CHAPTER 6

ENGINEERED SAFETY FEATURES

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CHAPTER 6

ENGINEERED SAFETY FEATURES

6.0 ENGINEERED SAFETY FEATURES

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

6.1 ENGINEERED SAFETY FEATURES MATERIALS

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

6.1.1.2 Fabrication Requirements

Add the following information to the end of DCD Subsection 6.1.1.2:

STD COL 6.1-1

In accordance with Appendix B to 10 CFR Part 50, the quality assurance program establishes measures to provide control of special processes. One element of control is the review and acceptance of vendor procedures that pertain to the fabrication, welding, and other quality assurance methods for safety related component to determine both code and regulatory conformance. Included in this review and acceptance process are those vendor procedures necessary to provide conformance with the requirements of Regulatory Guides 1.31 and 1.44 for engineered safety features components as discussed in DCD Section 6.1 and reactor coolant system components as discussed in DCD Subsection 5.2.3.

6.1.2.1.6 Quality Assurance Features

STD COL 6.1-2

Replace the third paragraph under the subsection titled “Service Level I and Service Level III Coatings” within DCD Subsection 6.1.2.1.6 with the following information.

The protective coatings program controls the procurement, application, inspection, and monitoring of Service Level I and Service Level III coatings with the quality assurance features discussed above.

The protective coatings program complies with Regulatory Guide 1.54, and is controlled and implemented by administrative procedures.

6.1.3 COMBINED LICENSE INFORMATION ITEMS

6.1.3.1 Procedure Review

STD COL 6.1-1

This COL Item is addressed in Subsection 6.1.1.2.

6.1.3.2 Coating Program

STD COL 6.1-2 This COL Item is addressed in Subsection 6.1.2.1.6.

6.2 CONTAINMENT SYSTEMS

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

6.2.5.1 Design Basis

Add the following information at the end of DCD Subsection 6.2.5.1, as identified in Appendix A to NuStart Technical Report AP-TR-NS01-A, Rev 2, "Containment Leak Rate Test Program Description."

STD COL 6.2-1 The Containment Leak Rate Test Program using 10 CFR Part 50, Appendix J Option B is established in accordance with NEI 94-01 (DCD Subsection 6.2.7, Reference 30), as modified and endorsed by the NRC in Regulatory Guide 1.163. Table 13.4-201 provides milestones for containment leak rate testing implementation.

6.2.5.2.2 System Operation

STD COL 6.2-1 Add the following information at the end of the subsection "Scheduling and Reporting of Periodic Tests" within DCD Subsection 6.2.5.2.2, as identified in Appendix A to NuStart Technical Report AP-TR-NS01-A, Rev 2, "Containment Leak Rate Test Program Description."

Schedules for the performance of periodic Type A, B, and C leak rate tests are in accordance with NEI 94-01, as endorsed and modified by Regulatory Guide 1.163, and described below:

Type A Tests

A preoperational Type A test is conducted prior to initial fuel load. If initial fuel load is delayed longer than 36 months after completion of the preoperational Type A test, a second preoperational Type A test shall be performed prior to initial fuel load. The first periodic Type A test is performed within 48 months after the successful completion of the last preoperational Type A test. Periodic Type A tests are performed at a frequency of at least once per 48 months, until acceptable performance is established. The interval for testing begins at initial reactor operation. Each test interval begins upon completion of a Type A test and ends at the start of the next test. The extension of the Type A test interval is determined in accordance with NEI 94-01.

Type A testing is performed during a period of reactor shutdown at a frequency of at least once per 10 years based on acceptable performance history. Acceptable performance history is defined as successful completion of two consecutive Type A tests where the calculated performance leakage rate was less than 1.0 L_a. A

preoperational Type A test may be used as one of the two Type A tests that must be successfully completed to extend the test interval, provided that an engineering analysis is performed to document why a preoperational Type A test can be treated as a periodic test. Elapsed time between the first and last tests in a series of consecutive satisfactory tests used to determine performance shall be at least 24 months.

Type B Tests (Except Containment Airlocks)

Type B tests are performed prior to initial entry into Mode 4. Subsequent periodic Type B tests are performed at a frequency of at least once per 30 months, until acceptable performance is established. The test intervals for Type B penetrations may be increased based upon completion of two consecutive periodic as-found Type B tests where results of each test are within allowable administrative limits. Elapsed time between the first and last tests in a series of consecutive satisfactory tests used to determine performance shall be 24 months or the nominal test interval (e.g., refueling cycle) for the component prior to implementing Option B of 10 CFR Part 50, Appendix J. An extended test interval for Type B tests may be increased to a specific value in a range of frequencies from greater than once per 30 months up to a maximum of once per 120 months. The extension of specific test intervals for Type B penetrations is determined in accordance with NEI 94-01.

Type B Tests (Containment Airlocks)

Containment airlock(s) are tested at an internal pressure of not less than P_{ac}. (Prior to a preoperational Type A test $P_{ac}= P_a$.) Subsequent periodic tests are performed at a frequency of at least once per 30 months. In addition, equalizing valves, door seals, and penetrations with resilient seals (i.e., shaft seals, electrical penetrations, view port seals and other similar penetrations) that are testable, are tested at a frequency of once per 30 months.

For periods of multiple containment entries where the airlock doors are routinely used for access more frequently than once every seven days (e.g., shift or daily inspection tours of the containment), door seals may be tested once per 30 days during this time period.

Airlock door seals are tested prior to a preoperational Type A test. When containment integrity is required, airlock door seals are tested within seven days after each containment access.

Type C Tests

Type C tests are performed prior to initial entry into Mode 4. Subsequent periodic Type C tests are performed at a frequency of at least once per 30 months, until adequate performance has been established. Test intervals for Type C valves may be increased based upon completion of two consecutive periodic as-found Type C tests where the result of each test is within allowable administrative limits. Elapsed time between the first and last tests in a series of consecutive

passing tests used to determine performance shall be 24 months or the nominal test interval (e.g., refueling cycle) for the valve prior to implementing Option B of 10 CFR Part 50, Appendix J. Intervals for Type C testing may be increased to a specific value in a range of frequencies from 30 months up to a maximum of 60 months. Test interval extensions for Type C valves are determined in accordance with NEI 94-01.

Reporting

A post-outage report is prepared presenting results of the previous cycle's Type B and Type C tests, and Type A, Type B and Type C tests, if performed during that outage. The report is available on-site for NRC review. The report shows that the applicable performance criteria are met, and serves as a record that continuing performance is acceptable.

STD COL 6.2-1 Add the following subsection at the end of DCD Subsection 6.2.5.2.2, as identified in Appendix A to NuStart Technical Report AP-TR-NS01-A, Rev. 2, "Containment Leak Rate Test Program Description."

Acceptance Criteria

Acceptance criteria for Type A, B and C Tests are established in Technical Specification 5.5.8.

6.2.6 COMBINED LICENSE INFORMATION FOR CONTAINMENT LEAK RATE TESTING

STD COL 6.2-1 This COL item is addressed in Subsections 6.2.5.1 and 6.2.5.2.2.

6.3 PASSIVE CORE COOLING SYSTEM

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

6.3.8 COMBINED LICENSE INFORMATION

6.3.8.1 Containment Cleanliness Program

Insert the following information at the end of DCD Subsection 6.3.8.1:

This COL Item is addressed below.

STD COL 6.3-1 Administrative procedures implement the containment cleanliness program. Implementation of the program minimizes the amount of debris that might be left in containment following refueling and maintenance outages. The program is consistent with the containment cleanliness program used in the evaluation discussed in DCD Subsection 6.3.8.2. The program includes as a minimum the following:

Responsibilities

The program defines the organizational responsibilities for implementing the program; defines personnel and material controls; and defines the inspection and reporting requirements.

Implementation

Containment Entry

- Controls to account for the quantities and types of materials introduced into the containment.
- Limits on the types and quantities of materials, including scaffolding and tools, for a particular entry.
- Defined prohibited materials and limits on quantities of materials that may generate hydrogen when exposed to the containment environment.
- Personnel responsible for authorizing the types and quantities of material that may be introduced into containment, and approving the leaving of these materials unattended in containment.
- Controls for loose items, such as keys and pens, which could be inadvertently left in containment.
- Methods and controls for securing any items and materials left unattended in containment.

Containment Exit

- Controls for accounting for tools, equipment and other material left unattended in containment necessary for ongoing work.
- Controls for accounting of the permanent removal of materials previously introduced into the containment.
- Limits on the types and quantities of materials, including scaffolding and tools, that may be left unattended in containment during outages and power operation. Types of materials considered are tape, labels, plastic film, and paper and cloth products.
- Requirements and actions to be taken for unaccounted for material.
- Requirements for final containment cleanliness inspections.
- Record keeping requirements for entry/exit logs.

6.3.8.2 Verification of Water Sources for Long-Term Recirculation Cooling Following a LOCA

Insert the following information between the first and second paragraphs of DCD Subsection 6.3.8.2.

An assessment of the acceptability of the screen performance will be provided by performing testing and analysis of the screens. Downstream effects will be assessed to confirm the coolability of the core. The testing, analysis, and assessments will be completed prior to fuel load.

6.4 HABITABILITY SYSTEMS

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

6.4.3 SYSTEM OPERATION

Add the following information at the end of DCD Subsection 6.4.3:

STD COL 6.4-2 Generic Issue 83 addresses the importance of maintaining control room habitability following an accidental release of external toxic or radioactive material or smoke and the capability of the control room operators to safely control the reactor. Procedures and training for control room habitability are written in accordance with Section 13.5 for control room operating procedures, and Section 13.2 for operator training. The procedures and training are verified to be consistent to the intent of Generic Issue 83.

6.4.4 SYSTEM SAFETY EVALUATION

Add the following information after the second sentence of the sixth paragraph of DCD Subsection 6.4.4.

HAR SUP 6.4-1 The site does not plan to use any gas dispersants. The use of liquid dispersants is discussed in Section 10.4.

Insert the following subsections at the end of DCD Subsection 6.4.4.

6.4.4.1 Dual Unit Analysis

STD SUP 6.4-1 Credible events that could put the control room operators at risk from a dose standpoint at a single AP1000 unit have been evaluated and addressed in the DCD. The dose to the control room operators at an adjacent AP1000 unit due to a radiological release from another unit is bounded by the dose to control room operators on the affected unit. While it is possible that a unit may be downwind in an unfavorable location, the dose at the downwind unit would be bounded by what has already been evaluated for a single unit AP1000. Simultaneous accidents at multiple units at a common site are not considered to be a credible event.

6.4.4.2 Toxic Chemical Habitability Analysis

HAR COL 6.4-1 Subsection 2.2.3 determined that that there are no design basis events due to site-specific sources of hazardous materials in the vicinity of the plant that require

mitigating actions to be undertaken to eliminate or lessen the likelihood and severity of potential accidents.

6.4.7 COMBINED LICENSE INFORMATION

HAR COL 6.4-1 This COL Item is addressed in Subsection 6.4.4.2.

STD COL 6.4-2 This COL Item is addressed in Subsection 6.4.3.

6.5 FISSION PRODUCT REMOVAL AND CONTROL SYSTEMS

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

6.6 INSERVICE INSPECTION OF CLASS 2, 3, AND MC COMPONENTS

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

Add the following to DCD Section 6.6 ahead of Subsection 6.6.1 heading:

STD COL 6.6-1 The initial inservice inspection program incorporates the latest edition and addenda of the ASME Boiler and Pressure Vessel Code approved in 10 CFR 50.55a(b) on the date 12 months before initial fuel load. Inservice examination of components and system pressure tests conducted during successive 120-month inspection intervals must comply with the requirements of the latest edition and addenda of the Code incorporated by reference in 10 CFR 50.55a(b) 12 months before the start of the 120-month inspection interval (or the optional ASME Code cases listed in Regulatory Guide 1.147, that are incorporated by reference in 10 CFR 50.55a(b), subject to the limitations and modifications listed in 10 CFR 50.55a(b)).

6.6.1 COMPONENTS SUBJECT TO EXAMINATION

Add the following to the end of DCD Subsection 6.6.1:

STD COL 6.6-1 Class 2 and 3 components are included in the equipment designation list and the line designation list contained in the inservice inspection program.

6.6.2 ACCESSIBILITY

Revise the first and last sentences of the third paragraph in DCD Subsection 6.6.2 to add supplemental information as follows:

STD SUP 6.6-1 Considerable experience has been drawn on in designing, locating, and supporting Quality Group B and C (ASME Class 2 and 3) and Class MC pressure-retaining components to permit pre-service and inservice inspection required by Section XI of the ASME Code. Factors such as examination requirements, examination techniques, accessibility, component geometry, and material selections are used in establishing the designs. The inspection design goals are to eliminate uninspectable components, reduce occupational radiation exposure, reduce inspection times, allow state-of-the-art inspection systems, and enhance detection and the reliability of flaw characterization. There are no Quality Group B and C components or Class MC components, which require inservice inspection during reactor operation.

Add the following to the end of DCD Subsection 6.6.2:

STD COL 6.6-2 During the construction phase of the project, anomalies and construction issues are addressed using change control procedures. Modifications reviewed following design certification adhere to the same level of review as the certified design per 10 CFR Part 50, Appendix B as implemented by the Westinghouse Quality Management System (QMS). The QMS requires that changes to approved design documents, including field changes, are subject to the same review and approval process as the original design. This explicitly requires the field change process to follow the same level of review that was required during the design process. Accessibility and inspectability are key components of the design process.

Control of accessibility for inspectability and testing during post-design certification activities is provided via procedures for design control and plant modifications.

6.6.3 EXAMINATION TECHNIQUES AND PROCEDURES

Add the following Subsections 6.6.3.1, 6.6.3.2 and 6.6.3.3 to the end of DCD Subsection 6.6.3:

6.6.3.1 Examination Methods

Visual Examination

STD COL 6.6-1 Visual examination methods VT-1, VT-2 and VT-3 are conducted in accordance with ASME Section XI, IWA-2210. In addition, VT-2 examinations meet the requirements of IWA-5240.

Where direct visual VT-1 examinations are conducted without the use of mirrors or with other viewing aids, clearance is provided in accordance with Table IWA-2210- 1.

Surface Examination

Magnetic particle, liquid penetrant, and eddy current examination techniques are performed in accordance with ASME Section XI, IWA-2221, IWA-2222, and IWA-2223 respectively. Direct examination access for magnetic particle (MT) and liquid penetrant (PT) examination is the same as that required for direct visual (VT-1) examination (see Visual Examination), except that additional access is provided as necessary to enable physical contact with the item in order to perform the examination. Remote MT and PT generally are not appropriate as a standard examination process; however, boroscopes and mirrors can be used at close range to improve the angle of vision.

Ultrasonic Examination

Volumetric ultrasonic direct examination is performed in accordance with ASME Section XI, IWA-2232, which references mandatory Appendix I.

Alternative Examination Techniques

As provided by ASME Section XI, IWA-2240, alternative examination methods, a combination of methods, or newly developed techniques may be substituted for the methods specified for a given item in this section, provided that they are demonstrated to be equivalent or superior to the specified method. This provision allows for the use of newly developed examination methods, techniques, etc., which may result in improvements in examination reliability and reductions in personnel exposure. In accordance with 10 CFR 50.55a(b)(2)(xix), IWA-2240 as written in the 1997 Addenda of ASME Section XI must be used when applying these provisions.

6.6.3.2 Qualification of Personnel and Examination Systems for Ultrasonic Examination

Personnel performing examinations shall be qualified in accordance with ASME Section XI, Appendix VII. Ultrasonic examination systems shall be qualified in accordance with industry accepted programs for implementation of ASME Section XI, Appendix VIII.

6.6.3.3 Relief Requests

The specific areas where the applicable ASME Code requirements cannot be met are identified after the examinations are performed. Should relief requests be required, they will be developed through the regulatory process and submitted to the NRC for approval in accordance with 10 CFR 50.55a(g)(5). The relief requests include appropriate justifications and proposed alternative inspection methods.

6.6.4 INSPECTION INTERVALS

Add the following to the end of DCD Subsection 6.6.4:

STD SUP 6.6-1 Because 10 CFR 50.55a(g)(4) requires 120-month inspection intervals, Inspection Program B of IWB-2400 must be chosen. The inspection interval is divided into three periods. Period one comprises the first three years of the interval, period two comprises the next four years of the interval, and period three comprises the remaining three years of the inspection interval. The periods within

each inspection interval may be extended by as much as one year to permit inspections to be concurrent with plant outages. The adjustment of period end dates shall not alter the rules and requirements for scheduling inspection intervals. It is intended that inservice examinations be performed during normal plant outages, such as refueling shutdown or maintenance shutdowns occurring during the inspection interval.

6.6.6 EVALUATION OF EXAMINATION RESULTS

Add the following new paragraph at the end of DCD Subsection 6.6.6:

STD COL 6.6-1 Components containing flaws or relevant conditions and accepted for continued service in accordance with the requirements of IWC-3122.3 or IWC-3132.3 for Class 2 components, IWD-3000 for Class 3 components, IWE-3122.3 for Class MC components, or IWF-3112.2 or IWF-3122.2 for component supports, are subjected to successive period examinations in accordance with the requirements of IWC-2420, IWD-2420, IWE-2420, or IWF-2420, respectively. Examinations that reveal flaws or relevant conditions exceeding Table IWC-3410-1, IWD-3000, IWE-3000, or IWF-3400 acceptance standards are extended to include additional examinations in accordance with the requirements of IWC-2430, IWD-2430, or IWF-2430, respectively.

6.6.9 COMBINED LICENSE INFORMATION ITEMS

6.6.9.1 Inspection Programs

STD COL 6.6-1 This COL Item is addressed in Section 6.6 introduction, and in Subsections 6.6.1, 6.6.3.1, 6.6.3.2, 6.6.3.3, 6.6.4, and 6.6.6.

6.6.9.2 Construction Activities

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

APPENDIX 6A
FISSION PRODUCT DISTRIBUTION IN THE AP1000 POST-DESIGN BASIS ACCIDENT CONTAINMENT ATMOSPHERE

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