LOCA Containment Response Analysis

This section of the referenced DCD is incorporated by reference with no departures or supplements.

Appendix 6F Break Spectrums of Break Sizes and Break Elevations

This section of the referenced DCD is incorporated by reference with no departures or supplements.

Appendix 6G TRACG LOCA SER Confirmation Items

This section of the referenced DCD is incorporated by reference with no departures or supplements.

Appendix 6H Additional TRACG Outputs and Parametrics Cases

This section of the referenced DCD is incorporated by reference with no departures or supplements.

Appendix 6I Results of the Containment Design Basis Calculations With Suppression Pool Bypass Leakage Assumption of 1 cm^2 (1.08E-03 ft^2)

This section of the referenced DCD is incorporated by reference with no departures or supplements