CHAPTER 9

AUXILIARY SYSTEMS

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CHAPTER 9

AUXILIARY SYSTEMS

9.1 FUEL STORAGE AND HANDLING

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

9.1.3.7 Instrumentation Requirements

Add the following paragraph after the first paragraph of DCD Subsection 9.1.3.7.D.

WLS SUP 9.1-1 All three safety-related spent fuel pool level instruments and associated instrument tubing lines are located below the fuel handling area operating deck and the cask washdown pit. This location provides protection from missiles that may result from damage to the structure over the spent fuel pool. The SFP level instruments associated with PMS divisions A and C are physically separated from the SFP level instrument associated with PMS division B. The safety-related spent fuel pool level instruments measure the water level from the top of the spent fuel pool to the top of the fuel racks. These instruments are conservatively calibrated at a reference temperature suitable for normal spent fuel pool operation on a regular basis and accuracy is not affected by power interruptions.

Add the following subsection after DCD Subsection 9.1.4.3.7:

9.1.4.3.8 Radiation Monitoring

STD COL 9.1-6 Plant procedures require that an operating radiation monitor is mounted on any machine when it is handling fuel. Refer to DCD Subsection 11.5.6.4 for a discussion of augmented radiation monitoring during fuel handling operations.

9.1.4.4 Inspection and Testing Requirements

Add the following paragraph at the end of DCD Subsection 9.1.4.4:

STD COL 9.1-5 The above requirements are part of the plant inspection program for the light load handling system, which is implemented through procedures. In addition to the above inspections, the procedures reflect the manufacturers' recommendations for inspection.

The light load handling program, including system inspections, is implemented prior to receipt of fuel onsite.

9.1.5 OVERHEAD HEAVY LOAD HANDLING SYSTEMS

STD SUP 9.1-2 Add the following at the end of DCD Subsection 9.1.5.

The heavy loads handling program is based on NUREG-0612 and vendor recommendations. The key elements of the program are:

- Listing of heavy loads to be lifted during operation of the plant. This list will be provided once magnitudes have been accurately formalized but no later than three (3) months prior to fuel receipt.
- Listing of heavy load handling equipment as outlined in DCD Table 9.1-5 and whose characteristics are described in Subsection 9.1.5 of the DCD.
- Heavy load handling safe load paths and routing plans including descriptions of interlocks, (automatic and manual) safety devices and procedures to assure safe load path compliance. Anticipated heavy load movements are analyzed and safe load paths defined. Safe load path considerations are based on comparison with analyzed cases, previously defined safe movement areas, and previously defined restricted areas. The analyses are in accordance with Appendix A of NUREG-0612.
- Heavy load handling equipment maintenance manuals and procedures as described in Subsection 9.1.5.5.
- Heavy load handling equipment inspection and test plans, as outlined in Subsections 9.1.5.4 and 9.1.5.5.
- Heavy load handling personnel qualifications, training, and control procedures as described in Subsection 9.1.5.5.
- QA programs to monitor, implement, and ensure compliance with the heavy load-handling procedures as described in Subsection 9.1.5.5.

A quality assurance program, consistent with Paragraph 10 of NUREG-0554, is established and implemented for the procurement, design, fabrication, installation, inspection, testing, and operation of the crane. The program, as a minimum, includes the following elements:

- Design and procurement document control
- Instructions, procedures, and drawings

- Control of purchased material, equipment, and services
- Inspection
- Testing and test control
- Non-conforming items
- Corrective action
- Records

9.1.5.3 Safety Evaluation

Add the following information at the end of DCD Subsection 9.1.5.3.

STD SUP 9.1-1 There are no planned heavy load lifts outside those already described in the DCD. However, over the plant life there may be occasions when heavy loads not presently addressed need to be lifted (i.e. in support of special maintenance/ repairs). For these occasions, special procedures are generated that address, as a minimum, the following:

- The special procedure complies with NUREG-0612.
- A safe load path is determined. Mechanical and/or electrical stops are incorporated in the hardware design to prohibit travel outside the safe load path. Maximum lift heights are specified to minimize the impact of an unlikely load drop.
- Where a load drop could occur over irradiated fuel or safe shutdown equipment, the consequence of the load drop is evaluated. If the evaluation concludes that the load drop is not acceptable, an alternate path is evaluated, or the lift is prohibited.
- The lifting equipment is in compliance with applicable ANSI standards and has factors of safety that meet or exceed the requirements of the applicable standards.
- Operator training is provided prior to actual lifts.
- Inspection of crane components is performed in accordance with the manufacturer recommendations.

STD COL 9.1-6 Plant procedures require that an operating radiation monitor is mounted on any crane when it is handling fuel. Refer to DCD Subsection 11.5.6.4 for a discussion of augmented radiation monitoring during fuel handling operations.

9.1.5.4 Inservice Inspection/Inservice Testing

Add the following paragraph at the end of DCD Subsection 9.1.5.4.

STD COL 9.1-5 The above requirements are part of the plant inspection program for the overhead heavy load handling system, which is implemented through procedures. In addition to the above inspections, the procedures reflect the manufacturers' recommendations for inspection and the NUREG-0612 recommendations.

The overhead heavy load handling equipment inservice inspection procedures, as a minimum, address the following:

- Identification of components to be examined
- Examination techniques
- Inspection intervals
- Examination categories and requirements
- Evaluation of examination results

The overhead heavy load handling program, including system inspections, is implemented prior to receipt of fuel onsite.

9.1.5.5 Load Handling Procedures

STD SUP 9.1-3 Load handling operations for heavy loads that are handled over, could be handled over or are in the proximity of irradiated fuel or safe shutdown equipment are controlled by written procedures. As a minimum, procedures are used for handling loads with the spent fuel cask bridge and polar cranes, and for those loads listed in Table 3.1-1 of NUREG-0612. The procedures include and address the following elements:

- The specific equipment required to handle load (e.g., special lifting devices, slings, shackles, turnbuckles, clevises, load cells, etc.).

- Qualification and training of crane operators and riggers in accordance with chapter 2-3.1 of ASME B30.2, "Overhead and Gantry Cranes."
- The requirements for inspection and acceptance criteria prior to load movement.
- The defined safe load path and provisions to provide visual reference to the crane operator and/or signal person of the safe load path envelope.
- Specific steps and proper sequence to be followed for handling load.
- Precautions, limitations, prerequisites, and/or initial conditions associated with movement of heavy loads.
- The testing, inspection, acceptance criteria and maintenance of overhead heavy load handling systems. These procedures are in accordance with the manufacturer recommendations and are consistent with ANSI B30.2 or with other appropriate and applicable ANSI standards.

Safe load paths are defined for movement of heavy loads to minimize the potential for a load drop on irradiated fuel in the reactor vessel, spent fuel pool or safe shutdown equipment. Paths are defined clearly in procedures and equipment layout drawings. Equipment layout drawings showing the safe load path are used to define safe load paths in load handling procedures. Deviation from defined safe load paths requires a written alternative procedure approved by a plant safety review committee.

9.1.6 COMBINED LICENSE INFORMATION FOR FUEL STORAGE AND HANDLING

STD COL 9.1-5 This COL Item is addressed in Subsections 9.1.4.4 and 9.1.5.4.

STD COL 9.1-6 This COL Item is addressed in Subsections 9.1.4.3.8 and 9.1.5.3.

STD COL 9.1-7 A spent fuel rack Metamic coupon monitoring program is to be implemented when the plant is placed into commercial operation. This program includes tests to monitor bubbling, blistering, cracking, or flaking; and a test to monitor for corrosion, such as weight loss measurements and/or visual examination. The program will also include tests to monitor changes in physical properties of the absorber material, including neutron attenuation and thickness measurements.

The program will include the methodology and acceptance criteria for the tests listed and provide corrective action requirements based on vendor recommendations and industry operating experience. The program will be implemented through plant procedures.

Metamic Monitoring Acceptance Criteria:

- Verification of continued presence of the boron is performed by neutron attenuation measurement. A decrease of no more than 5% in Boron-10 content, as determined by neutron attenuation, is acceptable. This is equivalent to a requirement for no loss in boron within the accuracy of the measurement.

- Coupons are monitored for unacceptable swelling by measuring coupon thickness. An increase in coupon thickness at any point of no more than 10% of the initial thickness at that point is acceptable.

Changes in excess of either of the above two acceptance criteria are investigated under the corrective action program and may require early retrieval and measurement of one or more of the remaining coupons to provide validation that the indicated changes are real. If the deviation is determined to be real, an engineering evaluation is performed to identify further testing or any corrective action that may be necessary.

Additional parameters are examined for early indications of the potential onset of Metamic degradation that would suggest a need for further attention and possibly a change in the coupon withdrawal schedule. These include visual inspection for surface pitting, blistering, cracking, corrosion or edge deterioration, or unaccountable weight loss in excess of the measurement accuracy.

9.2 WATER SYSTEMS

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

9.2.1.2.2 Component Description

WLS SUP 9.2-2 Add the following paragraph at the end of DCD Subsection 9.2.1.2.2, Component Description, Cooling Tower Subsection.

The SWS Cooling Tower is evaluated for potential impacts from interference and air restriction effects due to yard equipment layout and tower operation in an adjacent unit. Based on unit spacing, yard equipment layout, and the margins inherent in the performance requirements and design conditions of the towers, no adverse impacts were determined.

9.2.5.2.1 General Description

Replace the first and third sentences of the second paragraph of DCD Subsection 9.2.5.2.1 with the following information.

WLS COL 9.2-1 The source of water for the potable water system is the Draytonville Water District. The potable water system meets or exceeds the pressure, capacity, and quality requirements in DCD Subsection 9.2.5.

9.2.5.3 System Operation

Replace the first paragraph of DCD Subsection 9.2.5.3 with the following information.

WLS COL 9.2-1 The municipal water supply system provides filtered and disinfected water to the potable water distribution system. The potable water system maintains the required pressure throughout the water distribution system.

9.2.6.1.1 Safety Design Basis

Revise the first sentence of the first paragraph of DCD Subsection 9.2.6.1.1 to read as follows:

WLS DEP 6.4-1 The sanitary drainage system isolates the SDS vent penetration in the main control room boundary on High-2 particulate or iodine concentrations in the main control room air supply or on extended loss of ac power to support operation of the main control room emergency habitability system as described in Section 6.4.

9.2.6.2.1 General Description

Replace the 3rd paragraph of DCD Subsection 9.2.6.2.1 with the following information.

WLS SUP 9.2-1 The SDS collects sanitary waste from plant restrooms and locker room facilities in the turbine building, auxiliary building, and annex building, and carries this waste off-site to the Gaffney Board of Public Works treatment plant where it is processed.

9.2.8 TURBINE BUILDING CLOSED COOLING WATER SYSTEM

WLS CDI The turbine building closed cooling water system (TCS) provides chemically treated, demineralized cooling water for the removal of heat from nonsafety-related heat exchangers in the turbine building and rejects the heat to either the circulating water system (CWS) or the RWS.

9.2.8.1 Design Basis

9.2.8.1.1 Safety Design Basis

DCD The turbine building closed cooling water system has no safety-related function and therefore has no nuclear safety design basis.

9.2.8.1.2 Power Generation Design Basis

The turbine building closed cooling water system provides corrosion-inhibited, demineralized cooling water to the equipment shown in DCD Table 9.2.8-1 during normal plant operation.

WLS CDI During power operation, the TCS provides a continuous supply of cooling water to turbine building equipment at a temperature of 105°F or less assuming a circulating water or raw water temperature of 100°F or less.

DCD The cooling water is treated with a corrosion inhibitor and uses demineralized water for makeup. The system is equipped with a chemical addition tank to add chemicals to the system.

WLS CDI The heat sink for the TCS is the CWS or RWS. The heat is transferred to the circulating water or raw water through plate type heat exchangers which are components of the TCS.

DCD A surge tank is sized to accommodate thermal expansion and contraction of the fluid due to temperature changes in the system.

One of the turbine building closed cooling system pumps or heat exchangers may be unavailable for operation or isolated for maintenance without impairing the function of the system.

The turbine building closed cooling water pumps are provided ac power from the 6900V switchgear bus. The pumps are not required during a loss of normal ac power.

9.2.8.2 System Description

9.2.8.2.1 General Description

WLS CDI Classification of equipment and components is given in Section 3.2. The system consists of two 100-percent capacity pumps, three 50-percent capacity heat exchangers (connected in parallel), one surge tank, one chemical addition tank, and associated piping, valves, controls, and instrumentation. Heat is removed from the TCS by the CWS via the heat exchangers. If the CWS is not in operation, the TCS can be aligned to reject heat to the RWS.

DCD The pumps take suction from a single return header. Either of the two pumps can operate in conjunction with any two of the three heat exchangers. Discharge flows from the heat exchangers combine into a single supply header. Branch lines then distribute the cooling water to the various coolers in the turbine building. The flow rates to the individual coolers are controlled either by flow restricting orifices or by control valves, according to the requirements of the cooled systems. Individual coolers can be locally isolated, where required, to permit maintenance of the cooler while supplying the remaining components with cooling water. A bypass line with a manual valve is provided around the turbine building closed cooling water system heat exchangers to help avoid overcooling of components during startup/low-load conditions or cold weather operation.

The system is kept full of demineralized water by a surge tank which is located at the highest point in the system. The surge tank connects to the system return header upstream of the pumps. The surge tank accommodates thermal expansion and contraction of cooling water resulting from temperature changes in the system. It also accommodates minor leakage into or out of the system. Water makeup to the surge tank, for initial system filling or to accommodate leakage from the system, is provided by the demineralized water transfer and storage system. The surge tank is vented to the atmosphere.

A line from the pump discharge header back to the pump suction header contains valves and a chemical addition tank to facilitate mixing chemicals into the closed loop system to inhibit corrosion in piping and components.

A turbine building closed cooling water sample is periodically taken and analyzed to verify that water quality is maintained.

9.2.8.2.2 Component Description

Surge Tank

A surge tank accommodates changes in the cooling water volume due to changes in operating temperature. The tank also temporarily accommodates leakage into or out of the system. The tank is constructed of carbon steel.

Chemical Addition Tank

The chemical addition tank is constructed of carbon steel. The tank is normally isolated from the system and is provided with a hinged closure for addition of chemicals.

Pumps

Two pumps are provided. Either pump provides the pumping capacity for circulation of cooling water throughout the system. The pumps are single stage, horizontal, centrifugal pumps, are constructed of carbon steel, and have flanged suction and discharge nozzles. Each pump is driven by an ac powered induction motor.

Heat Exchangers

Three heat exchangers are arranged in a parallel configuration. Two of the heat exchangers are in use during normal power operation and turbine building closed cooling water flow divides between them.

WLS CDI The heat exchangers are plate type heat exchangers. TCS circulates through one side of the heat exchangers while circulating water or raw water flows through the other side. During system operation, the turbine building closed cooling water in the heat exchangers is maintained at a higher pressure than the circulating water or raw water so leakage of circulating water or raw water into the closed cooling water system does not occur. The heat exchangers are constructed of titanium plates with a carbon steel frame.

Valves

DCD Manual isolation valves are provided upstream and downstream of each pump. The pump isolation valves are normally open but may be closed to isolate the non-operating pump and allow maintenance during system operation. Manual isolation valves are provided upstream and downstream of each turbine building closed cooling water heat exchanger. One heat exchanger is isolated from system flow during normal power operation. A manual bypass valve can be opened to bypass flow around the turbine building closed cooling water heat exchanger when necessary to avoid low cooling water supply temperatures.

Flow control valves are provided to restrict or shut off cooling water flow to those cooled components whose function could be impaired by overcooling. The flow control valves are air operated and fail open upon loss of control air or electrical power. An air operated valve is provided to control demineralized makeup water to the surge tank for system filling and for accommodating leakage from the system. The makeup valve fails closed upon loss of control air or electrical power.

A TCS heat exchanger can be taken out of service by closing the inlet isolation valve. Water chemistry in the isolated heat exchanger train is maintained by a continuous flow of circulating water through a small bypass valve around the inlet isolation valve.

Backwashable strainers are provided upstream of each TCS heat exchanger. They are actuated by a timer and have a backup starting sequence initiated by a high differential pressure across each individual strainer. The backwash can be manually activated.

Piping

System piping is made of carbon steel. Piping joints and connections are welded, except where flanged connections are used for accessibility and maintenance of components. Nonmetallic piping may also be used.

9.2.8.2.3 System Operation

The turbine building closed cooling water system operates during normal power operation. The system does not operate with a loss of normal ac power.

Startup

WLS CDI

The TCS is placed in operation during the plant startup sequence after cooling water flow from the CWS, or RWS when applicable, is established but prior to the operation of systems that require turbine building closed cooling water flow. The system is filled by the demineralized water transfer and storage system (DWS) through a fill line to the surge tank. The system is placed in operation by starting one of the pumps.

DCD

Normal Operation

During normal operation, one turbine building closed cooling water system pump and two heat exchangers provide cooling to the components listed in DCD Table 9.2.8-1. The other pump is on standby and aligned to start automatically upon low discharge header pressure.

During normal operation, leakage from the system will be replaced by makeup from the demineralized water transfer and storage system through the automatic makeup valve. Makeup can be controlled either manually or automatically upon reaching low level in the surge tank.

Shutdown

The system is taken out of service during plant shutdown when no longer needed by the components being cooled. The standby pump is taken out of automatic control, and the operating pump is stopped.

9.2.8.3 Safety Evaluation

The turbine building closed cooling water system has no safety-related function and therefore requires no nuclear safety evaluation.

9.2.8.4 Tests and Inspections

Pre-operational testing is described in DCD Chapter 14. The performance, structural, and leaktight integrity of system components is demonstrated by operation of the system.

9.2.8.5 Instrument Applications

Parameters important to system operation are monitored in the main control room. Flow indication is provided for individual cooled components as well as for the total system flow.

Temperature indication is provided for locations upstream and downstream of the turbine building closed cooling water system heat exchangers. High temperature of the cooling water supply alarms in the main control room. Temperature test points are provided at locations to facilitate thermal performance testing.

Pressure indication is provided for the pump suction and discharge headers. Low pressure at the discharge header automatically starts the standby pump.

Level instrumentation on the surge tank provides level indication and both low- and high-level alarms in the main control room. On low tank level, a valve in the makeup water line automatically actuates to provide makeup flow from the demineralized water transfer and storage system.

9.2.9 WASTE WATER SYSTEMS

9.2.9.2.2 Component Description

Replace the paragraph in the Waste Water Retention Basin portion of DCD Subsection 9.2.9.2.2 with the following text.

Waste Water Retention Basins

WLS COL 9.2-2 There is one waste water retention basin per unit, located to the northwest of the main plant area. The basin is constructed such that its contents, dissolved or suspended, do not penetrate the liner and leach into the ground. The basin can receive waste streams for holdup or, if required, for treatment to meet specific environmental discharge requirements. The basin has a usable capacity of approximately 5,000,000 gallons.

The configuration and size of the waste water retention basins allows settling of solids larger than 10 microns which may be suspended in the waste water stream.

Waste water can be sampled prior to discharge from the waste water retention basin.

Basin Transfer Pumps

Two 750 gpm capacity transfer pumps send the waste water from the retention basin to the common blowdown sump. Operation of both pumps will transfer at least 75% of the basin's full level in one compartment (2,500,000 gallons) in 24 hours. Each basin has two compartments. In the event of oily waste leakage into the basin, the oil will be removed manually (as by skimming or vacuuming). Controls are provided for automatic or manual operation of the pumps based on the level in the retention basin.

Blowdown Sump

A blowdown sump common to both Units 1 and 2 receives input from the wastewater retention basins and the CWS cooling tower blowdown. The blowdown sump is located to the southeast of Units 1 and 2, outside of the protected area. A connection with the raw water supply subsystem of the RWS provides an alternate dilution source to the blowdown sump. The blowdown sump outfall piping is sized to prevent sump overflow during maximum inlet flow to the sump.

Plant Outfall

The plant outfall is the final discharge point for Units 1 and 2. The single walled high density polyethylene (HDPE) outfall pipe is sized to drain, via gravity, the maximum expected flow from the blowdown sump. Dilution water for radioactive waste discharges may be supplied to the blowdown sump from the RWS when cooling tower blowdown is not available. To prevent radioactive contamination of the blowdown sump, the location of the tie-in between the WLS and the outfall pipe is downstream of and below the bottom elevation of the blowdown sump. Effluent from the blowdown sump mixes with the much smaller flow rate from the WLS adjacent to the western bank of the Broad River and is discharged via the outfall pipe/diffuser to the Ninety-Nine Islands Reservoir. The outfall pipe is attached to the upstream face of the Ninety-Nine Islands Dam below the normal level of the impoundment, runs along the dam approximately 750 ft. and ends with an approximately 88 ft. long multi-port diffuser located in the zone where the impoundment water flows to the intake of the Ninety-Nine Islands Hydroelectric station. The top of the multi-port diffuser is at elevation 501.1 ft., which is approximately 10 ft. below the full pond elevation of the Ninety-Nine Islands Reservoir. Liquid radioactive waste discharges are monitored for radiation and are addressed in detail in DCD Section 11.2; the applicable radiation monitor is addressed in detail in DCD Subsection 11.5.2.3.3.

9.2.9.5 Instrumentation Applications

Add the following paragraph at the end of DCD Subsection 9.2.9.5.

Level instrumentation is provided at the waste water retention basin and is used to control operation of the basin transfer pumps. High level alarms indicate the basin level where operator action is required.

Add the following subsection after DCD Subsection 9.2.10. DCD Subsections 9.2.11 and 9.2.12 are renumbered as Subsections 9.2.12 and 9.2.13, respectively.

STD DEP 1.1-1 9.2.11 RAW WATER SYSTEM

WLS SUP 9.2-4 The RWS withdraws water from the Broad River, transfers it for storage in Make-Up Ponds A, B, and C and supplies raw and treated water to various plant systems.

9.2.11.1 Design Basis

9.2.11.1.1 Safety Design Basis

The RWS serves no safety-related function and therefore has no nuclear safety design basis.

Failure of the RWS or its components will not affect the ability of safety-related systems to perform their intended function.

9.2.11.1.2 Power Generation Design Basis

The RWS provides water to the CWS, SWS, fire protection system (FPS), demineralized water treatment system (DTS), TCS and waste water system (WWS) for purposes such as system make-up, fill, cooling, and dilution.

The RWS provides inventory and SWS make-up flow to support normal plant cooldown. During this operational sequence, the normal residual heat removal system (RNS) and associated component cooling water system (CCS) reduces the temperature of the reactor coolant system from approximately 350°F to approximately 125°F within 96 hours after shutdown.

The RWS is designed with sufficient inventory and pump capacity to provide makeup needs for the limiting SWS heat load identified in DCD Table 9.2.1-1.

The clarified water supply subsystem, using the inventory provided in the clarified water storage tank, is the normal make-up supply to the SWS cooling towers in both units. The clarified water supply subsystem contains approximately

2.7 million gallons of inventory and is equipped with redundant pumps capable of receiving power from the standby diesels.

9.2.11.2 System Description

9.2.11.2.1 General Description

The various subsystems in the RWS are shown on the following figures:

- Figure 9.2-201 River Water Subsystem
- Figure 9.2-202 Raw Water Supply Subsystem
- Figure 9.2-203 Make-Up Pond B Subsystem
- Figure 9.2-204 Clarifier Subsystem
- Figure 9.2-205 Clarified Water Supply Subsystem
- Figure 9.2-206 Refill Subsystem
- Figure 9.2-207 Make-Up Pond C Subsystem

The RWS is designed based on an average total suspended solids (TSS) of 20 mg/l and a maximum TSS of 300 mg/l.

A discussion of ice effects at the Lee Nuclear Station is provided in FSAR Subsection 2.4.7. In summary, the regional climate does not support ice formation on surface waters and the potential for ice jams or frazil ice formation that would affect intake structures is remote.

Subsystems that provide normal and alternate make-up flow to the SWS cooling towers predominately utilize HDPE material for underground piping. Operating experience has demonstrated that HDPE is compatible with raw and treated water chemistry and is highly resistant to corrosion and biofouling. All RWS piping is designed to ASME Code for Power Piping, B31.1.

RWS underground piping is routed in the vicinity of the turbine building. Flooding in the yard area adjacent to the turbine building resulting from an RWS piping failure is bounded by a postulated piping failure in the CWS.

RWS piping from the clarified water supply subsystem is routed inside the turbine building to the DTS and TCS. The effects of a RWS pipe failure would not result in detrimental effects on safety-related equipment since there is no safety-related equipment in the turbine building. A break in the RWS piping inside the turbine building is bounded by a postulated pipe failure in the CWS.

9.2.11.2.2 Subsystems Providing Off-Site Supply and On-Site Storage

Make-Up Pond A serves as a central repository for raw water and contains the intake structure for the station. During normal Broad River flow conditions, withdrawal from the river is used to maintain a normal level in Make-Up Pond A and, if required, store water in Make-Up Ponds B and C. When permit conditions limit withdrawal from the Broad River, withdrawal from Make-Up Ponds B and C, and if allowed, the Broad River, is used to maintain a normal level in Make-Up Pond A.

The water inventory required to support the power generation design basis is provided by the raw water supply subsystem and maintained in Make-Up Pond A. The river water, refill, and Make-Up Ponds B and C subsystems provide water storage and source diversity to adapt to Broad River flow conditions.

River Water Subsystem

The river water subsystem withdraws water from the Broad River and transfers it to maintain normal level in Make-Up Pond A and provide water for storage in Make-Up Pond B.

A single intake on the Broad River supports the pumps and related equipment for the river water and refill subsystems. The river water subsystem contains four pumps and functions to maintain Make-Up Pond A at its normal level. Two pumps are normally in operation and two are in standby. There are conditions when only one Broad River pump is required to support operations, based on unit demand or utilization of the alternate supply sources, Make-Up Ponds B and C. For example, under permit limiting conditions, river water withdrawals may be reduced, withdrawing only the nonconsumptive flow (screen wash and blowdown) that is returned to the river. During these conditions, supplemental water stored in Make-Up Ponds B and C is used to maintain Make-Up Pond A level.

Make-Up Pond B Subsystem

The Make-Up Pond B subsystem receives and stores water from the Broad River, utilizing a transfer path through Make-Up Pond A or a refill path directly from the river. The primary function of Make-Up Pond B is to maintain the normal level in Make-Up Pond A when withdrawals from the Broad River are reduced or terminated. An alternate function is to transfer water to Make-Up Pond C for storage or refill.

When transfers from Make-Up Pond B are used to maintain Make-Up Pond A level, the Broad River is used to replenish Make-Up Pond B as allowed by the permit. The inventory in Make-Up Pond B can be rapidly replenished by aligning the Make-Up Pond A and refill subsystem pumps to Make-Up Pond B.

In addition, there are periods when permit conditions allow limited withdrawal flows that are below the minimum capacity of the refill pumps. In order to refill Make-Up Pond C during these conditions, the river water subsystem pumps transfer water into Make-Up Pond A, which is in turn transferred to Make-Up Pond B and then on to Make-Up Pond C.

An intake on Make-Up Pond B contains five make-up pond pumps. Four pumps are used to transfer water to Make-Up Pond A. When Make-Up Pond B is aligned to maintain level in Make-Up Pond A, up to three pumps are in operation and one is in standby to support plant operation. The fifth pump is dedicated to transferring water to Make-Up Pond C.

Refill Subsystem

When permit conditions on the Broad River support supplemental water withdrawals, the refill subsystem transfers water from the Broad River to Make-Up Ponds C or B for storage. The primary function of the refill subsystem is to maintain inventory in Make-Up Pond C. An alternate function is to transfer water to Make-Up Pond B.

The four pumps in the refill subsystem are located in the same intake structure as the river water subsystem. If Make-Up Ponds B or C require additional make-up from the Broad River to recover from extended periods of low river flow conditions, the four pumps would be placed into operation, provided permit conditions on the river support the additional withdrawal.

Make-Up Pond C Subsystem

The Make-Up Pond C subsystem receives water from the Broad River through the refill subsystem. The function of the Make-Up Pond C subsystem is to store water and transfer it to Make-Up Pond B to support continued operation during extended periods of low river flow conditions.

An intake in Make-Up Pond C contains three pumps. These pumps are not normally in operation. They are only used when the Make-Up Pond B usable storage has been depleted, in which case the pumps transfer water from Make-Up Pond C to Make-Up Pond B, which transfers it to Make-Up Pond A to support continued plant operations as discussed above.

9.2.11.2.3 Subsystems Supplying Raw Water and Treated Raw Water

Raw Water Supply Subsystem

The raw water supply subsystem supports the SWS make-up function described in the power generation design basis. The raw water supply subsystem receives and stores water from the Broad River and/or Make-Up Pond B and supplies untreated water to plant systems. The subsystem consists of Make-Up Pond A, an intake, pumps, piping, valves and instrumentation. The intake contains four raw water supply pumps, two per unit.

During abnormal conditions, for example, when the clarified water supply subsystem is not available, the raw water supply subsystem provides an assured make-up supply to maintain the power generation design basis for SWS. Make-Up

Pond A has a usable storage volume of 1200 acre-ft, which provides sufficient capacity to support a dual unit cooldown to cold shutdown conditions and maintain the station in this condition for longer than 7 days.

Clarifier Subsystem

The clarifier subsystem receives water from the raw water supply subsystem and treats the water, using chemical and physical processes. The treated water is then forwarded to the clarified water supply subsystem for storage and distribution.

The clarifier subsystem has a design capacity sufficient to supply the design demands of all systems supplied by the clarified water supply subsystem for both units.

Clarified Water Supply Subsystem

The clarified water supply subsystem receives and stores treated water from the clarifier subsystem and supplies flow to SWS, DTS and FPS in both units. The subsystem consists of a clarified water storage tank with an approximate storage capacity of 2.7 million gallons that is shared by both units. Four pumps, two per unit, take suction from the tank and discharge to unit-specific headers.

The clarified water supply subsystem is the normal make-up source for the SWS cooling towers in both units and is the preferred source of water for the normal plant cooldown described in the power generation design basis. In the event the clarifier fails or is out-of-service during a normal plant shutdown of both units, the inventory in the SWS cooling tower basin, secondary fire water tank, and the clarified water storage tank contain a sufficient volume to support aligning the raw water supply subsystem to the SWS cooling towers.

9.2.11.3 Component Description

9.2.11.3.1 River Water Subsystem

Intake

The single intake structure supports the pumps and related equipment (i.e. intake screens, screen wash pumps, etc.) for both the river water and refill subsystems. The intake structure has eight separate forebays – four are dedicated to the river water pumps and the remainder to the refill subsystem pumps. Each forebay is equipped with a steel bar/trash rack assembly, traveling screen(s), and a screen wash pump.

River Water Pumps

Four river water pumps are located in the intake structure. Each pump is sized to supply 100 percent of the design raw water demand for one unit. The river water pumps are of vertical turbine, wet pit design. The length of each pump barrel is sized to meet the minimum submergence and net positive suction head (NPSH) requirements for the pump based on minimum level conditions in the Broad River.

Piping

The discharges of the river water pumps for both units are routed to a common header and pipeline to Make-Up Pond A. A break tank structure is installed between the intake and Make-Up Pond A. The break tank is open to atmosphere and is used to dissipate the hydraulic energy in the flow from the river intake. Check valves are installed on the pump discharge piping to limit reverse flow in the system following a pump trip.

Valves

Motor-operated and manual valves are installed on the discharge of the river water and screen wash pumps. These valves are used for normal system alignments.

9.2.11.3.2 Make-Up Pond B Subsystem

Intake

The Make-Up Pond B intake structure is equipped with a passive screening system that is located near the bottom of the intake structure. Intake flow is pulled through the passive screens into two compartments. Each compartment has two pump forebays. Each pump forebay contains one pump except one forebay contains two pumps (one pump used to transfer water to Make-Up Pond A and one pump dedicated to transfer water to Make-Up Pond C).

Make-Up Pond B Pumps

Five pumps are mounted on the Make-Up Pond B intake. Four pumps are used to transfer water to Make-Up Pond A. Each of these pumps is sized to supply one third of the normal raw water demand for two units. When Make-Up Pond B is aligned to maintain level in Make-Up Pond A, three pumps are in operation and one is in standby. The pumps are of vertical turbine, wet pit design.

The fifth pump is dedicated to transferring water to Make-Up Pond C when permit conditions on the Broad River allow for supplemental withdrawals that are below the minimum capacity of the refill subsystem pumps.

All five of the Make-Up Pond B pumps are of vertical turbine, wet pit design. The design of the intake structure, pump structure, and connecting piping maintains the pump forebay water level at the same level as Make-Up Pond B. The length of each pump barrel is sized to meet minimum submergence and NPSH requirements for the pumps for the maximum drawdown level in Make-Up Pond B.

Piping

The four pumps that transfer water to Make-Up Pond A discharge into a common header that supplies a pipeline to the break tank between the river water intake and Make-Up Pond A. Valves are installed to allow the same piping to be used to both fill Make-Up Pond B and transfer water back to Make-Up Pond A.

The piping on the pump that supplies Make-Up Pond C is routed to a break tank between the refill subsystem and Make-Up Pond C. The piping from the break tank to Make-Up Pond C is designed to allow flow in both directions; from the break tank to Make-Up Pond C for filling the pond and from the Make-Up Pond C intake structure to the break tank for transferring water into Make-Up Pond B.

Valves

The fill line for Make-Up Pond B from Make-Up Pond A is equipped with a motor-operated valve. Motor-operated valves are located on the pump discharges and on the piping to Make-Up Pond A and the break tank. The remaining valves are operated manually.

9.2.11.3.3 Refill Subsystem

Intake

A single intake structure supports the pumps and related equipment (i.e. intake screens, screen wash pumps, etc.) for both the refill and river water subsystems. The intake structure has eight separate forebays – four are dedicated to the refill pumps and the remainder to the river water pumps. Each forebay is equipped with a steel bar/trash rack assembly, a traveling screen, and a screen wash pump.

Refill Pumps

Four refill pumps are located in the intake structure. Since the allowable withdrawal from the Broad River is dependent on permit conditions, each pump is designed to provide 25 percent of the design make-up flow to Make-Up Pond C. The pumps are of vertical turbine, wet pit design. The length of each pump barrel is sized to meet the minimum submergence and NPSH requirements for the pump based on minimum level conditions in the Broad River.

Piping

The refill pumps discharge into a common header which supplies piping routed to Make-Up Pond C. Check valves are installed on the pump discharge piping to limit reverse flow in the system following a pump trip. A break tank structure is installed between the intake and Make-Up Pond C to provide system venting. Branch lines off the refill piping from the river intake are also routed to an outlet structure in Make-Up Pond B to provide an alternate means of filling Make-Up Pond B directly from the river through the refill subsystem.

Valves

Motor-operated and manual valves are installed on the discharge of the refill and associated screen wash pumps. Motor-operated valves are also installed on the pipeline between the intake and Make-Up Pond C on either side of the break tank and on the piping between the refill pumps and the outlet structure in Make-Up Pond B. These valves support the alignment of various water transfer options.

9.2.11.3.4 Make-Up Pond C Subsystem

Intake

The Make-Up Pond C intake structure is a free-standing structure located offshore in a deeper part of the pond to provide maximum pump submergence. The structure is equipped with a passive screening system located near the bottom of the intake structure. Intake flow is pulled through the passive screens into one compartment. This compartment contains three pump forebays with one pump per forebay.

Make-Up Pond C Pumps

Three pumps are located in the intake structure. One forebay supplies two pumps while the second forebay has a single pump. Each pump is sized to supply 33 percent of the design flow from Make-Up Pond C to Make-Up Pond B. The pumps are of vertical turbine, wet pit design and the pump barrel lengths are sized to meet the minimum submergence and NPSH requirements for the pump based on pond minimum level conditions.

Piping

The pumps discharge to a common header that supplies a pipeline to the break tank structure. Check valves are installed on the pump discharge piping to limit reverse flow in the system following a pump trip. The pipeline is designed to transfer water in two directions: out of the break tank and into Make-Up Pond C during refilling, and out of Make-Up Pond C and into the break tank when transferring water to Make-Up Pond B.

Valves

Motor-operated valves are installed on the pump discharge piping and between the discharge header and the break tank. These valves support the alignment of various water transfer options.

9.2.11.3.5 Raw Water Supply Subsystem

Intake

The Make-Up Pond A intake supplies both units at the Lee Nuclear Station. The intake is separated into four forebays; two for each unit. Each forebay is equipped with a raw water supply pump and a separate traveling screen assembly. The separate forebays and traveling screens provide diversity to ensure the ability to supply RWS flow.

The traveling screens are powered from the normal ac power system, and are not backed by the standby power supply for occurrences of loss of normal ac power. RWS make-up requirements following a loss of normal ac power condition are a small fraction of the normal flow. In this condition, the intake screens act as a passive screen. This is acceptable because the lower flow velocities and limited duration reduce the potential for entrainment and impingement.

Raw Water Supply Pumps

Four raw water supply pumps are located in the Make-Up Pond A pump structure. Each pump is sized to supply 100 percent of the design raw water demand for one unit, so one pump is typically in standby for each unit. If river water is transferred for storage in Make-Up Pond B with both units at full power, a standby pump(s) would be placed in service. The pumps are of vertical turbine, wet pit design. The length of each pump barrel is sized so that the minimum submergence and NPSH requirements for the pump are satisfied during the maximum operating drawdown condition for Make-Up Pond A.

The standby pumps are isolated from the discharge header by a motor-operated valve. Each pump is equipped with a pressure transmitter on the discharge piping that alarms in the control room on a low pressure condition. To start the standby pump, the operator manually opens the isolation valve and starts the pump either remotely or locally.

The pumps are powered from the normal ac power system in each unit. Each pump is supplied from a separate bus, and both of the raw water pumps in each unit are backed by the standby power supply for occurrences of loss of normal ac power. In the event of a loss of normal ac power, standby power is manually aligned to one or more raw water supply pumps. The pumps are started by operations, either locally or remotely as necessary.

If the raw water supply subsystem alignment to support SWS cooling tower make-up is required, and both raw water supply pumps are shut down, the manual isolation valves between the pump discharge and the clarified water supply header are opened. The selected pump is aligned to the discharge header by opening the motor-operated discharge valve and minimum flow path valve. These valves can be operated from the control room or a local handswitch. The valve operators are also equipped with handwheels to allow the valves to be opened manually during a loss of normal ac power condition. The pump is started to refill the SWS cooling tower basin and secured when the desired level is attained. Once the discharge and minimum flow recirculation flow paths have been aligned, the pump can be restarted from the control room to maintain the desired basin level.

Piping

The raw water supply pumps in each unit discharge to a common header that has supply piping take-offs to various systems. The minimal elevation difference between the Make-Up Pond A intake structure and the supplied equipment limits column separation if the pumps trip, as well as transient effects during restart. Check valves installed on the pump discharges also maintain the discharge piping filled. Temperatures in the system are moderate and the pressure of the fluid is maintained above saturation at all locations to minimize the potential for thermodynamic water hammer.

The raw water supply subsystem provides dilution water to the WWS during unit outage conditions when CWS blowdown is unavailable. The raw water supply subsystem and WWS effluent flow are combined in a blowdown sump structure that is open to the atmosphere. From the sump, the dilution water gravity drains towards the Broad River. The WLS effluent from both units is piped separately to the Broad River and the two fluids are mixed directly upstream of a diffuser structure that discharges into the river. The elevation difference between the blowdown sump and the diffuser physically prevents WLS effluent from back-flowing into the blowdown sump and cross-contaminating RWS and CWS. The atmospheric pressure conditions in the sump prevent formation of a vacuum that could draw WLS effluent into the sump.

Valves

Motor-operated valves are located on the discharge of each raw water supply pump. They are supplied from the normal ac power system in each unit. The valves are designed to fail "as-is" during a loss of normal ac power condition. The operator on each valve is equipped with a handwheel to allow manual realignment if ac power is lost or an actuator fails.

Two manual valves isolate the raw water supply subsystem in each unit from the clarified water supply subsystem make-up piping to the SWS. These valves are manually opened to align the raw water supply subsystem for make-up to the SWS cooling tower basins.

Conditions affecting the operation of an intake screen, raw water pump or associated discharge valve are addressed by aligning and starting the standby pump. This action is normally performed from the control room. The motor-operated valves are also equipped with handwheels, if local operation is required.

9.2.11.3.6 Clarifier Subsystem

Clarifier Equipment

A single clarifier and associated chemical feed and filtration equipment provides treated water for both units. The clarifier is a solids contact design, and primarily functions to remove TSS from the raw water. The treated water is then transferred to the clarified water supply subsystem for storage and distribution. Due to the time required to place a clarifier in operation and obtain the desired water quality, the clarifier normally remains in operation, with the supply flow balanced to maintain normal level in the clarified water storage tank.

9.2.11.3.7 Clarified Water Supply Subsystem

Storage

A clarified water storage tank, with a usable inventory of approximately 2.7 million gallons, provides normal fill, make-up and supply to the SWS, DTS and FPS systems in both units. The tank is maintained in the full inventory condition during normal operation by the continuous operation of the clarifier subsystem.

The elevation head of the clarified water storage tank maintains a positive pressure on system supply lines, reducing the potential for column separation following a clarified water supply pump trip and subsequent transient effects during restart. Temperatures in the system are moderate and the pressure of the fluid is maintained above saturation at all locations to minimize the potential for thermodynamic water hammer.

Pumps

Four pumps, two per unit, take suction from the tank. Each pump is sized to provide 100 percent of the combined design demands of DTS, FPS and SWS for a single unit. The pumps are of centrifugal, horizontal design. The design NPSH for the pumps supports operation to the tank's low-low level setpoint. Minimum flow piping is installed on the discharge of the pumps to support sustained operation at reduced flow.

Both the operating and standby pump for each unit is normally aligned to the discharge header. Pressure indication on the discharge header in each unit alerts the control room of a low pressure condition, whereby the operator manually starts the standby pump.

The pumps are powered from separate buses in the normal ac power system. These buses are backed by the standby power supply for occurrences of loss of normal ac power. In the event of a loss of normal ac power, standby power is manually aligned to one or more pumps.

Piping

The two clarified water supply pumps in each unit discharge to a unit specific header and distribution piping. The distribution piping in each unit has an individual cross tie to the raw water supply subsystem header.

Clarified water demand from the DTS, SWS and FPS is controlled by flow control valves, and is variable. The system utilizes a minimum flow path back to the clarified water storage tank to maintain a constant header pressure and protect the pumps from damage during sustained low-flow operation. The minimum flow loop also allows pressure to increase gradually when the system is started following an outage or trip to prevent void formation in the piping and the subsequent hydraulic transient during restart.

Valves

The clarified water supply pumps in each unit are equipped with a minimum flow line that automatically opens to prevent pump dead-heading when the pumps are placed into service under low system demand. All remaining valves in the clarified water supply subsystem are manual, and the only realignments expected during operation would be to support individual component or system maintenance.

9.2.11.4 System Operation

The RWS operates during normal modes of plant operation, including startup, power operation (full and partial loads), cooldown, shutdown, and refueling. The raw water supply and clarified water supply subsystems are also available during loss of normal ac power conditions.

9.2.11.4.1 System Startup

For initial system startup, the refill and river water subsystems are started and, if required, Make-Up Ponds A, B, and C are filled to the normal operating levels. The raw water supply subsystem is then started to support fill and startup of the clarifier subsystem and, if required, transfer water to Make-Up Pond B for storage. Once the clarifier subsystem is producing water of the desired quality, the clarified water storage tank is filled and the clarified water supply subsystem is placed in operation.

9.2.11.4.2 Plant Startup

During plant startup, the river water and raw water supply subsystems will be in operation to supply water to refill CWS piping and to replace evaporative losses as the CWS cooling towers are placed into operation. Clarifier and clarified water supply subsystems operate to support the water demands of SWS, DTS and FPS.

9.2.11.4.3 Power Operation

During normal operation, one river water pump and one raw water supply pump per unit are normally in operation to supply untreated water to the CWS cooling towers and clarifier subsystem. If water storage in Make-Up Pond B is desired, a standby raw water supply pump in the Make-Up Pond A intake is placed in service. A standby river water pump is placed in service as necessary to maintain level in Make-Up Pond A.

If permit conditions restrict withdrawals from the Broad River, the river water pumps may operate at partial flow. The Make-Up Pond B pumps are placed in service to maintain normal level in Make-Up Pond A. The Make-Up Pond C pumps are placed in service to transfer water to Make-Up Pond B when Make-Up Pond B usable storage is depleted.

After extended periods of low river flow conditions, water levels in Make-Up Ponds B and C are expected to be below full pond. If permit conditions allow supplemental withdrawals, the standby river water pump, standby raw water pump, and one or more refill pumps are placed in service to refill the ponds.

The clarifier subsystem is in service, maintaining level in the clarified water storage tank. One clarified water supply pump is in service, while the other is in standby for each unit.

9.2.11.4.4 Plant Cooldown/Shutdown

The plant cooldown phase utilizes the same system alignment as normal power operation. As untreated make-up demand from the CWS cooling towers decreases, one raw water supply pump on the shutdown unit is stopped and placed in standby.

9.2.11.4.5 Refueling

During refueling, one raw water supply pump is in service on the shutdown unit to support operation of the clarifier subsystem and to provide dilution water for the WWS. The river water subsystem is operated as necessary to maintain level in Make-Up Pond A. The clarifier and clarified water supply subsystems are in the same system alignment as normal power operation.

9.2.11.4.6 Loss of Normal AC Power Operation

In the event of a loss of normal ac power, the clarified water supply pumps and instrumentation associated with pump discharge pressure indication and clarified water storage tank level are manually loaded on their assigned diesel buses. The clarified water supply pumps in each unit have a motor-operated minimum flow valve that normally opens during pump start to prevent pump dead-heading. Depending on the system alignment at the time of the event, these valves may have to be manually re-opened before restarting the pumps. If so, the minimum flow valves are equipped with handwheels to allow manual operation. The pump is manually restarted locally.

The flow control valve on the make-up line to the SWS cooling towers is part of the SWS and isolates on a loss of normal ac power. The normal level in the clarified water storage tank, the check valves on the discharge of the clarified water supply pumps, and the pump minimum flow lines prevent transient effects when the pumps are tripped and restarted.

The clarifier subsystem is not powered from a diesel-backed bus. If a long-term loss of normal ac power condition depletes the clarified water storage tank, make-up flow to the SWS is aligned to the raw water supply subsystem as described in Subsection 9.2.11.3.5. Both raw water supply pumps in each unit are on buses that can be manually aligned to receive power from associated standby diesels. The raw water supply pumps can be started locally, or from the Control Room. The motor-operated valves in the raw water supply subsystem are designed to fail as-is during a loss of normal ac power, but can be operated locally by manual handwheels.

9.2.11.4.7 Abnormal Conditions

The clarified water supply subsystem is the normal source of make-up to the SWS cooling towers. If the clarified water storage tank has been depleted or both clarified water supply pumps are unavailable, the raw water supply subsystem is aligned as described in Subsection 9.2.11.3.5.

Issues affecting the performance of an in-service raw water supply pump or discharge valve are detected by a low pump discharge pressure alarm in the control room. The response is to align and start the standby pump.

9.2.11.5 Safety Evaluation

The RWS has no safety-related functions and therefore requires no nuclear safety evaluation.

9.2.11.6 Tests and Inspections

Preoperational testing is described in FSAR Chapter 14. System performance and structural and pressure integrity of system components are demonstrated by operation of the system, monitoring of system parameters such as flow and pressure, and visual inspection. Administrative procedures provide direction for operation of the system under all modes of required operation.

9.2.11.7 Instrumentation Requirements

The intakes on the Broad River and Make-Up Pond A are equipped with level transmitters on the upstream and downstream sides of the traveling screens. An indicated level difference identifies flow degradation through the screens and equipment malfunctions. Trouble alarms are used by the control room to identify degraded component issues and initiate subsequent actions.

Pressure indication, with high and low level alarms, is provided for the discharge of each raw water supply pump.

Pressure indication, with high and low level alarms, is provided on each unit-specific clarified water supply pump discharge header.

Flow instrumentation is provided on the discharge of the clarifier equipment to identify issues affecting the normal refilling of the clarified water storage tank.

Level instrumentation, with high and low level alarms, is provided on the clarified water storage tank for control room status of clarified water inventory.

Power actuated valves in the RWS are provided with valve position indication instrumentation.

STD DEP 1.1-1

9.2.12 COMBINED LICENSE INFORMATION

9.2.12.1 Potable Water

WLS COL 9.2-1 This COL Item is addressed in Subsections 9.2.5.2.1 and 9.2.5.3.

9.2.12.2 Waste Water Retention Basins

WLS COL 9.2-2 This COL Item is addressed in Subsection 9.2.9.2.2.

STD DEP1.1-1

9.2.13 REFERENCES

9.3 PROCESS AUXILIARIES

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

9.3.1.1.2 Power Generation Design Basis

Change the third paragraph in DCD Subsection 9.3.1.1.2, as follows:

WLS DEP 6.4-2 The high-pressure air subsystem consists of one compressor, its associated air purification system and controls, and a high-pressure receiver. It provides clean, oil-free, high-pressure air to recharge the main control room emergency habitability system cylinders, refill the individual fire fighting breathing air bottles, and recharge the generator breaker reservoir. Quality Verification Level E air as defined in ANSI/CGA G-7.1, with a pressure dew point of 40°F or lower at 3400 psig or greater, is produced by this subsystem. See Section 6.4 for a description of the main control room habitability system.

9.3.6.3.7 Chemical and Volume Control System Valves

Revise the paragraph under the subheading Demineralized Water System Isolation Valves as follows:

Demineralized Water System Isolation Valves

WLS DEP 7.3-1 These normally open, air-operated butterfly valves are located outside containment in the line from the demineralized water storage and transfer system. These valves close on a signal from the protection and safety monitoring system derived by either a reactor trip signal, a source range flux doubling signal, low input voltage (loss of ac power) to the 1E dc and uninterruptable power supply system battery chargers, or a safety injection signal, isolating the demineralized water source to prevent inadvertent boron dilution events and, during shutdown conditions, whenever the flux doubling signal is blocked to prevent inadvertent boron dilution. Manual control for these valves is provided from the main control room and at the remote shutdown workstation.

9.3.6.4.5.1 Boron Dilution Events

Add the following at the end of the third paragraph of DCD Subsection 9.3.6.4.5.1:

WLS DEP 7.3-1 In addition, when the flux doubling signal is blocked during shutdown, the demineralized water system isolation valves are closed to prevent inadvertent boron dilution.

9.3.6.7 Instrumentation Requirements

Revise the fourth bullet following the third paragraph of DCD Subsection 9.3.6.7 as follows:

WLS DEP 7.3-1

- **Demineralized water system isolation valves** – To prevent inadvertent boron dilution, the demineralized water system isolation valves close on a signal from the protection and safety monitoring system derived from either a reactor trip signal, a source range flux doubling signal, low input voltage (loss of ac power) to the 1E dc and uninterruptible power supply system battery chargers, or a safety injection signal providing a safety-related method of stopping an inadvertent dilution. In addition, when the flux doubling logic is blocked during shutdown, the valves are closed to prevent inadvertent boron dilution. The main control room and remote shutdown workstation provide manual control for these valves.

9.3.7 COMBINED LICENSE INFORMATION

STD COL 9.3-1 This COL Item is addressed below.

Generic Issue 43, and the concerns of Generic Letter 88-14 and NUREG-1275 regarding degradation or malfunction of instrument air supply and safety-related valve failure, are addressed by the training and procedures for operations and maintenance of the instrument air subsystem and air-operated valves.

Plant systems, including the compressed and instrument air system, are maintained in accordance with procedures. Maintenance procedures are discussed in Subsection 13.5.2.2.6. The instrument air supply subsystem components are maintained and tested in accordance with manufacturers' recommendations and procedures. The safety-related air-operated valves are maintained in accordance with manufacturers' recommendations and tested in accordance with plant procedures to allow proper function on loss of air. The instrument air is periodically sampled and tested for compliance with the quality requirements of ANSI/ISA-S7.3-1981.

Operators are provided training on loss of instrument air in accordance with abnormal operating procedures. Plant systems, including the compressed and instrument air system, are operated in accordance with system operating procedures, abnormal operating procedures, and alarm response procedures which are written in accordance with Subsection 13.5.2. The training program for operations and maintenance personnel is discussed in Section 13.2.

9.4 AIR-CONDITIONING, HEATING, COOLING, AND VENTILATION SYSTEM

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

9.4.1.1.1 Safety Design Basis

Revise the second bullet in the first paragraph of DCD Subsection 9.4.1.1.1 to read as follows:

WLS DEP 6.4-1
- Isolates the HVAC penetrations in the main control room boundary on High-2 particulate or iodine concentrations in the main control room supply air or on extended loss of ac power to support operation of the main control room emergency habitability system as described in Section 6.4.

9.4.1.1.2 Power Generation Design Basis

Revise the third bullet in the first paragraph of DCD Subsection 9.4.1.1.2 to read as follows:

WLS DEP 6.4-1
- Isolates the main control room and/or CSA area from the normal outdoor air intake and provides filtered outdoor air to pressurize the main control room and CSA areas to a positive pressure of at least 1/8 inch wg when a High-1 radioactivity concentration (gaseous, particulate, or iodine) is detected in the main control room supply air duct.

Post-72-Hour Design Basis

Main Control Room

Revise the first paragraph of DCD Subsection 9.4.1.1.2, under the sub-heading, Post-72-Hour Design Basis Main Control Room to read:

WLS DEP 6.4-2 The specific function of the nuclear island nonradioactive ventilation system is to maintain the main control room below a maximum average Wet Bulb Globe Temperature index of 90°F (32.2°C) based on operation at the maximum normal site ambient temperature.

9.4.1.2.1.1 Main Control Room/Control Support Area HVAC Subsystem

Revise the second to last sentence of the second paragraph of DCD Subsection 9.4.1.2.1.1 to read as follows:

WLS DEP 6.4-1 These monitors initiate operation of the nonsafety-related supplemental air filtration units on High-1 radioactivity concentrations (gaseous, particulate, or iodine) and isolate the main control room from the nuclear island nonradioactive ventilation system on High-2 particulate or iodine radioactivity concentrations.

9.4.1.2.3.1 Main Control Room/Control Support Area HVAC Subsystem

Abnormal Plant Operation

Revise the second and third sentences of the first paragraph of the Abnormal Plant Operation section of DCD Subsection 9.4.1.2.3.1 to read as follows:

WLS DEP 6.4-1 The first is "High-1" radioactivity based upon radioactivity instrumentation (gaseous, particulate, or iodine). The second is "High-2" radioactivity based upon either particulate or iodine radioactivity instruments.

Revise the first sentence of the second paragraph of the Abnormal Plant Operation section of DCD Subsection 9.4.1.2.3.1 to read as follows:

WLS DEP 6.4-1 If "High-1" radioactivity is detected in the main control room supply air duct and the main control room/control support area HVAC subsystem is operable, both supplemental air filtration units automatically start to pressurize the main control room and CSA areas to at least 1/8 inch wg with respect to the surrounding areas and the outside environment using filtered makeup air.

Revise the first sentence of the third paragraph of the Abnormal Plant Operation section of DCD Subsection 9.4.1.2.3.1 to read as follows:

WLS DEP 6.4-1 If ac power is unavailable for more than 10 minutes or if "High-2" particulate or iodine radioactivity is detected in the main control room supply air duct, which would lead to exceeding GDC-19 operator dose limits, the protection and safety monitoring system automatically isolates the main control room from the normal main control room/control support area HVAC subsystem by closing the supply, return, and toilet exhaust isolation valves.

Revise the eighth paragraph of DCD Subsection 9.4.1.2.3.1, Abnormal Plant Operation to read:

WLS DEP 6.4-2 When complete ac power is lost and the outside air is acceptable radiologically and chemically, MCR habitability is maintained by operating one of the two MCR ancillary fans to supply outside air to the MCR. It is expected that outside air will be acceptable within 72 hours following a radiological release. See Subsection 6.4.2.2 for details. The outside air pathway to the ancillary fans is provided through the nonradioactive ventilation system air intake opening located on the roof, the mechanical room at floor elevation 135′-3″, and nonradioactive ventilation system supply duct. Warm air from the MCR is vented to the annex building through stairway S05, into the remote shutdown room and the clean access corridor at elevation 100′-0″. The ancillary fan capacity and air flow rate maintain the MCR environment below a maximum average Wet Bulb Globe Temperature index of 90°F (32.2°C). The ancillary fans and flow path are located within the auxiliary building which is a Seismic Category I structure.

9.4.1.4 Tests and Inspection

Add the following information at the end of DCD Subsection 9.4.1.4:

STD COL 9.4-1a The main control room/control support area HVAC subsystem of the nuclear island nonradioactive ventilation system (VBS) is tested and inspected in accordance with ASME/ANSI AG-1-1997 and Addenda AG-1a-2000 (Reference 201), ASME N509-1989, ASME N510-1989, and Regulatory Guide 1.140.

The VBS is tested as separate components and as an integrated system. Surveillance tests are performed to monitor the condition of the system. Testing methods include:

- Visual inspection
- Duct and housing leak tests
- Airflow capacity and distribution tests
- Air-aerosol mixing uniformity test
- HEPA filter bank and adsorber bank in-place leak tests
- Duct damper bypass tests
- System bypass tests
- Air heater performance tests
- Laboratory testing of adsorbers
- Ductwork inleakage test

Testing is performed at the frequency provided in Table 1 of ASME N510-1989.

9.4.7.4 Tests and Inspections

Add the following information at the end of DCD Subsection 9.4.7.4:

STD COL 9.4-1a The exhaust subsystem of the containment air filtration system (VFS) is tested and inspected in accordance with ASME/ANSI AG-1-1997 and Addenda AG-1a-2000 (Reference 201), ASME N509-1989, ASME N510-1989, and Regulatory Guide 1.140.

The VFS is tested as separate components and as an integrated system. Surveillance tests are performed to monitor the condition of the system. Testing methods include:

- Visual inspection
- Airflow capacity and distribution tests
- HEPA filter bank and adsorber bank in-place leak tests
- System bypass tests
- Air heater performance tests
- Laboratory testing of adsorbers
- Ductwork inleakage test

Testing is performed at the frequency provided in Table 1 of ASME N510-1989.

9.4.12 COMBINED LICENSE INFORMATION

STD COL 9.4-1a This COL Item is addressed in Subsections 9.4.1.4 and 9.4.7.4.

WLS COL 9.4-1b This COL Item is addressed below.

Section 6.4 does not identify any toxic emergencies that require the main control room/control support area HVAC system to enter recirculation mode.

9.4.13 REFERENCES

201. ASME/ANSI AG-1a-2000, Addenda to ASME AG-1-1997 Code on Nuclear Air and Gas Treatment, Section HA, “Housings.”

9.5 OTHER AUXILIARY SYSTEMS

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

9.5.1.2.1.3 Fire Water Supply System

STD SUP 9.5-1 Add the following information at the end of DCD Subsection 9.5.1.2.1.3:

Threads compatible with those used by the offsite fire department are provided on all hydrants, hose couplings and standpipe risers, or a sufficient number of thread adapters compatible with the offsite fire department are provided.

WLS SUP 9.2-4 Makeup water is provided to the fire water storage tanks by raw water system as described in Section 9.2.11. The makeup water is filtered, treated, and monitored in the clarification process to prevent or control biofouling or microbiologically induced corrosion which meets RG 1.189 guidance.

9.5.1.6 Personnel Qualification and Training

STD COL 9.5-1 Add the following paragraph at the end of DCD Subsection 9.5.1.6.

Subsections 9.5.1.8.2 and 9.5.1.8.7 summarize the qualification and training programs that are established and implemented for the fire protection program.

Add the following subsections after DCD Subsection 9.5.1.7. DCD Subsection 9.5.1.8 is renumbered as Subsection 9.5.1.9.

STD DEP 1.1-1 9.5.1.8 Fire Protection Program

STD COL 9.5-1 The fire protection program is established such that a fire will not prevent safe shutdown of the plant and does not endanger the health and safety of the public. Fire protection at the plant uses a defense-in-depth concept that includes fire prevention, detection, control and extinguishing systems and equipment, administrative controls and procedures, and trained personnel. These defense-in-depth principles are achieved by using the following objectives.

- Prevent fires from starting.
- Detect rapidly, control, and extinguish promptly those fires that do occur.
- Provide protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by the fire suppression activities will not prevent the safe shutdown of the plant.
- Minimize the potential for radiological releases.

9.5.1.8.1 Fire Protection Program Implementation

As indicated in Table 13.4-201, the required elements of the fire protection program are fully operational prior to receipt of new fuel for buildings storing new fuel and adjacent fire areas that could affect the fuel storage area in that reactor unit. Other required elements of the fire protection program described in this section are fully operational prior to initial fuel loading in that reactor unit.

Elements of the fire protection program are reviewed on a frequency established by procedures and updated as necessary.

9.5.1.8.1.1 Fire Protection Program Criteria

STD COL 9.5-3

STD COL 9.5-4 The fire protection program is based on the criteria of several industry and regulatory documents referenced in Subsection 9.5.5 and DCD Subsection 9.5.5, and also based on the guidance provided in Regulatory Guide 1.189. Table 9.5-201 and DCD Table 9.5.1-1 provide a cross-reference to information addressing compliance with BTP CMEB 9.5-1. Exceptions to the National Fire Protection Association (NFPA) Standards beyond those included in DCD Table 9.5.1-3 and exceptions taken to the NFPA Standards listed in Subsection 9.5.5 are identified in Table 9.5-202.

9.5.1.8.1.2 Organization and Responsibilities

STD COL 9.5-1 The organizational structure of the fire protection personnel is discussed in Subsection 13.1.1.2.10.

The site executive in charge of the fire protection program, through the engineer in charge of fire protection, is responsible for the following:

a. Programs and periodic inspections are implemented to:

   1. Minimize the amount of combustibles in safety-related areas.

   2. Determine the effectiveness of housekeeping practices.

3. Provide for availability and acceptability of the following:

    i. Fire protection system and components.

    ii. Manual fire fighting equipment.

    iii. Emergency breathing apparatus.

    iv. Emergency lighting.

    v. Portable communication equipment.

STD COL 9.5-8

STD COL 9.5-1

    vi. Fire barriers including fire rated walls, floors and ceilings, fire rated doors, dampers, etc., fire stops and wraps, and fire retardant coating. Procedures address the administrative controls in place, including fire watches, when a fire area is breached for maintenance.

STD COL 9.5-1

4. Confirm prompt and effective corrective actions are taken to correct conditions adverse to fire protection and preclude their recurrence.

b. Conducting periodic maintenance and testing of fire protection systems, components, and manual fire fighting equipment, evaluating test results, and determining the acceptability of systems under test, in accordance with established plant procedures.

c. Designing and selecting equipment related to fire protection.

d. Reviewing and evaluating proposed work activities to identify potential transient fire loads.

e. Managing the plant fire brigade, including:

1. Developing, implementing and administering the fire brigade training program.

2. Scheduling and conducting fire brigade drills.

3. Critiquing fire drills to determine if training objectives are met.

4. Performing a periodic review of the fire brigade roster and initiating changes as needed.

5. Maintaining the fire training program records for members of the fire brigade and other personnel.

6. Maintaining a sufficient number of qualified fire brigade personnel to respond to fire emergencies for each shift.

f. Developing and conducting the fire extinguisher training program.

g. Implementing a program for indoctrination of personnel gaining unescorted access to the protected area in appropriate procedures which implement the fire protection program, such as fire prevention and fire reporting procedures, plant emergency alarms, including evacuation.

h. Implementing a program for instruction of personnel on the proper handling of accidental events such as leaks or spills of flammable materials.

i. Preparing procedures to meet possible fire situations in the plant and for assuring assistance is available for fighting fires in radiological areas.

j. Implementing a program that utilizes a permit system that controls and documents inoperability of fire protection systems and equipment. This program initiates proper notifications and compensatory actions, such as fire watches, when inoperability of any fire protection system or component is identified.

k. Developing and implementing preventive maintenance, corrective maintenance, and surveillance test fire protection procedures.

l. Confirming that plant modifications, new procedures and revisions to procedures associated with fire protection equipment and systems that have significant impact on the fire protection program are reviewed by an individual who possesses the qualifications of a fire protection engineer.

m. Continuing evaluation of fire hazards during construction or modification of other units on the site. Special considerations, such as fire barriers, fire protection capability and administrative controls are provided as necessary to protect the operating unit(s) from construction or modification activities.

n. Establishing a fire prevention surveillance plan and training plant personnel on that plan.

o. Developing pre-fire plans and making them available to the fire brigade and control room.

The responsibilities of the engineer in charge of fire protection and his staff are discussed in Section 13.1.2.1.2.9.

STD COL 9.5-1 9.5.1.8.2 Fire Brigade

9.5.1.8.2.1 General

The organization of the fire brigade is discussed in Subsection 13.1.2.1.5.

To qualify as a member of the fire brigade, an individual must meet the following criteria:

a. Has attended the required training sessions for the position occupied on the fire brigade.

b. Has passed an annual physical exam including demonstrating the ability for performing strenuous activity and the use of respiratory protection.

9.5.1.8.2.2 Fire Brigade Training

A training program is established so that the capability to fight fires is developed and documented. The program consists of classroom instruction supplemented with periodic classroom retraining, practice in fire fighting, and fire drills. Classroom instruction and training is conducted by qualified individuals knowledgeable in fighting the types of fires that could occur within the plant and its environs and using onsite fire fighting equipment. Individual records of training provided to each fire brigade member, including drill critiques, are maintained as part of the permanent plant files for at least three years to document that each member receives the required training.

The fire brigade leader and at least two brigade members per shift have sufficient training and knowledge of plant safety-related systems to understand the effects of fire and fire suppressants on safe shutdown capability. The brigade leader is competent to assess the potential safety consequences of a fire and advise control room personnel. Such competence by the brigade leader may be evidenced by possession of an operator's license or equivalent knowledge of plant systems.

Personnel assigned as fire brigade members receive formal training prior to assuming brigade duties. The course subject matter is selected to satisfy the requirements of Regulatory Guide 1.189. Course material selection also includes guidance from NFPA 600 (Reference 204) and 1500 (Reference 210) as appropriate. Additional training may also include material selected from NFPA 1404 (Reference 208) and 1410 (Reference 209).

The minimum equipment provided for the fire brigade consists of personal protective equipment, such as turnout coats, boots, gloves, hard hats, emergency communications equipment, portable lights, portable ventilation equipment, and portable extinguishers. Self-contained breathing apparatus (SCBA) approved by NIOSH, using full face positive pressure masks, and providing an operating life of at least 30 minutes, are provided for selected fire brigade, emergency repair and control room personnel. At least ten masks are provided for fire brigade personnel. At least two extra air bottles, each with at least 30 minutes of operating life, are located onsite for each SCBA. An additional onsite 6-hour supply of reserve air is provided to permit quick and complete replenishment of exhausted supply air bottles. DCD Subsection 6.4.2.3 discusses the portable breathing apparatus for control room personnel. Additional SCBAs are provided near the personnel containment entrance for the exclusive use of the fire brigade. The fire brigade leader has ready access to keys for any locked fire doors.

The on-duty shift supervisor has responsibility for taking certain actions based on an assessment of the magnitude of the fire emergency. These actions include safely shutting down the plant, making recommendations for implementing the Emergency Plan, notification of emergency personnel and requesting assistance from off-duty personnel, if necessary. Emergency Plan consideration of fire emergencies includes the guidance of Regulatory Guide 1.101.

9.5.1.8.2.2.1 Classroom Instruction

Fire brigade members receive classroom instruction in fire protection and fire fighting techniques prior to qualifying as members of the fire brigade. This instruction includes:

a. Identification of the types of fire hazards along with their location within the plant and its environs.

b. Identification of the types of fires that could occur within the plant and its environs.

c. Identification of the location of onsite fire fighting equipment and familiarization with the layout of the plant including ingress and egress routes to each area.

d. The proper use of on-site fire fighting equipment and the correct method of fighting various types of fires including at least the following:

- Fires involving radioactive materials
- Fires in energized electrical equipment
- Fires in cables and cable trays
- Fires involving hydrogen
- Fires involving flammable and combustible liquids or hazardous process chemicals
- Fires resulting from construction or modifications (welding)
- Fires involving record files

e. Review of each individual’s responsibilities under the fire protection program.

f. Proper use of communication, lighting, ventilation, and emergency breathing equipment.

g. Fire brigade leader direction and coordination of fire fighting activities.

h. Toxic and radiological characteristics of expected combustion products.

i. Proper methods of fighting fires inside buildings and confined spaces.

j. Detailed review of fire fighting strategies, procedures and procedure changes.

k. Indoctrination of the plant fire fighting plans, identification of each individual's responsibilities, and review of changes in the fire fighting plans resulting from fire protection-related plant modifications.

l. Coordination between the fire brigade and offsite fire departments that have agreed to assist during a major fire onsite is provided to establish responsibilities and duties. Educating the offsite organization in operational precautions when fighting fires on nuclear power plant sites, and awareness of special hazards and the need of radiological protection of personnel.

9.5.1.8.2.2.2 Retraining

Classroom refresher training is scheduled on a biennial basis to supplement retention of the initial training. These sessions may be concurrent with the regular planned meetings.

9.5.1.8.2.2.3 Practice

Practice sessions are held for each fire brigade and for each fire brigade member on the proper method of fighting various types of fires which might occur in the plant. These sessions are scheduled on an annual basis and provide brigade members with team experience in actual fire fighting and the use of emergency breathing apparatus under strenuous conditions encountered in fire fighting.

9.5.1.8.2.2.4 Drills

Fire brigade drills are conducted at least once per calendar quarter for each shift. Each fire brigade member participates in at least two drills annually. Drills are either announced or unannounced. At least one unannounced drill is held annually for each shift fire brigade. At least one drill is performed annually on a "back shift" for each shift's fire brigade. The drills provide for offsite fire department participation at least annually. Triennially, a randomly selected, unannounced drill shall be conducted and critiqued by qualified individuals independent of the plant staff. Training objectives are established prior to each drill and reviewed by plant management. Drills are critiqued on the following points:

a. Assessment of fire alarm effectiveness.

b. Assessment of time required to notify and assemble the fire brigade.

c. Assessment of the selection, placement, and use of equipment.

d. Assessment of the fire brigade leader's effectiveness in directing the fire fighting effort.

e. Assessment of each fire brigade member's knowledge of fire fighting strategy, procedures and simulated use of equipment.

f. Assessment of the fire brigade's performance as a team.

Performance deficiencies identified, based on these assessments, are used as the basis for additional training and repeat drills. Unsatisfactory drill performance is followed by a repeat drill within 30 days.

9.5.1.8.2.2.5 Meetings

Regular planned meetings are held at least quarterly for the fire brigade members to review changes in the fire protection program and other subjects as necessary.

STD COL 9.5-1 9.5.1.8.3 Administrative Controls

Administrative controls for the fire protection program are implemented through plant administrative procedures. Applicable industry publications are used as guidance in developing those procedures.

Administrative controls include procedures to:

a. Control actions to be taken by an individual discovering a fire, such as notification of the control room, attempting to extinguish the fire, and actuation of local fire suppression systems.

b. Control actions to be taken by the control room operator, such as sounding fire alarms, and notifying the shift manager of the type, size and location of the fire.

c. Control actions to be taken by the fire brigade after notification of a fire, including location to assemble, directions given by the fire brigade leader, the responsibilities of brigade members, such as selection of fire fighting and protective equipment, and use of preplanned strategies for fighting fires in specific areas.

d. Control actions to be taken by the security force upon notification of a fire.

e. Define the strategies established for fighting fires in safety-related areas and areas presenting a hazard to safety-related equipment, including the designation of the:

1. Fire hazards in each plant area/zone covered by a fire fighting procedure (pre-fire plan). Pre-fire plans utilize the guidance of NFPA 1620 (Reference 205).

2. Fire extinguishers best suited for controlling fires with the combustible loadings of each zone and the nearest location of these extinguishers.

3. Most favorable direction from which to attack a fire in each area in view of the ventilation direction, access hallways, stairs, and doors that are most likely to be free of fire, and the best station or elevation for fighting the fire. Access and egress routes that involve locked doors are specifically identified in the procedure with the appropriate precautions and methods for access specified.

4. Plant systems that should be managed to reduce the damage potential during a local fire and the location of local and remote controls for such management (e.g., any hydraulic or electrical system in the zone covered by the specific fire fighting procedure that could increase the hazards in the area because of overpressurization or electrical hazards).

5. Vital heat-sensitive system components that need to be kept cool while fighting a local fire. Particularly hazardous combustibles that need cooling are designated.

6. Potential radiological and toxic hazards in fire zones.

7. Ventilation system operation that ensures desired plant air distribution when the ventilation flow is modified for fire containment or smoke clearing operations.

8. Operations requiring control room and shift supervisor coordination or authorization.

9. Instructions for plant operators and other plant personnel during a fire.

f. Organize the fire brigade and assign special duties according to job title so that the fire fighting functions are covered for each shift by personnel trained and qualified to perform these functions. These duties include command control of the brigade, transporting fire suppression and support equipment to the fire scenes, applying the extinguishing agent to the fire, communication with the control room, and coordination with offsite fire departments.

STD COL 9.5-1

9.5.1.8.4 Control of Combustible Materials, Hazardous Materials and Ignition Sources

The control of combustible materials are defined by administrative procedures. These procedures impose the following controls:

a. Prohibit the storage of combustible materials (including unused ion exchange resins) in areas that contain or expose safety-related equipment.

b. Govern the handling of and limit transient fire loads such as flammable liquids, wood and plastic materials in buildings containing safety-related systems or equipment.

c. Assign responsibility to the appropriate supervisor for reviewing work activities to identify transient fire loads.

d. Govern the use of ignition sources by use of a flame permit system to control welding, flame cutting, grinding, brazing and soldering operations, and temporary electrical power cables. A separate permit is issued for each area where such work is done. If work continues over more than one shift, the permit is valid for not more than 24 hours when the plant is operating or for the duration of a particular job during plant shutdown. NFPA 51B (Reference 202) and NFPA 241 (Reference 203) are used as guidance.

e. Minimize waste, debris, scrap, and oil spills or other combustibles resulting from a work activity in the safety-related area while work is in progress and remove the same upon completion of the activity or at the end of each work shift.

f. Govern periodic inspections for accumulation of combustibles for continued compliance with these administrative controls.

g. Prohibit the storage of acetylene-oxygen and other compressed gasses in areas that contain or expose safety-related equipment or the fire protection system that serves those areas. A permit system is required to control the use of this equipment in safety-related areas of the plant.

h. Govern the use and storage of hazardous chemicals in areas that contain or expose safety-related equipment.

i. Control the use of specific combustibles in safety-related areas. Wood used in safety-related areas during maintenance, modification, or refueling operation (such as lay-down blocks or scaffolding) is treated with a flame retardant in accordance with NFPA 703 (Reference 207). Use of wood inside buildings containing systems or equipment important to safety is only permitted when suitable noncombustible substitutes are not available. Equipment or supplies (such as new fuel) shipped in untreated combustible packing containers are unpacked in safety-related areas if required for valid operating reasons. However, combustible materials are removed from the area immediately following unpacking. Such transient combustible material, unless stored in approved containers, is not left unattended during lunch breaks, shift changes, or other similar periods. Loose combustible packing material, such as wood or paper excelsior, or polyethylene sheeting, is placed in metal containers with tight-fitting self-closing metal covers. Only noncombustible panels or flame-retardant tarpaulins or approved materials of equivalent fire-retardant characteristics are used. Any other fabrics or plastic films used are certified to conform to the large-scale fire test described in NFPA 701 (Reference 206).

j. Govern the control of electrical appliances in areas that contain or expose safety-related equipment.

STD COL 9.5-1

9.5.1.8.5 Control of Radioactive Materials

The plant is designed with provisions for sampling of liquids resulting from fire emergencies that may contain radioactivity and may be released to the environment. Plant operating procedures require such liquids to be collected, sampled, and analyzed prior to discharge. Liquid discharges are required to be below activity limits prior to discharge.

STD COL 9.5-1

9.5.1.8.6 Testing and Inspection

Testing and inspection requirements are imposed through administrative procedures. Maintenance or modifications to the fire protection system are subject to inspection for conformation to design requirements. Procedures governing the inspection, testing, and maintenance of fire protection alarm and detection systems, and water-based suppression and supply systems, utilize the guidance of NFPA 72 (DCD Reference 9.5.5.2) and NFPA 25 (Reference 212). Installation of portions of the system where performance cannot be verified through pre-operational tests, such as penetration seals, fire retardant coatings, cable routing, and fire barriers are inspected. Inspections are performed by individuals knowledgeable of fire protection design and installation requirements. Open flame or combustion-generated smoke is not used for leak testing or similar procedures such as air flow determination.

Inspection and testing procedures address the identification of items to be tested or inspected, responsible organizations for the activity, acceptance criteria, documentation requirements and sign-off requirements.

Fire protection materials subject to degradation (such as fire stops, seals and fire retardant coatings) are visually inspected periodically for degradation or damage. Fire hoses are hydrostatically tested in accordance with NFPA 1962 (Reference 201). Hoses stored in outside hose stations are tested annually and interior standpipe hoses are tested every three years.

The fire protection system is periodically tested in accordance with plant procedures. Testing includes periodic operational tests and visual verification of damper and valve positions. Fire doors and their closing and latching mechanisms are also included in these procedures.

STD COL 9.5-6 The preoperational testing program describes the procedures for confirming that the as-installed configuration of fire barriers matches the tested configurations. The procedures describe the process for identifying and dispositioning deviations.

9.5.1.8.7 Personnel Qualification and Training

STD COL 9.5-1 The engineer in charge of fire protection is responsible for the formulation and implementation of the fire protection program and meets the qualification requirements listed in Subsection 13.1.2.1.2.9.

Qualification and training of other plant personnel involved in the fire protection program is governed by plant qualification procedures and is conducted by personnel qualified by training and experience in these areas. These classifications include training personnel, maintenance personnel assigned to work on the fire protection system, and operations personnel assigned to system operation and testing.

9.5.1.8.8 Fire Doors

STD COL 9.5-3 Fire doors separating safety-related areas are self-closing or provided with closing mechanisms and are inspected semiannually to verify that the automatic hold open, release and closing mechanisms and latches are operable. Watertight and missile resistant doors are not provided with closing mechanisms. Fire doors with automatic hold open and release mechanisms are inspected daily to verify that the doorways are free of obstructions.

Fire doors separating safety-related areas are normally closed and latched. Fire doors that are locked closed are inspected weekly to verify position. Fire doors that are closed and latched are inspected daily to assure that they are in the closed position. Fire doors that are closed and electrically supervised at a continuously manned location are not inspected.

9.5.1.8.9 Emergency Planning

STD COL 9.5-3 Emergency planning is described in Section 13.3.

STD DEP 1.1-1

9.5.1.9 Combined License Information

9.5.1.9.1 Qualification Requirements for Fire Protection Program

STD COL 9.5-1 This COL Item is addressed as follows:

Qualification requirements for individuals responsible for development of the Fire Protection Program are discussed in Subsections 9.5.1.6 and 9.5.1.8.7.

Training of firefighting personnel is discussed in Subsections 9.5.1.8, 9.5.1.8.2, and 9.5.1.8.7.

Administrative procedures and controls governing the Fire Protection Program during plant operation are discussed in Subsections 9.5.1.8.1.2, 9.5.1.8.3, 9.5.1.8.4, 9.5.1.8.5 and 9.5.1.8.6.

Fire protection system maintenance is discussed in Subsection 9.5.1.8.6.

9.5.1.9.2 Fire Protection Analysis Information

WLS COL 9.5-2 This COL Item is addressed in Subsection 9A.3.3.

9.5.1.9.3 Regulatory Conformance

STD COL 9.5-3 This COL Item is addressed in Subsections 9.5.1.8.1.1, 9.5.1.8.8, and 9.5.1.8.9 and in Table 9.5-201.

9.5.1.9.4 NFPA Exceptions

STD COL 9.5-4 This COL item is addressed in Subsection 9.5.1.8.1.1.

9.5.1.9.6 Verification of Field Installed Fire Barriers

STD COL 9.5-6 This COL Item is addressed in Subsection 9.5.1.8.6.

9.5.1.9.7 Establishment of Procedures to Minimize Risk for Fire Areas Breached During Maintenance

STD COL 9.5-8 This COL Item is addressed in Subsection 9.5.1.8.1.2.a.3.vi.

Add the following subsections at the end of DCD Subsection 9.5.2.2.3.

9.5.2.2.3.1 Offsite Interfaces

WLS COL 9.5-9
WLS COL 18.2-2 The offsite communications system is used for emergency communications between the Station and various emergency organizations. The offsite interfaces are divided into two categories: the NRC interface, and State, Local and Corporate interfaces.

9.5.2.2.3.1.1 NRC Offsite Interfaces

In the event of an emergency at the Station, offsite interfaces with the NRC are required for notification and continued communication. The primary means of communication between the Station and the NRC is the Emergency Telephone System (ETS). The ETS provides a reliable communication link to the NRC Operations Center.

The ETS provides voice and data communication between the Station and the NRC headquarters. Calls using the ETS phones are connected directly to Duke’s long distance provider over Duke’s private fiber optic network. The design utilizes existing corporate telecommunications equipment to provide access to long distance lines without having to go through a local telephone company switch.

Onsite systems supporting the ETS phones are provided with alternate or backup power sources with automatic transfer capability to maintain continuity of communication in the event the normal power source is lost. The design addresses the recommendations of IE Bulletin BL-80-15 “Possible Loss of Emergency Notification System (ENS) With Loss of Offsite Power”.

9.5.2.2.3.1.2 State, Local and Corporate Offsite Interfaces

In the event of an emergency at the Station, notification and activation of the State, Local and Corporate emergency response network is established. This network requires communication interfaces between the Station and the following offsite agencies:

- North Carolina State Emergency Operations Center
- South Carolina Warning Point
- Cherokee County Warning Point
- Cleveland County Warning Point

- York County Warning Point
- Duke Energy Emergency Operating Facility (EOF)

The primary means of communication between the station and these offsite agencies is the selective signaling system. The selective signaling system uses Duke telecommunication interfaces to dedicated private lines leased from the local telephone companies to provide reliable communication links with these offsite organizations. The design utilizes existing corporate telecommunications equipment to complete calls without having to go through a local telephone company switch.

Onsite systems supporting the selective signaling system are provided with sufficient alternate or backup power sources having automatic transfer capability to maintain continuity of communication in the event the normal power source is lost. The design addresses the recommendations of IE Bulletin BL-80-15 “Possible Loss of Emergency Notification System (ENS) With Loss of Offsite Power.”

9.5.2.2.3.1.3 Other Interfaces

Communication between the station and offsite radiological monitoring teams is by a radio system. Each radio is powered by a non-essential ac source and has a built-in battery backup.

As an alternative to ground-based communications mentioned above, in the event of a natural disaster the Station also maintains a satellite phone system. The phone system is portable, self-contained, and intended for use with communications with the NRC.

WLS COL 9.5-10 9.5.2.2.3.2 Emergency Offsite Communications

9.5.2.2.3.2.1 NRC Communication Interfaces

The ETS system provides the primary method for voice and data communication from the Station control room or Technical Support Center (TSC) to the NRC Operations Center. As a minimum, the following communication links are provided to support the NRC functional areas:

(1) dedicated telephone for the NRC Emergency Notification System (ENS)

(1) dedicated telephone for the NRC Health Physics Network (HPN)

(4) dedicated telephones for use by NRC personnel for dialing onsite and offsite locations. These phones also support the following NRC communications requirements:

- Reactor Safety Counterpart Link (RSCL)
- Protective Measures Counterpart Link (PMCL)
- Management Counterpart Link (MCL)
- Operations Center LAN (OCL)

(2) dedicated telephones for the Emergency Response Data Systems (ERDS)

The dedicated telephones in the ETS use Duke Energy fiber optic lines to public long distance lines. The design utilizes existing corporate telecommunications equipment to provide access to long distance lines without having to go through a local telephone company switch. The associated equipment is provided with sufficient alternate or backup power sources having automatic transfer capability to maintain continuity of communication in the event the normal power source is lost.

The secondary means of communication between the station and the NRC are commercial telephone company lines.

9.5.2.2.3.2.2 State, Local and Corporate Offsite Interfaces

The primary means of communication between the station and these offsite agencies is the selective signaling system. The selective signaling system uses Duke telecommunication interfaces to dedicated private lines leased from the local telephone companies to provide reliable communication links with these offsite organizations. The design utilizes existing corporate telecommunications equipment to complete calls without having to go through a local telephone company switch.

Onsite systems supporting the selective signaling system are provided with sufficient alternate or backup power sources having automatic transfer capability to maintain continuity of communication in the event the normal power source is lost. The design addresses the recommendations of IE Bulletin BL-80-15 “Possible Loss of Emergency Notification System (ENS) With Loss of Offsite Power.”

The secondary means of communication between the station and offsite state, local and corporate interfaces are commercial telephone company lines.

A radio system provides a backup means of communication between the station and these offsite communication points. Communications by radio with the state and local agencies can be achieved either by using the Duke network or by using the radio network operated by each state agency. Communication between the station, offsite radiological monitoring teams, and the EOF can also be achieved by using the Duke radio network.

The site radio system is powered by a non-essential ac source and has a built-in battery backup.

9.5.2.5 Combined License Information

9.5.2.5.1 Offsite Interfaces

WLS COL 9.5-9 This COL Item is addressed in Subsection 9.5.2.2.3.1

9.5.2.5.2 Emergency Offsite Communications

WLS COL 9.5-10 This COL Item is addressed in Subsection 9.5.2.2.3.2

9.5.2.5.3 Security Communications

STD COL 9.5-11 This COL Item is addressed in the Physical Security Plan.

Add the following subsection after DCD Subsection 9.5.4.5.1.

9.5.4.5.2 Fuel Oil Quality

STD COL 9.5-13 The diesel fuel oil testing program requires testing both new fuel oil and stored fuel oil. High fuel oil quality is provided by specifying the use of ASTM Grade 2D fuel oil with a sulfur content as specified by the engine manufacturer.

A fuel sample is analyzed prior to addition of ASTM Grade 2D fuel oil to the storage tanks. The sample moisture content and particulate or color is verified per ASTM D4176 (Reference 213). In addition, kinematic viscosity is tested to be within the limits specified in Table 1 of ASTM D975 (Reference 214). The remaining critical parameters per Table 1 of ASTM D975 are verified compliant within 7 days.

Fuel oil quality is verified by sample every 92 days to meet ASTM Grade 2D fuel oil criteria. The addition of fuel stabilizers and other conditioners is based on sample results.

The fuel oil storage tanks are inspected on a monthly basis for the presence of water. Any accumulated water is to be removed.

9.5.4.7 Combined License Information

STD COL 9.5-13 This COL Item is addressed in Subsection 9.5.4.5.2.

9.5.5 REFERENCES

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201. National Fire Protection Association, “Standard for Inspection, Care, and Use of Fire Hose Couplings, and Nozzles and the Service Testing of Fire Hose,” NFPA 1962, 2003.

202. National Fire Protection Association, “Standard for Fire Prevention During Welding, Cutting, and Other Hot Work,” NFPA 51B, 2003.

203. National Fire Protection Association, “Standard for Safeguarding Construction, Alteration, and Demolition Operations,” NFPA 241, 2004.

204. National Fire Protection Association, “Standard on Industrial Fire Brigades,” NFPA 600, 2005.

205. National Fire Protection Association, “Recommended Practice for Pre-incident Planning,” NFPA 1620, 2003.

206. National Fire Protection Association, "Standard Methods of Fire Tests for Flame Propagation of Textiles and Films," NFPA 701, 2004.

207. National Fire Protection Association, “Standard for Fire-Retardant Treated Wood and Fire-Retardant Coatings for Building Materials,” NFPA 703, 2006.

208. National Fire Protection Association, “Standard for Fire Service Respiratory Protection Training,” NFPA 1404, 2006.

209. National Fire Protection Association, “Standard on Training for Initial Emergency Scene Operations,” NFPA 1410, 2005.

210. National Fire Protection Association, “Standard on Fire Department Occupational Safety and Health Program,” NFPA 1500, 2007.

211. NFPA-804, 2001, “Standard for Fire Protection for Advanced Light Water Reactor Electric Generating Plants.”

212. National Fire Protection Association, “Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems,” NFPA 25, 2008.

213. American Society of Mechanical Engineers, "Standard Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)," ASTM D4176-04e1.

214. American Society of Mechanical Engineers, "Standard Specification for Diesel Fuel Oils," ASTM D975-08.

STD COL 9.5-3
STD COL 9.5-4

TABLE 9.5-201 (Sheet 1 of 10)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH
BTP CMEB 9.5-1[(a)]

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
Fire Protection Program			
1. Direction of fire protection program; availability of personnel.	C.1.a(1)	C	Comply. Subsections 9.5.1.8.1.2 and 13.1.1.2.10 address this requirement.
2. Defense-in-depth concept; objective of fire protection program.	C.1.a(2)	C	Comply. Subsections 9.5.1.8 and 9.5.1.8.1 address this requirement.
3. Management responsibility for overall fire protection program; delegation of responsibility to staff.	C.1.a(3)	C	Comply. Subsections 9.5.1.8.1.2, 13.1.2.1.2.9 and 13.1.1.2.10
4. The staff should be responsible for: a. Fire protection program requirements. b. Post-fire shutdown capability. c. Design, maintenance, surveillance, and quality assurance of fire protection features. d. Fire prevention activities. e. Fire brigade organization and training. f. Prefire planning.	C.1.a(3)	C	Comply. Subsection 13.1.2.1.2.9 addresses this requirement.

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STD COL 9.5-4

TABLE 9.5-201 (Sheet 2 of 10)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH
BTP CMEB 9.5-1[(a)]

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
5. The organizational responsibilities and lines of communication pertaining to fire protection should be defined through the use of organizational charts and functional descriptions.	C.1.a(4)	C	Comply. Organization and lines of communication are addressed in Figure 13.1-201. Functional descriptions are addressed in Subsections 13.1.1.2.10, 13.1.1.3.1.3, 13.1.2.1.2.9, and 13.1.2.1.5.
6. Personnel qualification requirements for fire protection engineer, reporting to the position responsible for formulation and implementation of the fire protection program.	C.1.a(5)(a)	C	Comply. Subsection 13.1.2.1.2.9 addresses this requirement.
7. The fire brigade members' qualifications should include a physical examination for performing strenuous activity, and the training described in Position C.3.d.	C.1.a(5)(b)	C	Comply. Subsections 9.5.1.8.2.1 and 9.5.1.8.2.2 address these requirements.
8. The personnel responsible for the maintenance and testing of the fire protection systems should be qualified by training and experience for such work.	C.1.a(5)(c)	C	Comply. Subsection 9.5.1.8.7 addresses this requirement.

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STD COL 9.5-4

TABLE 9.5-201 (Sheet 3 of 10)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH
BTP CMEB 9.5-1[(a)]

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
9. The personnel responsible for the training of the fire brigade should be qualified by training and experience for such work.	C.1.a(5)(d)	C	Comply. Subsection 9.5.1.8.2.2 addresses this requirement.
10. The following NFPA publications should be used for guidance to develop the fire protection program: No. 4, No. 4A, No. 6, No. 7, No. 8, and No. 27.	C.1.a(6)	AC	Alternate Compliance. The NFPA codes cited in BTP CMEB 9.5-1 are historical. Current NFPA codes are referenced for guidance for the fire protection program. Subsection 9.5.1.8.1.1 addresses this requirement.
11. On sites where there is an operating reactor, and construction or modification of other units is underway, the superintendent of the operating plant should have a lead responsibility for site fire protection.	C.1.a(7)	C	Comply. Subsection 13.1.1.2.10 addresses this requirement.

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STD COL 9.5-4

TABLE 9.5-201 (Sheet 4 of 10)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH
BTP CMEB 9.5-1[a]

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
Fire Protection Analysis			
14. Fires involving facilities shared between units should be considered.	C.1.b	C	Comply. The FHA demonstrates the plant's ability to perform safe shutdown functions and minimize radioactive releases to the environment. Postulated fires in shared facilities that do not contain SSCs important to safety and do not contain radioactive materials do not affect these functions
15. Fires due to man-made site-related events that have a reasonable probability of occurring and affecting more than one reactor unit should be considered.	C.1.b	C	Comply. Subsections 2.2.3 and 3.5 establish that these events are not credible.
Fire Suppression System Design Basis			
22. Fire protection systems should retain their original design capability for potential man-made, site-related events that have a reasonable probability of occurring at a specific plant site.	C.1.c(4)	C	Comply. Subsections 2.2.3 and 3.5 establish that these events are not credible.

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STD COL 9.5-4

TABLE 9.5-201 (Sheet 5 of 10)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH BTP CMEB 9.5-1[(a)]

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
Fire Protection Program Implementation			
26. The fire protection program for buildings storing new reactor fuel and for adjacent fire areas that could affect the fuel storage area should be fully operational before fuel is received at the site.	C.1.e(1)	C	Comply. Subsection 9.5.1.8.1 addresses this requirement.
27. The fire protection program for an entire reactor unit should be fully operational prior to initial fuel loading in that unit.	C.1.e(2)	C	Comply. Subsection 9.5.1.8.1 addresses this requirement.
28. Special considerations for the fire protection program on reactor sites where there is an operating reactor and construction or modification of other units is under way.	C.1.e(3)	C	Comply. Subsection 9.5.1.8.1.2.m addresses this requirement.
29. Establishing administrative controls to maintain the performance of the fire protection system and personnel.	C.2	C	Comply. Subsection 9.5.1.8.1.2 addresses this requirement.
Fire Brigade			
30. The guidance in Regulatory Guide 1.101 should be followed as applicable.	C.3.a	C	Comply. Subsection 9.5.1.8.2.2 addresses this requirement.

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STD COL 9.5-4

TABLE 9.5-201 (Sheet 6 of 10)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH
BTP CMEB 9.5-1[(a)]

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
31. Establishing site brigade: minimum number of fire brigade members on each shift; qualification of fire brigade members; competence of brigade leader.	C.3.b	C	Comply. Subsections 9.5.1.8.2.2 and 13.1.2.1.5 address this requirement.
32. The minimum equipment provided for the brigade should consist of turnout coats, boots, gloves, hard hats, emergency communications equipment, portable ventilation equipment, and portable extinguishers.	C.3.c	C	Comply. Subsection 9.5.1.8.2.2 addresses this requirement.
33. Recommendations for breathing apparatus for fire brigade, damage control, and control room personnel.	C.3.c	C	Comply. Subsection 9.5.1.8.2.2 and DCD Subsections 6.4.2.3 and 6.4.4 address these requirements.
34. Recommendations for the fire brigade training program.	C.3.d	C	Comply. Subsection 9.5.1.8.2.2 addresses this requirement.
Quality Assurance Program			
35. Establishing quality assurance (QA) programs by applicants and contractors for the fire protection systems for safety-related areas; identification of specific criteria for quality assurance programs.	C.4	C	Comply. Chapter 17 and DCD Subsection 9.5.1.7 address this requirement.

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STD COL 9.5-4

TABLE 9.5-201 (Sheet 7 of 10)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH
BTP CMEB 9.5-1[(a)]

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
Building Design			
50. Fire doors should be inspected semiannually to verify that automatic hold-open, release, and closing mechanisms and latches are operable.	C.5.a (5)	C	Comply. Subsection 9.5.1.8.8 addresses this requirement.
51. Alternative means for verifying that fire doors protect the door opening as required in case of fire.	C.5.a (5)	C	Comply. Subsection 9.5.1.8.8 addresses this requirement.
52. The fire brigade leader should have ready access to keys for any locked fire doors.	C.5.a (5)	C	Comply. Subsection 9.5.1.8.2.2 addresses this requirement.
55. Stairwells serving as escape routes, access routes for firefighting, or access routes to areas containing equipment necessary for safe shutdown should be enclosed in masonry or concrete towers with a minimum fire resistance rating of 2 hours and self-closing Class B fire doors.	C.5.a(6)	C	Comply. Subsection 9A.3.3 addresses this requirement for miscellaneous buildings located in the yard.
56. Fire exit routes should be clearly marked.	C.5.a (7)	C	Comply. DCD Subsection 9.5.1.2.1.1 addresses this requirement.
71. Water drainage from areas that may contain radioactivity should be collected, sampled, and analyzed before discharge to the environment.	C.5.a(14)	C	Comply. Capability is provided. Subsection 9.5.1.8.5 addresses this requirement.

STD COL 9.5-3
STD COL 9.5-4

TABLE 9.5-201 (Sheet 8 of 10)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH
BTP CMEB 9.5-1[(a)]

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
Control of Combustibles			
80. Use of compressed gases inside buildings should be controlled.	C.5.d (2)	C	Comply. Subsection 9.5.1.8.4g addresses this requirement.
Lighting and Communication			
111. A portable radio communications system should be provided for use by the fire brigade and other operations personnel required to achieve safe plant shutdown.	C.5.g (4)	C	Comply. Subsections 9.5.1.8.1.2.a.3.v, 9.5.1.8.2.2, and DCD Subsections 9.5.2 and 9.5.2.2.1 address this requirement.
Water Sprinkler and Hose Standpipe Systems			
149. All valves in the fire protection system should be periodically checked to verify position.	C.6.c (2)	C	Comply. Subsection 9.5.1.8.6 addresses this requirement.
157. The fire hose should be hydrostatically tested in accordance with NFPA 1962. Hoses stored in outside hose houses should be tested annually. The interior standpipe hose should be tested every 3 years.	C.6.c (6)	C	Comply. Subsection 9.5.1.8.6 addresses this requirement.
Primary and Secondary Containment			
174. Self-contained breathing apparatus should be provided near the containment entrances for fire fighting and damage control personnel. These units should be independent of any breathing apparatus provided for general plant activities.	C.7.a (2)	C	Comply. Subsection 9.5.1.8.2.2 addresses this requirement.

STD COL 9.5-3
STD COL 9.5-4

TABLE 9.5-201 (Sheet 9 of 10)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH
BTP CMEB 9.5-1[(a)]

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
Main Control Room Complex			
180. Breathing apparatus for main control room operators should be readily available.	C.7.b	C	Comply. DCD Subsection 6.4.2.3 addresses this requirement.
Cooling Towers			
225. Cooling towers should be of noncombustible construction or so located and protected that a fire will not adversely affect any safety-related systems or equipment.	C.7.q	C	Comply. Subsection 9A.3.3 addresses this requirement.
Storage of Acetylene-Oxygen Fuel Gases			
228. Gas cylinder storage locations should not be in areas that contain or expose safety-related equipment or the fire protection systems that serve those safety-related areas.	C.8.a	C	Comply. Subsection 9.5.1.8.4.g addresses this requirement.
229. A permit system should be required to use this equipment in safety-related areas of the plant.	C.8.a	C	Comply. Subsection 9.5.1.8.4.g addresses this requirement.
Storage Areas for Ion Exchange Resins			
230. Unused ion exchange resins should not be stored in areas that contain or expose safety-related equipment.	C.8.b	C	Comply. Subsection 9.5.1.8.4.a addresses this requirement.

STD COL 9.5-3
STD COL 9.5-4

TABLE 9.5-201 (Sheet 10 of 10)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH
BTP CMEB 9.5-1[(a)]

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
Hazardous Chemicals			
231. Hazardous chemicals should not be stored in areas that contain or expose safety-related equipment.	C.8.c	C	Comply. Subsection 9.5.1.8.4.h addresses this requirement.

a) This table supplements DCD Table 9.5.1-1.

STD COL 9.5-4

TABLE 9.5-202[a]
EXCEPTIONS TO NFPA STANDARD REQUIREMENTS

Requirement	AP1000 Exception or Clarification
NFPA 804 (Reference 211) contains requirements specific to light water reactors.	Compliance with portions of this standard is as identified within DCD Section 9.5.1 and WCAP-15871. The intake structure is non-combustible construction, does not provide any safety function, and does not contain any equipment important to safety. Automatic sprinkler protection is not warranted and is not provided.

a) This table supplements DCD Table 9.5.1-3.

WLS DEP 6.3-1

TABLE 9.5.1-201 (Sheet 1 of 2)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH
BTP CMEB 9.5-1

BTP CMEB 9.5-1 Guideline	Paragraph	Comp(1)	Remarks
Safe Shutdown Capability			
72. Fire damage should be limited so that one train of systems necessary to achieve and maintain hot shutdown conditions from either the main control room or emergency control station is free of fire damage.	C.5.b(1)	C	
73. Fire damage should be limited so that systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station can be repaired within 72 hours.	C.5.b(1)	AC	Safe shutdown following a fire is defined for the AP1000 plant as the ability to achieve and maintain the reactor coolant system (RCS) temperature below 215.6°C (420°F) without uncontrolled venting of the primary coolant from the RCS. This is a departure from the criteria applied to the evolutionary plant designs, and the existing plants where safe shutdown for fires applies to both hot and cold shutdown capability. With expected RCS leakage, the AP1000 plant can maintain safe shutdown conditions for greater than 14 days. Therefore, repairs to systems necessary to reach cold shutdown need not be completed within 72 hours.

WLS DEP 6.3-1

TABLE 9.5.1-201 (Sheet 2 of 2)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH
BTP CMEB 9.5-1

BTP CMEB 9.5-1 Guideline	Paragraph	Comp[(1)]	Remarks
74. Separation requirements for verifying that one train of systems necessary to achieve and maintain hot shutdown is free of fire damage.	C.5.b(2)	C	

Notes:

1. Compliance with NUREG-0800 Section 9.5.1, Branch Technical Position CMEB 9.5-1 is indicated by the following codes:
   C - Compliance: AP1000 is committed to compliance with the guideline.
   AC - Alternate Compliance: compliance with the guideline by alternate means or intent. Alternative means or design are provided in the remarks column.

APPENDIX 9A
FIRE PROTECTION ANALYSIS

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

9A.2 FIRE PROTECTION ANALYSIS METHODOLOGY

9A.2.1 Fire Area Description

WLS DEP 18.8-1 Add the following information at the end of the first paragraph in DCD Subsection 9A.2.1:

Figure 9A-201 replaces DCD Figure 9A-3 (sheet 1), to reflect the relocation of the Operations Support Center.

9A.3.3 Yard Area and Outlying Buildings

Replace the second sentence of DCD Subsection 9A.3.3 with the following information.

WLS COL 9.5-2 Miscellaneous yard areas do not contain safety-related components or systems, do not contain radioactive materials, and are so located that a fire or effects of a fire, including smoke, will not adversely affect any safety-related systems or equipment. Miscellaneous areas include such structures, for example, as maintenance shops, warehouses, training/office centers, and flammable and combustible material storage tanks. The four intake structures (river water, Make-Up Pond A, Make-Up Pond B, and Make-Up Pond C) are non-safety-related, do not contain any safety-related equipment, and are remotely located from safety-related structures, systems and components. National Fire Protection Association (NFPA) Standard 804 (Reference 203), Paragraph 8.28, requires automatic sprinkler protection for the intake structures. Due to the non-combustible construction, remote location, and the absence of safety-related equipment and systems, an exception to the automatic sprinkler protection is justified. The miscellaneous areas are located outside of the nuclear island, which is separated from the other yard areas by 3-hour fire rated barriers. Water-based fire suppression systems are provided as determined by the fire hazards analysis and are supplied by a branch line from the underground yard fire water system.

The administrative building is a separate detached building located in the yard. The building does not contain any equipment required for safe shutdown, nor contain any radioactive systems or components. The building is so located and protected that a fire or by-products of a fire does not adversely affect any safety-related systems or equipment. The administrative building is remotely located from HVAC air intakes such that smoke and products of combustion do not affect any safety-related plant areas. The administrative building is typical of an office environment. Based on the NFPA Fire Protection Handbook, 16th Edition (DCD Section 9A.4, Reference 2), Table 7-9C, for a general office use for a private building, the total fire load would be equivalent to 7.7 BTU/ft^2. For conservatism, a total fire load of 10.0 BTU/ft^2 is assumed. The heat potential associated with this fire load is 80,000 BTU/ft^2, which corresponds to an equivalent fire duration of one hour per Table 7-9B of DCD Section 9A.4, Reference 2. Severity is slight per Table 7-9E of DCD Section 9A.4, Reference 2. In accordance with DCD Subsection 9A.2.4, for a combustible loading greater than 80,000 BTU/ft^2 automatic and manual suppression systems and fire detection are required. Fixed automatic sprinklers and hose stations supplied by a branch line from the underground yard fire water system are provided for the administrative building. Portable extinguishers are provided throughout. A fire in this fire area is detected by a fire detection system which produces an audible alarm locally and both visual and audible alarms in the main control room and the security central alarm station. The fire is extinguished by the wet pipe sprinkler system or manually using hose streams or portable extinguishers. The administrative building is served by a dedicated HVAC system, which does not interface with other ventilation systems serving safety-related areas. Smoke is removed from the building using portable exhaust fans and flexible ductwork.

The cooling towers are non-combustible construction and are not used as the ultimate heat sink or for fire protection purposes. Therefore, the guidance specified in BTP CMEB 9.5-1 is not applicable. The cooling towers serve no safety function and have no safety design basis. The cooling towers do not contain any equipment capable of releasing radioactivity to the atmosphere. The cooling tower fill is a PVC material with a flame spread rating of 25 or less, which is considered non-combustible per Regulatory Guide 1.189. There are limited combustibles, primarily cabling, located in the fan housings at the top of the tower structures. There are limited combustibles located in the circulating water intake structure, primarily cabling. The combustible loading is estimated to be less than one hour. In accordance with DCD Subsection 9A.2.4 for a combustible loading of up to 80,000 BTU/ft^2 (one hour), manual suppression and fire detection are required. Due to the limited combustibles and location of the fan housings, manual suppression and detection is not warranted. A fire in the intake structure is detected by a fire detection system which produces an audible alarm locally and both visual and audible alarms in the main control room and the security central alarm station. Portable extinguishers are provided in the area for manual suppression. The cooling towers are remotely located from HVAC air intakes such that smoke and products of combustion do not affect any safety-related plant areas.

STD COL 9.5-3 Stairwells in miscellaneous buildings located in the yard serving as escape routes or access routes for firefighting are enclosed in masonry or concrete towers with a minimum fire resistance rating of 2 hours and self-closing Class B fire doors. The two-hour fire-resistance rating for the masonry or concrete material is based on testing conducted in accordance with ASTM E119 (Reference 201) and NFPA 251 (Reference 202).

9A.4 REFERENCES

201. American Society of Mechanical Engineers, “Standard Test Methods for Fire Tests of Building Construction and Materials,” ASTM E119-08a.

202. National Fire Protection Association, "Standard Methods of Tests of Fire Endurance of Building Construction and Materials," NFPA 251, 2006.

203. NFPA-804, 2001, "Standard for Fire Protection for Advanced Light Water Reactor Electric Generating Plants.”