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.

During the design and construction phase the coatings program associated with selection, procurement and application of safety related coatings is performed to applicable quality standards. Regulatory Guide 1.54 and ASTM D5144 (Reference 201) form the basis for the coating program. During the operations phase, the coatings program is administratively controlled in accordance with the quality assurance program implemented to satisfy 10 CFR Part 50, Appendix B, and 10 CFR Part 52 requirements. The coatings program provides direction for the procurement, application, and monitoring of safety related coating systems.

Coating system monitoring requirements for the containment coating systems are based on ASTM D5163 (Reference 202), "Standard Guide for Establishing Procedures to Monitor the Performance of Coating Service Level I Coating Systems in an Operating Nuclear Power Plant," and ASTM D7167 (Reference 203), "Standard Guide for Establishing Procedures to Monitor the Performance of Safety-Related Coating Service Level III Lining Systems in an

Operating Nuclear Power Plant." Any anomalies identified during coating monitoring are resolved in accordance with applicable quality assurance requirements.

Add the following after the third paragraph of the subsection titled "Service Level II Coatings" within DCD Subsection 6.1.2.1.6.

Coating system inspection and monitoring requirements for the Service Level II coatings used inside containment will be performed in accordance with a program based on ASTM D5144 (Reference 201), "Standard Guide for Use of Protective Coating Standards in Nuclear Power Plants" and the guidance of ASTM D5163 (Reference 202), "Standard Guide for Establishing Procedures to Monitor the Performance of Coating Service Level I Coating Systems in an Operating Nuclear Power Plant." Any anomalies identified during coating monitoring are resolved in accordance with applicable quality requirements.

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.

The following information supplements the information provided in DCD Subsection 6.1.4.

6.1.4 REFERENCES

201. ASTM 5144-08, "Standard Guide for Use of Protective Coating Standards in Nuclear Power Plants"

202. ASTM D5163-05a, "Standard Guide for Establishing Procedures to Monitor the Performance of Coating Service Level I Coating Systems in an Operating Nuclear Power Plant"

203. ASTM D7167-05, "Standard Guide for Establishing Procedures to Monitor the Performance of Safety-Related Coating Service Level III Lining Systems in an Operating Nuclear Power Plant"

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.

6.2.5.1.2 Power Generation Design Basis

Replace the second sentence of DCD Subsection 6.2.5.1.2 with the following sentence.

BLN DEP 2.3-1 The specified maximum allowable containment leak rate is 0.09 weight percent of the containment air mass per day at the calculated peak accident pressure, Pa, identified in Subsection 6.2.1.

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 left in containment following personnel entry and exits. The program is consistent with the containment cleanliness program limits discussed in DCD Subsection 6.3.8.1. 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/Exit

- 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, to ensure adequate accountability controls. This may be accomplished by the work management process. Storage of aluminum is prohibited without engineering authorization. Cardboard boxes or miscellaneous packing material is not brought into containment without approval.
- If entries are made at power, prohibited materials and limits on quantities of materials that may generate hydrogen are established.
- 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.
- Administrative controls for accounting for tools, equipment and other material are established.
- Administrative 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 consistent with the design bases provided in DCD Subsection 6.3.8.1.
- Record keeping requirements for entry/exit logs.

Housekeeping

Housekeeping procedures require that work areas be maintained in a clean and orderly fashion during work activities and returned to original conditions (or better) upon completion of work.

Sampling Program

A sampling program is implemented consistent with NEI Guidance Report 04-07, "Pressurized Water Reactor Sump Performance Evaluation Methodology" as supplemented by the NRC in the "Safety Evaluation by The Office of Nuclear Reactor Regulation Related to NRC Generic Letter 2004-02, Nuclear Energy Institute Guidance Report (Proposed Document Number NEI 04-07), 'Pressurized Water Reactor Sump Performance Evaluation Methodology.'" Latent debris sampling is implemented before startup. The sampling is conducted after containment exit cleanliness inspections to provide reasonable assurance that the plant latent debris design bases are met. Sampling frequency and scope may be adjusted based on sampling results. Results are evaluated post-start up and any nonconforming results will be addressed in the Corrective Action Program.

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

Insert the following information at the end of the eighth paragraph of DCD Subsection 6.4.4.

STD SUP 6.4-2
BLN COL 6.4-1
STD COL 6.4-1

Table 6.4-202 provides additional details regarding the evaluated onsite chemicals.

Insert the following subsection 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.

Add the following subsection after the Subsection 6.4.4.1, at the end of DCD Subsection 6.4.4.

6.4.4.2 Toxic Chemical Habitability Analysis

BLN COL 6.4-1 Regulatory Guide 1.78 establishes the Occupational Safety and Health Administration (OSHA) National Institute for Occupational Safety and Health (NIOSH) Immediately Dangerous to Life and Health (IDLH) guidelines for 30 minute exposure as the required screening criteria for airborne hazardous chemicals. In accordance with Regulatory Guide 1.78, the NIOSH IDLH values are utilized to screen chemicals and to evaluate concentrations of hazardous chemicals to determine their effect on control room habitability.

Regulatory Guide 1.78 specifies the use of HABITV1.1 software for evaluating control room habitability. The HABITV1.1 software consists of modules that evaluate radiological and toxic chemical transport and exposure. The EXTRAN module of HABITV1.1 is utilized to model toxic chemical transport from the selected release point to the HVAC intake. The CHEM module is utilized to model chemical exposure to control room personnel, based upon EXTRAN output and control room design parameters.

Subsection 2.2.3.1.3.3 identifies ethyl alcohol, nitrogen, anhydrous ammonia, propylene oxide, chlorine, and hydrogen fluoride as potential threats to control room habitability.

Ethyl alcohol, or ethanol, is shipped by barges in a liquid state. Therefore, the mechanism of released plume is caused only by evaporation. The initial mass of the ethyl alcohol released is assumed to be 5,140,000 lbs (2,331,465 kg). The closest approach to the site intake is 0.65 miles (1046 meters). Analysis of ethyl alcohol in the EXTRAN module of HABIT V1.1 shows that the maximum ethyl alcohol concentration at the control room HVAC intake does not approach the ethyl alcohol IDLH value of 3,300 ppm. The maximum ethyl alcohol concentration at the control room HVAC intake is 1337 ppm and thus further analysis for ethyl alcohol is not required. Release of ethyl alcohol does not pose a credible threat to the control room operators.

Nitrogen is transported in a compressed liquid state by trucks at a mass of up to 58,500 lbs, based on the total weight of truck and cargo limit on interstate highways of 80,000 lb (27,210 kg). Storage temperature is assumed equal to ambient temperature as a conservative simplification. Greater storage temperature promotes faster initial flashing. The closest approach to the site intake is 1.25 miles (2,011 m). While nitrogen is not a toxic substance, and there is no IDLH defined for it, it can be a simple asphyxiant by displacing oxygen. The normal atmospheric chemistry is 78.1% N2, 20.9% O2 and 1% of other elements. A safe level of O2 is 19.5%. The limit for excess nitrogen is 67,000 ppm. The analysis shows that the maximum nitrogen concentration at the control room HVAC intake does not approach the derived concentration of 67,000 ppm. Analysis of nitrogen in the EXTRAN module of HABIT V1.1 shows that the maximum nitrogen concentration at the control room HVAC intake is 4028 ppm and thus further analysis for nitrogen is not required. Release of nitrogen does not pose a credible threat to the control room operators.

Anhydrous ammonia is transported by rail as a compressed liquid in 90 ton (81,650 kg) pressurized rail cars. The closest approach to the control room HVAC intake is 2.5 miles (4,023 meters). Analysis of anhydrous ammonia in the EXTRAN module of HABIT V1.1 shows that the maximum anhydrous ammonia concentration at the control room HVAC intake does not approach anhydrous ammonia IDLH value of 300 ppm. The maximum anhydrous ammonia concentration at the control room HVAC intake is 110 ppm and thus further analysis for anhydrous ammonia is not required. Release of anhydrous ammonia does not pose a credible threat to the control room operators.

Propylene oxide is transported by rail as compressed liquid in 90 ton (81,650 kg) pressurized rail cars. The closest approach to the site intake is 2.5 miles (4,023 meters). Analysis of propylene oxide in the EXTRAN module of HABIT V1.1 shows that the maximum propylene oxide concentration at the control room HVAC intake does not approach the propylene oxide IDLH value of 400 ppm. The maximum propylene oxide concentration at the control room HVAC intake is 111 ppm and thus further analysis for anhydrous ammonia is not required. Release of propylene oxide does not pose a credible threat to the control room operators.

Chlorine is transported by rail as a liquid under pressure. Chlorine is transported in a compressed liquid state in 90 ton (81,650 kg) pressurized rail cars. The closest approach to the control room HVAC intake is 2.5 miles (4,023 meters). An analysis is performed using EXTRAN and CHEM modules of HABIT V1.1 in order to determine the worst case scenario. It is noted that the residence time of the plume at the intake is greater for lower wind speeds, and the highest control room concentrations are not associated with the highest exterior concentrations. Analysis of chlorine in the EXTRAN module of HABIT V1.1 shows that the maximum chlorine concentration at the control room intake exceeds the IDLH for chlorine. Analysis of chlorine in the CHEM module of HABIT V1.1 shows that the maximum control room chlorine concentration exceeds the IDLH levels. The chlorine concentrations at the control room HVAC intake and inside the control room are shown on Figure 6.4-201.

Chlorine detectors are not installed at Bellefonte Nuclear Plant, Units 3 and 4 (BLN) for this event. Chlorine can be detected by the human senses at levels that are not immediately dangerous to life and health (approximately 0.31 ppm).

The analysis shows that for the case resulting in the most rapid rise in the chlorine concentration inside the control room, it takes approximately ten minutes after the event initiation before the chlorine concentration reaches the human detection threshold of 0.31 ppm. The chlorine concentration inside the control room would reach the IDLH value of 10 ppm at approximately 16 minutes after the event initiation, or approximately 6 minutes after human detection.

Hydrogen fluoride is transported by rail in its anhydrous state as a pressurized and refrigerated liquid. Storage temperature is assumed equal to ambient temperature as a conservative simplification. Greater storage temperature promotes faster initial flashing. The closest approach to the control room intake is 2.5 miles (4,023 meters). An analysis is performed using EXTRAN and CHEM modules of HABIT V1.1 and HABIT V1.1 methodology in order to determine the worst case scenario. As is in the analysis of chlorine, it is noted that the residence time of the plume at the intake is greater for lower wind speeds, and the highest control room concentrations are not associated with the highest exterior concentrations. Analysis of hydrogen fluoride in the EXTRAN module of HABIT V1.1 shows that the maximum hydrogen fluoride concentration at the control room HVAC intake exceeds the IDLH for hydrogen fluoride. Analysis of hydrogen fluoride in the CHEM module of HABIT V1.1 shows that the maximum concentration of hydrogen fluoride inside the control room exceeds the IDLH levels. The hydrogen fluoride concentrations at the control room HVAC intake and inside the control room are shown on Figure 6.4-202.

Hydrogen fluoride detectors are not installed at Bellefonte Nuclear Plant, Units 3 and 4 (BLN) for this event. Hydrogen fluoride can be detected by the human senses at levels that are not immediately dangerous to life and health (approximately 0.04 ppm).

The sensitivity study shows that for the most rapid hydrogen fluoride concentration build up inside the control room it takes approximately five to six minutes after the event takes place before hydrogen fluoride concentration at the control room HVAC intake reaches elevated levels. Approximately one additional minute or less passes before the hydrogen fluoride concentration inside the control room reaches the human detection threshold of 0.04 ppm. Hydrogen fluoride concentration inside the control room would reach the IDLH value of 30 PPM at approximately 27 minutes, or approximately 15.75 minutes after human detection.

As indicated in Regulatory Guide 1.78, it is expected that a control room operator will take protective measures within two minutes after detection. As shown in Figures 6.4-201 and 6.4-202, it takes significantly longer than two minutes for chlorine or for the hydrogen fluoride concentrations inside the control room to rise from the human detection threshold to the IDLH value. For chlorine the human detection threshold is 0.31 ppm and the IDLH value is 10 ppm. For hydrogen fluoride the human detection threshold is 0.04 ppm and the IDLH value is 30 ppm. The control room emergency habitability system (VES) is described in DCD Section 6.4. Upon manual actuation, VES isolates and pressurizes the control room envelope to 1/8 inch of water column (positive).

Procedures require that control room personnel manually activate VES in the event of a hydrogen fluoride or chlorine gas release that affects the control room environment. This system is designed to pressurize the control room for 72 hours once activated. VES availability and pressurization capability is required by Technical Specification 3.7.6.

A combined operator manual action and VES response time of two minutes is conservatively used for activation, isolation, and pressurization of the control room environment after detecting the presence of hydrogen fluoride or chlorine gas. This time allows the operators to activate VES and protect the operations staff from IDLH limits. About 11 minutes after the hydrogen fluoride or chlorine gas cloud reaches the control room inlet, the control room is isolated. At this point, a concentration of less than 3 ppm of hydrogen fluoride or less than 5 ppm of chlorine is present in the control room envelope.

With VES in operation the only potential toxic inflow to the MCR envelope is the inleakage total of 15 cfm. This inleakage results in a slight increase in toxic gas concentration in the interior of the MCR, but remains below the chemical IDLH peak concentration criteria. For chlorine, the allowed operator action time decreases from approximately 6 minutes to approximately 5.75 minutes with odor detection of 0.31 ppm and for hydrogen fluoride, the allowed operator action time decreases from approximately 15.75 minutes to approximately 15.5 minutes. Allowed operator action time is greater than 2 minutes and therefore satisfies Regulatory Guide (RG) 1.78 guidance for protecting the control room operator from toxic gas releases.

To support FSAR Chapter 15 accident scenarios respirators and protective clothing are available in the control room for 11 persons. This equipment may be used by Operations personnel as required to protect the health and safety of the public in shutting down the reactor and maintaining it in a safe shutdown condition during any emergency scenario. Operating procedures specify removal of nonessential personnel from the control room upon declaration of a radiological event.

Due to the concentration of hydrogen fluoride or chlorine postulated to exist outside the control room envelope, non-essential control room personnel are not evacuated during this short term event. Figures 6.4-201 and 6.4-202 indicate that hydrogen fluoride and chlorine clouds begin to dissipate at approximately 18 minutes into the event for the modeled conditions. Complete dissipation to pre-event conditions is anticipated within 4 hours for both chemicals when normal control room HVAC can be restored, rapidly dropping the remaining elevated levels of hydrogen fluoride or chlorine gas in the control room to non-detectable levels. The VES can provide sufficient air for numerous personnel for the duration of this short term event.

Arrangements with Federal, State and Local agencies for the prompt notification of BLN Shift Operations in the event of a toxic gas release, with periodic status updates for releases within 5 miles of the facility, are established. Preplanned actions are established for toxic gas releases.

Input values for the CHEM analysis are summarized in Table 6.4-201.

6.4.7 COMBINED LICENSE INFORMATION

BLN 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.

BLN COL 6.4-1

TABLE 6.4-201 (Sheet 1 of 2)
INPUT VALUES USED IN HABIT V1.1 ANALYSIS FOR TOXIC CHEMICALS

Control Room Parameter	Value	Unit
Control Room Volume	1,011	m^3
Occupancy Factor	1	--
Spill Size:		
Barge	2,331,465	kg
Rail	81,650	kg
Truck	27,210	kg
Wind Direction	Toward the plant	--
Spill to CR Intake Distance:		
Barge	1,046	m
Rail	4,023	m
Truck	2,011	m
Normal Mode Parameters		
Intake Flow	0.31	m^3/s
Meteorological Condition determining worst care scenario		
Ethyl alcohol		
Stability Class	E	--
Wind Speed	4	m/s
Nitrogen		
Stability Class	E	--
Wind Speed	8	m/s

BLN COL 6.4-1

TABLE 6.4-201 (Sheet 2 of 2)
INPUT VALUES USED IN HABIT V1.1 ANALYSIS FOR TOXIC CHEMICALS

Control Room Parameter	Value	Unit
Anhydrous ammonia		
Stability Class	F	--
Wind Speed	4	m/s
Propylene oxide		
Stability Class	E	--
Wind Speed	8	m/s
Chlorine		
Stability Class	E	--
Wind Speed	5	m/s
Hydrogen fluoride		
Stability Class	E	--
Wind Speed	4	m/s

TABLE 6.4-202 (Sheet 1 of 2)
ONSITE CHEMICALS(1)

	Material	State	Quantity	Distance to MCR Intake	Location
STD SUP 6.4-2	Hydrogen	Gas	500 ft^3	375 ft	Gas storage
STD SUP 6.4-2	Hydrogen	Liquid	2000 gal	375 ft	Gas storage
STD COL 6.4-1	Nitrogen	Liquid	1500 gal	328 ft	Gas storage
STD COL 6.4-1	CO_2	Liquid	6 tons	328 ft	Gas storage
STD SUP 6.4-2	Oxygen Scavenger [Hydrazine]	Liquid	1600 gal	245 ft	Turbine building
STD SUP 6.4-2	pH Addition [Morpholine]	Liquid	1600 gal	245 ft	Turbine building
BLN COL 6.4-1	pH Addition [Sulfuric Acid]	Liquid	85 gal	2000 ft	CWS area(2)
STD SUP 6.4-2	Sulfuric Acid	Liquid	20,000 gal	328 ft	Turbine building
BLN COL 6.4-1	Sulfuric Acid	[see pH Addition above]			CWS area(2)
STD SUP 6.4-2	Sodium Hydroxide	Liquid	20,000 gal	328 ft	Turbine building
BLN COL 6.4-1	Sodium Hydroxide	Not used	Not used	Not used	CWS area(2)
BLN COL 6.4-1	Dispersant [Polymeric silt dispersant]	Liquid	6000 gal	328 ft	Turbine building
BLN COL 6.4-1	Dispersant [Polymeric silt dispersant]	Liquid	10,000 gal	2000 ft	CWS area(2)
STD SUP 6.4-2	Fuel Oil	Liquid	200,000 gal	328 ft	DG fuel oil storage tank; DG building; Annex building
STD SUP 6.4-2	Corrosion Inhibitor [Sodium Molybdate (molybdic acid, disodium salt)]	Liquid	5000 gal(3)	328 ft	Turbine building
BLN COL 6.4-1	Corrosion Inhibitor [Ortho polyphosphate]	Liquid	1450 gal	2000 ft	CWS area(2)
STD SUP 6.4-2	Scale Inhibitor [Sodium Hexametaphosphate]	Liquid	5000 gal(3)	328 ft	Turbine building

TABLE 6.4-202 (Sheet 2 of 2)
ONSITE CHEMICALS[1]

	Material	State	Quantity	Distance to MCR Intake	Location
BLN COL 6.4-1	Scale Inhibitor [Phosphonate]	Liquid	1050 gal	2000 ft	CWS area[2]
STD SUP 6.4-2	Biocide/Disinfectant [Sodium hypochlorite]	Liquid	10,000 gal	378 ft	Turbine building
BLN COL 6.4-1	Biocide/Disinfectant [Sodium hypochlorite]	Liquid	5000 gal	2000 ft	CWS area[2]
STD COL 6.4-1	Algaecide [Ammonium comp polyethoxylate]	Liquid	800 gal	378 ft	Turbine building
BLN COL 6.4-1	Algaecide [Quaternary amine]	Liquid	3500 gal	2000 ft	CWS area[2]

1) This table supplements DCD Table 6.4-1. Quantities are by largest container content for the specified location per unit. Quantities and distances are bounding calculation values and not actual amounts and distances.

2) The CWS area is in the vicinity of the cooling tower and greater than 2000 ft from the control room HVAC intake.

3) Corrosion inhibitor and scale inhibitor are mixed together in a 10,000 gal tank.

6.5 FISSION PRODUCT REMOVAL AND CONTROL SYSTEMS

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

BLN DEP 2.3-1

TABLE 6.5-201
BLN PRIMARY CONTAINMENT OPERATION FOLLOWING A DESIGN BASIS ACCIDENT

BLN Design basis containment leak rate	0.09% containment air weight per day

Note: This table supplements DCD Table 6.5.3-1.

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(a)(3) or 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 COL 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.