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.

LNP 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.

9.1.4.3 Safety Evaluation

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 will be implemented when the plant is placed into commercial operation. This program will include 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 testing 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.

<u>Metamic Monitoring Acceptance Criteria:</u>

- 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

Add the following paragraph at the end of DCD Subsection 9.2.1.2.2, Component Description, Cooling Tower Subsection:

LNP SUP 9.2-2 The SWS cooling tower was evaluated for potential impacts from interference and air restriction effects due to yard equipment layout and tower operation on an adjacent unit. Based on unit spacing, yard equipment layout, and the margins inherent in the performance requirements and design conditions of the SWS cooling 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.

LNP COL 9.2-1 The source of water for the potable water system is the raw water system (freshwater subsystem – well water) (Subsection 9.2.11).

9.2.5.3 System Operation

Replace the first and second paragraphs of DCD Subsection 9.2.5.3 with the following information.

LNP COL 9.2-1 Filtered water is supplied from groundwater wells via the raw water system (RWS) for the potable water distribution system (Subsection 9.2.11).

The pumps of the potable water supply system maintain the required pressure throughout the potable water distribution system. The biocide for the potable water system is sodium hypochlorite.

9.2.6.1.1 Safety Design Basis

LNP DEP 6.4-1 Revise the first sentence of the first paragraph of DCD Subsection 9.2.6.1.1 to read as follows:

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 final paragraph at the end of DCD Subsection 9.2.6.2.1 (to remove the reference to the "site specific") with:

LNP SUP 9.2-1 Sanitary waste is treated on-site. A 40,000 gallon per day per unit capacity sewage treatment plant is provided. The plant has the capacity to treat the waste from LNP 1 and 2.

9.2.6.2.2 General Description

Replace the text under Trunk Line in DCD Subsection 9.2.6.2.2 (to remove the reference to the "site" treatment plant) with:

LNP SUP 9.2-1 The trunk line is the primary line that the sanitary drainage system piping connects into for the transport of the sanitary drainage to the treatment plant.

Replace the last sentence under Manholes in DCD Subsection 9.2.6.2.2 (to remove the reference to the "site specific") with:

LNP SUP 9.2-1 Quantity and locations of the manholes are determined by these criteria.

Replace the last sentence under Lift Stations in DCD Subsection 9.2.6.2.2 (to remove the reference to the "site specific") with:

LNP SUP 9.2-1 Quantity and locations of the lift stations are determined by these criteria.

9.2.6.4 Test and Inspection

Replace the last sentence in DCD Subsection 9.2.6.4 (to remove the reference to the "site" specific governing codes) with:

LNP SUP 9.2-1 System inspection is performed in compliance with the Uniform Plumbing Code Section 103.5.

9.2.6.5 Instrument Application

Replace the text under DCD Subsection 9.2.6.5 (to remove the reference to the "site" treatment plant) with:

LNP SUP 9.2-1 Sufficient instrumentation for operation is provided to monitor the treatment plant.

DCD Subsection 9.2.8 is modified using full text incorporation to provide site-specific information to replace the DCD conceptual design information (CDI).

9.2.8 TURBINE BUILDING CLOSED COOLING WATER SYSTEM

LNP 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 the circulating water system.

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 Table 9.2.8-1 during normal plant operation.

LNP CDI During power operation, the turbine building closed cooling water system provides a continuous supply of cooling water to turbine building equipment at a temperature of 105°F or less assuming a circulating 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.

LNP CDI

The heat sink for the turbine building closed cooling water system is the circulating water system. The heat is transferred to the circulating water through plate type heat exchangers which are components of the turbine building closed cooling water system.

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 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

LNP 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 turbine building closed cooling water system by the circulating water system via the heat exchangers.

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 a 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 bank 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.

LNP CDI

The heat exchangers are plate type heat exchangers. Turbine building closed cooling water circulates through one side of the heat exchangers while circulating 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 so leakage of circulating 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

LNP CDI The turbine building closed cooling water system is placed in operation during the plant startup sequence after the circulating water system is in operation 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 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 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 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 SYSTEM

9.2.9.2.1 General Description

Add the following text to the end of DCD Subsection 9.2.9.2.1.

LNP COL 9.2-2 The wastewater treatment system is located on the LNP site and shared by LNP 1 and 2. This system allows wastewater sediment to settle at the bottom of a settling basin before the water is discharged to the Crystal River Energy Complex (CREC) discharge canal through the circulating water system (CWS) blowdown.

9.2.9.2.2 Component Description

Add the following paragraph at the end of the text under the heading "Waste Water Retention Basin" in DCD Subsection 9.2.9.2.2.

LNP COL 9.2-2 The wastewater retention basins are located southwest of LNP 1 and 2 near the sewage treatment plant. One basin is provided per unit. For redundancy, each basin is sized to intake the maximum possible flow from two units if one basin is out of service. The basins are sized large enough to allow for sediments as small as silt to settle before the water exits the basin. The basins are constructed of reinforced concrete walls and continuously poured base mats with no construction joints in the mats or any exterior walls (except a construction joint with a waterstop may be used at the exterior wall/mat junction) and waterstops at all construction joints to minimize seepage. This size of the basins provide retention time for settling of solids larger than 10 microns that may be suspended in the wastewater stream. Two 100% pumps for each retention basin are provided to transfer water from the wastewater retention basin to the CWS blowdown. For each retention basin, only one of the pumps will operate at any given time. The pumps will have separate feeds from the 480VAC distribution system. In the event of a LOOP, power will not be supplied to the wastewater retention basin transfer pumps. The basin transfer pumps are designed to discharge a maximum of 850 gpm to the CWS blowdown.

9.2.9.5 Instrumentation Applications

Add the following information after the last paragraph of DCD Subsection 9.2.9.5.

LNP COL 9.2-2 A level indicator and level transmitter are provided for each wastewater retention basin to automatically control flow out of the wastewater retention basin. High alarms will indicate basin level where operator action is required. A radiation monitor is located on the common discharge of the basin transfer pumps to provide an alarm and trip the basin transfer pumps upon detection of radioactivity in the wastewater.

STD DEP 1.1-1 Add the following subsections after DCD Subsection 9.2.10. DCD Subsections 9.2.11 and 9.2.12 are renumbered as Subsections 9.2.13 and 9.2.14.

LNP SUP 9.2-1

9.2.11 RAW WATER SYSTEM

The RWS provides makeup to the circulating water mechanical draft cooling tower basins, demineralized water treatment system, potable water storage tank, the fire protection system fire water storage tanks, and service water cooling tower basins. The RWS consists of two subsystems:

- The freshwater subsystem that supplies strained and filtered groundwater for makeup to the demineralized water treatment system, potable water storage tank, the fire protection system fire water storage tanks, yard fire water system (YFS) and service water cooling tower basins.
- The saltwater subsystem that supplies strained water from the Cross Florida Barge Canal (CFBC) for makeup to the circulating water mechanical draft cooling tower basins.

9.2.11.1 Design Basis

9.2.11.1.1 Safety Design Basis

The RWS does not serve a safety-related function and therefore does not have a nuclear safety design basis.

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

The RWS does not have the potential to be a flow path for radioactive fluids.

9.2.11.1.2 Power Generation Design Basis

9.2.11.1.2.1 Normal Operation

The freshwater portion of the RWS provides a continuous supply of groundwater to the following services:

- Service water system (SWS) fill and makeup.
- Demineralized water treatment system (DTS) feed.
- Potable water storage tank.

In addition, the freshwater portion of the RWS performs the following functions:

- Filling of the fire protection system (FPS) fire water storage tanks.
- Supplying water to the YFS.
- Providing the water for the strainer backwash and the media filter backwashes.

The saltwater portion of the RWS provides a continuous supply of water for circulating water system (CWS) fill and makeup. This subsystem also provides water for the makeup strainer backwash and for the screen wash pump suction.

9.2.11.1.2.2 Outage Mode Operation

During plant outages, RWS provides the same continuous supplies as during normal operation with the exception of CWS cooling tower makeup.

The RWS provides inventory and SWS makeup flow to support normal plant cooldown. During this operational sequence, the component cooling water system reduces the temperature of the reactor coolant system from 350°F at approximately 4 hours after reactor shutdown to 125°F within 96 hours after shutdown by providing cooling to the normal residual heat removal system (RNS) heat exchangers.

9.2.11.2 System Description

9.2.11.2.1 General Description

The RWS is shown in Figures 9.2-201 (freshwater subsystem) and 10.4-201 (saltwater subsystem). Classification of components and equipment for the RWS is given in Section 3.2.

9.2.11.2.1.1 Freshwater Subsystem

The source of water for the RWS freshwater subsystem is the groundwater aquifer under the LNP site.

There are four wells that supply the freshwater. Each well contains a raw water well pump, two for each unit. In addition, there are Unit 1 and Unit 2 pump houses, a self cleaning strainer, and raw water storage tanks. Each pump house contains four 50 percent capacity raw water booster pumps and appropriate instrumentation and controls.

As discussed in FSAR Subsection 2.4.7, historical temperature measurements indicate that ice formation on large bodies of water is considered unlikely. Therefore, the potential that ice jams and frazil ice formation would prevent the RWS makeup to SWS is remote.

The flow path for the functions described in the power generation design basis is from the groundwater aquifer, through self cleaning strainer, to the raw water storage tank, and into the raw water booster pumps. The raw water booster pumps supply freshwater through media filters to a common header for the services and functions listed in Subsection 9.2.11.1.2. The pumps are sized to provide maximum design flow during outage conditions.

Four media filters are upstream of the SWS cooling tower makeup, the DTS feed, the fire water storage tanks, and the potable water storage tank. Each is sized to pass 50% of the maximum demand from those systems.

9.2.11.2.1.2 Saltwater Subsystem

The source of water for the RWS saltwater subsystem is the CFBC.

The makeup water pump house for the makeup water pumps is located on the CFBC, south of LNP 1 and 2. This structure is common for LNP 1 and 2. The intake structure is equipped with trash racks and traveling screens. The RWS equipment located in the raw water pump house for each unit consists of three RWS water pumps and strainers and their drivers, traveling screens, screen wash pumps and their drivers, appropriate instrumentation and controls, and piping to the required services provided in Subsection 9.2.11.1.2. Each RWS pump is located in a separate intake bay and has the capacity to provide 50% of the maximum raw water demand for a single unit. The RWS pumps can also be used to provide alternate dilution flow for the liquid waste discharge when cooling tower blowdown is not available for the discharge path.

The flow path for the functions described in the power generation design basis is from the CFBC, through the trash racks and intake screens and into the raw water supply pumps. The pumps discharge through strainers into two headers for each unit. The discharge headers provide suction for the RWS screen wash pumps.

9.2.11.2.2 Component Description

9.2.11.2.2.1 Freshwater Subsystem

Raw Water Well Pumps

Two 100 percent capacity well pumps for each unit draw freshwater from the wells to supply water to the raw water storage tank. The pumps are vertical pumps located in the well casings, and holes are provided in the well casing at the lower level to allow water to enter from the aquifer. Normally one well pump is operated. The length of each pump barrel is sized to meet the minimum submergence and net positive suction head requirements during low water level conditions. The well pumps are powered from the normal ac power system. The raw water well pumps can be manually loaded onto the standby diesel generators although only one can be loaded on a diesel generator at a time. The motor operated valves can be manually opened or closed as required. Each pump is equipped with a pressure transmitter that alarms in the control room on a low pressure condition, check valves to prevent backflow, and manual isolation valves on the discharge piping.

Automatic Self-Cleaning Strainer

An automatic self-cleaning strainer is located in the common discharge line from the raw water well pumps. Automatic valves facilitate cleaning the strainers by backwashing the strainer. Backwash from the strainer is discharged to the wastewater retention basin. The strainer backwash flow is not permitted if the raw water storage tank level is less than 75 percent. Power for the strainers is provided from the normal ac power system. In the event of a loss of normal ac power, the strainer is designed to fail “as-is”.

Raw Water Storage Tank

A raw water storage tank is provided for each unit. These tanks receive freshwater via the raw water well pumps. The tank is minimum 9.1 meters (30 feet) in diameter and 9.1 meters (30 feet) tall. A level transmitter and level control to start and stop the raw water well pumps are provided.

Raw Water Boosters Pumps

Four 50 percent raw water booster pumps per unit are provided to supply freshwater from the raw water storage tank to the required services and functions listed in Subsection 9.2.11.1.2 for the freshwater subsystem. The raw water booster pumps are used to provide two spare pumps during plant cooldown. This allows one spare pump to operate for media filter backwash and still provide a spare pump during plant cooldown. Recirculation lines are provided back to the storage tank to provide minimum flow protection via pressure operated recirculation valves. They are powered from the normal ac power system. The raw water booster pumps can be manually loaded onto the standby diesel generators, although only one can be loaded on a diesel generator at a time. Each pump is equipped with a pressure transmitter that alarms the control room on a low pressure condition, check valves to prevent backflow, and manual isolation valves on the discharge piping.

Media Filters

Four 50% capacity media filters per unit are provided downstream from the raw water booster pumps and upstream of the supply feeds to the SWS cooling tower, the DTS, the fire water storage tanks, and the potable water storage tank. The media filters are backwashed to remove suspended solids, and the backwash water is discharged to the wastewater retention basin. Each media filter is nominally sized for 50% of the required raw water flow. Flow transmitters in the supply piping detect plugging and timers control backwash. The valves for normal and backwash flow fail in a normal flow position to maintain flow through the system.

Piping

The discharges of the RWS pumps are routed to a common header for each unit. Discharge check valves on the RWS pumps limit reverse flow in the piping if pumps are tripped and restarted and the subsequent transient effects. The piping is designed to accommodate transient effects that may be generated by normal starting and stopping of pumps, opening and closing of valves, or other normal operating events. Air release valves are provided in the raw water well pump discharge piping to vent air on pump start. Buried portions of the piping are constructed of high-density polyethylene piping. All RWS piping is designed to ASME Code for Power Piping, B31.1.

Valves

Motor operated valves are located on the discharge of each RWS makeup water pump. They are supplied from the normal ac power system in each unit. The discharge valves have backup power feed from the diesel generators. The RWS pump valves are designed to fail "as-is" during a loss of normal ac power condition. Handwheels on the valve operators allow position of the valves locally.

9.2.11.2.2.2 Saltwater Subsystem

Intake

The raw water intake structure supports the pumps and related equipment (i.e., intake screens, screen wash pumps, etc.) for the RWS. The intake structure has three (3) separate intake bays for each unit, one for each makeup water pump. Each of the intake bays is equipped with a traveling screen and trash rack assembly.

Trash Racks

Trash racks are installed on the inlet to each intake bay, upstream of the traveling screens, to prevent large debris in the CFBC from entering the intake bay.

Traveling Screens

Traveling screens are located upstream of the RWS makeup water pumps in each intake bay. The traveling screens provide screening of floating and suspended solids in the CFBC water and minimize entrainment of aquatic life in the water entering the pump bay. The screens are sized so that the through screen velocity is less than 0.15 meters per second (0.5 feet per second) to reduce the impingement mortality of aquatic biota. Buildup on the screens is washed off with spray water from the screen wash pumps. Each traveling screen is powered by an electric motor powered from the normal ac power system.

RWS Makeup Water Pumps

Three 50 percent RWS makeup water pumps per unit draw water from the CFBC to supply the required flow for the services and functions listed in Subsection 9.2.11.1.2 for the saltwater subsystem. The pumps are vertical turbine pumps. They are powered from the normal ac power system. The length of each pump barrel is sized to meet the minimum submergence and net positive suction head requirements during low water level conditions. The motor operated valves can be manually opened or closed as required. Each pump is equipped with a pressure transmitter that alarms in the control room on a low pressure condition, check valves to prevent backflow, and manual isolation valves on the discharge piping. The RWS pumps can also be used to provide alternate dilution flow for the liquid waste discharge when cooling tower blowdown is not available for the discharge path.

Screen Wash Pumps

Three screen wash pumps per unit draw strained water from the RWS makeup water pump discharge flow and provide spray water to remove debris and fish from the traveling screens for the RWS makeup water pumps. The screen wash pumps are powered by electric motors fed from the normal ac power system.

Automatic Strainers

The automatic strainers are located in the RWS makeup pump discharge lines. These strainers can handle 100% of the discharge flow. Automatic valves facilitate cleaning the strainers by backwashing the strainer. Power for the strainers is provided from the normal ac power system.

Piping

The discharges of the RWS pumps are routed to a common header for each unit. Discharge check valves on the RWS pumps limit reverse flow in the piping if pumps are tripped and restarted and the subsequent transient effects. The piping is designed to accommodate transient effects that may be generated by normal starting and stopping of pumps, opening and closing of valves, or other normal operating events. Air release valves are provided in the makeup pump discharge piping to vent air on pump start.

Valves

Motor operated valves are located on the discharge of each RWS makeup water pump. They are supplied from the normal ac power system in each unit. The discharge valves have backup power feed from the diesel generators. The RWS pump valves are designed to fail “as-is” during a loss of normal ac power condition. Handwheels on the valve operators allow position of the valves locally.

9.2.11.3 System Operation

The RWS operates during normal modes of operation, including startup, power operation (full and partial loads), cooldown, shutdown, and refueling. The RWS saltwater and freshwater subsystems are used to fill the CWS and SWS cooling tower basins, respectively.

9.2.11.3.1 Plant Startup

During plant startup, the RWS makeup pump supplies strained water to the CWS cooling tower basin to fill the CWS piping and to replace evaporative losses as the CWS cooling tower is place into operation. The raw water well and booster pumps provide strained water to the media filters for treatment before being directed to the potable water storage tank, to the fire water storage tank, to the DTS, and to the SWS cooling tower basin.

9.2.11.3.2 Power Operation

Freshwater Subsystem

The raw water well pumps supply freshwater to the raw water storage. Normally one raw water well pump is operated. The raw water storage water tank allows the raw water well pumps to operate at their nominal capacity in a cycling mode. The capacity of the raw water storage tank is such that at 50 percent fill the raw water pump cycle time is approximately 1 hour and during normal operation approximately 2.5 hours of water is available before the tank reaches the 50 percent fill level. The raw water booster pumps supply freshwater from the storage tank to raw water users listed in Subsection 9.2.11.1.2.

Chemical injection points are provided to treat raw water supply to the FPS fire water storage tanks with sodium hypochlorite. Effectiveness of the treatment is monitored by periodic sample inspections of the wetted portions of the FPS headers.

Saltwater Subsystem

Under normal operation only two makeup and two screen wash pumps operate for each unit. The third 50% pump for each unit provides redundancy.

9.2.11.3.3 Plant Cooldown/Shutdown

For plant coodown/shutdown operation, four 500 gpm raw water booster pumps are used to provide two spare pumps during plant cooldown. Since makeup flow to the CWS is not normally required after the plant is shutdown, system operation is transferred to the freshwater subsystem when demand has decreased sufficiently.

9.2.11.3.4 Refueling

During refueling, one raw water well pump provides the required RWS supply with one well pump in standby. The makeup flow to the CWS is not normally require after the plant is shutdown. The RWS pumps can also be used to provide alternate dilution flow for the liquid waste discharge when cooling tower blowdown is not available for the discharge path.

9.2.11.3.5 Loss of Normal AC Power Operation

In the event of a loss of normal ac power, the freshwater subsystem raw water well and booster pumps have a backup power supply from the diesel generators and provide normal system interface makeup requirements. The raw water well pumps and booster pumps can be manually loaded onto the standby diesel generators although only one can be loaded on a diesel generator at a time. The media filters fail in the position that maintains the discharge flow, so the condition does not affect the position of the automatic valves. The check valves on the discharge of the raw water well and booster pumps prevent the formation of voids and transient water hammer conditions when the pumps are restarted.

9.2.11.4 Safety Evaluation

The RWS does not have a safety-related function and, therefore, does not require a nuclear safety evaluation. It does not have an interconnection with any system that contains radioactive fluids.

Per DCD Subsection 11.2.3.3, the liquid waste stream effluent is released off-site through a dilution flow stream. Dilution flow is routed from RWS to the CWS cooling tower blowdown during shutdown conditions. During normal operation, the CWS circulating water pumps provide dilution flow to the cooling tower blowdown pipe. Contamination of the RWS is not possible since the liquid waste stream effluent enters the blowdown pipe downstream of the RWS interface.

9.2.11.5 Tests and Inspections

Initial test requirements for the RWS are described in Subsection 14.2.9.4.24. System performance and structural and pressure integrity of system components is demonstrated by operation of the system, monitoring of system parameters such as flow and pressure, and visual inspections.

9.2.11.6 Instrumentation Applications

9.2.11.6.1 Freshwater Subsystem

Level controls on the raw water storage tank control the starting and stopping of the raw water well pumps. Normally one pump is operated, but the level control will start a second well pump at very low tank levels and shut the second pump down when a medium level is established in the tank. Redundant level transmitters on the raw water storage tank provide continuous level indication and input to low level alarms in the main control room. The low level alarms for the diverse level instrumentation provide control room indication of an abnormal low level in the raw water storage tank before the minimum NPSH requirements for the booster pumps are reached.

Automatic backwash controls are provided with the self-cleaning strainers and the media filters.

Local pressure indicators are provided on each pump discharge to monitor pressure. Information is used by the control room to identify component failures and initiate actions. Pressure controls on the raw water booster pump discharges control the recirculation valves.

Power actuated valves are provided with valve position indication instrumentation.

Flow transmitters are provided on the inlet to the media filters to identify conditions affecting the operation of the components.

9.2.11.6.2 Saltwater Subsystem

Level instrumentation provided in the circulating water pump intake structure activates makeup flow from the salt water portion of the RWS to the cooling tower basin, when required. Level transmitters in each cooling tower basin also annunciate a low-water level in the pump structure, and a high-water level in the cooling tower basin. Flow transmitters are provided on each cooling tower basin makeup supply line to monitor makeup flow to the cooling tower basin. (See Subsection 10.4.5.5).

Positioners are provided on each makeup water control valve. Power actuated valves are provided with valve position indication instrumentation.

Level transmitters are provided on both sides of each traveling screen located in the makeup pump house. Pump house bay high and low level alarms and a start/trip interlock are provided for each makeup water pump.

Pressure transmitters are provided on the discharge lines of each makeup water pump and each screen wash pump. Low and high alarms and a trip output interlock are provided for each makeup water pump if the discharge pressure fails to increase to normal operating pressure within a predetermined time after a pump is given a start command, or if discharge pressure decreases to a low setpoint during normal operations.

STD DEP 1.1-1 9.2.12 COMBINED LICENSE INFORMATION

9.2.12.1 Potable Water

LNP 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

LNP COL 9.2-2 This COL Item is addressed in Subsections 9.2.9.2.1, 9.2.9.2.2 and 9.2.9.5.

STD DEP 1.1-1 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

LNP DEP 6.4-2

Revise the third paragraph in DCD Subsection 9.3.1.1.2 to read as follows:

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

LNP DEP 7.3-1

Demineralized Water System Isolation Valves

Revise the second sentence of the first paragraph of DCD Subsection 9.3.6.3.7, Demineralized Water System Isolation Valves, to read as follows:

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.

9.3.6.4.5.1 Boron Dilution Events

LNP DEP 7.3-1

Add a new last sentence to the third paragraph of DCD Subsection 9.3.6.4.5.1 as follows:

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

LNP DEP 7.3-1

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

• 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

LNP DEP 6.4-1

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

- 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

Main Control Room/Control Support Area (CSA) Areas

LNP DEP 6.4-1

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

- 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

LNP DEP 6.4-2

Main Control Room

Revise the first paragraph of DCD Subsection 9.4.1.1.2, Post-72-Hour Design Basis Main Control Room section, to read as follows:

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

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LNP DEP 6.4-1

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

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

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LNP DEP 6.4-1

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:

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:

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:

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.

Abnormal Plant Operation

LNP DEP 6.4-2

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

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 text 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 text 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.

LNP COL 9.4-1b Section 6.4 does not identify any toxic emergencies that require the main control room/technical support center area HVAC to enter recirculation mode.

9.4.13 REFERENCES

Add the following information to the end of DCD Subsection 9.4.13:

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

Add the following paragraph at the end of DCD Subsection 9.5.1.2.1.3.

STD SUP 9.5-1 Threads compatible with those used by the off-site fire department are provided on all hydrants, hose couplings and standpipe risers, or a sufficient number of thread adapters compatible with the off-site fire department are provided.

9.5.1.6 Personnel Qualification and Training

Add the following paragraph at the end of DCD Subsection 9.5.1.6.

STD COL 9.5-1 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.

STD DEP 1.1-1 Insert 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 COL 9.5-1

9.5.1.8 Fire Protection Program

The fire protection program is established such that a fire does 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 meeting 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 does 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 The fire protection program is based on the criteria of several industry and regulatory documents referenced in FSAR Subsection 9.5.5 and DCD Subsection 9.5.5, and also based on the guidance provided in Regulatory Guide 1.189. DCD Tables 9.5.1-1 and FSAR Table 9.5-201 provide a cross-reference to information addressing compliance with BTP CMEB 9.5-1.
STD COL 9.5-4 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 FSAR Subsection 9.5.5, are identified in FSAR 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 firefighting 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 firefighting 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 ensuring assistance is available for fighting fires in radiological areas.

j. Implementing a program that uses 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 prefire plans and making them available to the fire brigade and control room.

LNP COL 9.5-1 The responsibilities of the engineer in charge of fire protection and his staff are discussed in Subsection 13.1.2.1.2.9.

9.5.1.8.2 Fire Brigade

9.5.1.8.2.1 General

LNP COL 9.5-1 The organization of the fire brigade is discussed in Subsection 13.1.2.1.5.

STD COL 9.5-1 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 firefighting, 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 firefighting 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 manager 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 firefighting 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 firefighting equipment and familiarization with the layout of the plant including ingress and egress routes to each area.

d. The proper use of onsite firefighting 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 firefighting 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 firefighting strategies, procedures and procedure changes.

k. Indoctrination of the plant firefighting plans, identification of each individual’s responsibilities, and review of changes in the firefighting 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 firefighting effort.

e. Assessment of each fire brigade member’s knowledge of firefighting 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.

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 firefighting 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 firefighting procedure (prefire plan). Prefire plans use 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 firefighting 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 provides desired plant air distribution when the ventilation flow is modified for fire containment or smoke clearing operations.

8. Operations requiring control room and shift manager 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 firefighting 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.

9.5.1.8.4 Control of Combustible Materials, Hazardous Materials, and Ignition Sources

The control of combustible materials is 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 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.

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.

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, use 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 preoperational 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

LNP 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.

STD COL 9.5-1

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 ensure 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

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

LNP 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.

Add the following subsection at the end of DCD Subsection 9.5.2.2.4.

LNP COL 9.5-9 9.5.2.2.5 Off-Site Interfaces and Emergency Off-Site Communications

LNP COL 9.5-10
LNP COL 18.2-2 Off-site interfaces and emergency off-site communications are discussed in the Emergency Plan.

The Emergency Notification System (ENS) on-site primary power supply is backed up by automatic transfer to a highly reliable secondary power supply, which complies with the requirements of NRC Bulletin 80-15 regarding loss of off-site power to the ENS. The ENS is accomplished by the communications system (EFS). The subsystems of the EFS that accomplish the ENS function are the wireless telephone system, telephone/page system and the private automatic branch system (PABX) system. These communication subsystems are independent of one another; therefore, a failure in one subsystem does not degrade performance of the other subsystems. Per DCD Subsections 9.5.2.2.1, 9.5.2.2.2, and 9.5.2.2.3, the normal 120-V ac power supplies the wireless telephone switch, the telephone/page system, and the PABX system. Upon loss of the normal power, the telephone switch, the telephone/page system, and the PABX system are powered from the non-Class 1E dc and uninterruptible power supply system sized to supply power for 120 minutes.

The non-Class 1E dc and UPS system (EDS) is described in DCD Subsection 8.3.2.1.2 and the on-site standby power system (ZOS) is described in DCD Subsection 8.3.1.1.2.1. The non Class 1E main ac power system (ECS) is described in DCD Subsection 8.3.1.1.1.

9.5.2.5 Combined License Information

9.5.2.5.1 Off-Site Interfaces

LNP COL 9.5-9 This COL Item is addressed in Subsection 9.5.2.2.5.

9.5.2.5.2 Emergency Off-Site Communications

LNP COL 9.5-10 This COL Item is addressed in Subsection 9.5.2.2.5.

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. In addition, kinematic viscosity is tested to be within the limits specified in Table 1 of ASTM D975. 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

9.5.4.7.2 Fuel Degradation Protection

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

9.5.5 REFERENCES

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. National Fire Protection Association, "Standard for Fire Protection for Advanced Light Water Reactor Electric Generating Plants," NFPA 804, 2001.

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

Table 9.5-201[a] (Sheet 1 of 9)
AP1000 Fire Protection Program Compliance with BTP CMEB 9.5-1

	BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
	Fire Protection Program			
STD COL 9.5-3 STD COL 9.5-4	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.
LNP COL 9.5-3 LNP COL 9.5-4	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. Pre-fire planning.	C.1.a(3)	C	Comply. Subsection 13.1.2.1.2.9 addresses this requirement.

Table 9.5-201[a] (Sheet 2 of 9)
AP1000 Fire Protection Program Compliance with BTP CMEB 9.5-1

	BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
LNP COL 9.5-3 LNP COL 9.5-4	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.
STD COL 9.5-3 STD COL 9.5-4	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 addresses this requirement.
	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.
	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.

STD COL 9.5-3
STD COL 9.5-4

Table 9.5-201[a] (Sheet 3 of 9)
AP1000 Fire Protection Program Compliance with BTP CMEB 9.5-1

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
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)	C	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.
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.

STD COL 9.5-3
STD COL 9.5-4

Table 9.5-201[(a)] (Sheet 4 of 9)
AP1000 Fire Protection Program Compliance with BTP CMEB 9.5-1

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
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 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 and 3.5 establish that these events are not credible.
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.

Table 9.5-201[a] (Sheet 5 of 9)
AP1000 Fire Protection Program Compliance with BTP CMEB 9.5-1

	BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
STD COL 9.5-3 STD COL 9.5-4	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.
LNP COL 9.5-3 LNP COL 9.5-4	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 9.5.1.8.1.2 and 13.1.2.1.5 address this requirement.
STD COL 9.5-3 STD COL 9.5-4	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.

STD COL 9.5-3
STD COL 9.5-4

Table 9.5-201[a] (Sheet 6 of 9)
AP1000 Fire Protection Program Compliance with BTP CMEB 9.5-1

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
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. DCD Subsection 9.5.1.7 and Chapter 17 address this requirement.
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.

STD COL 9.5-3
STD COL 9.5-4

Table 9.5-201[(a)] (Sheet 7 of 9)
AP1000 Fire Protection Program Compliance with BTP CMEB 9.5-1

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
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.
Control of Combustibles			
80. Use of compressed gases inside buildings should be controlled.	C.5.d (2)	C	Comply. Subsection 9.5.1.8.4.g 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.

STD COL 9.5-3
STD COL 9.5-4

Table 9.5-201[a] (Sheet 8 of 9)
AP1000 Fire Protection Program Compliance with BTP CMEB 9.5-1

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
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.
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.

STD COL 9.5-3
STD COL 9.5-4

Table 9.5-201[(a)] (Sheet 9 of 9)
AP1000 Fire Protection Program Compliance with BTP CMEB 9.5-1

BTP CMEB 9.5-1 Guideline	Paragraph	Comp	Remarks
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.
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.

LNP DEP 6.3-1

Table 9.5.1-201
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.
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	

APPENDIX 9A
FIRE PROTECTION ANALYSIS

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

9A.3.3 YARD AREA AND OUTLYING BUILDINGS

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

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 211) and NFPA 251 (Reference 212).

Insert the following subsections after DCD Subsection 9A.3.3.

LNP COL 9.5-2

9A.3.3.1 Circulating Water Pump Intake Structures (Circulating Water Pumphouses)

Fire Detection and Suppression Features

- Fire detectors (Reference 207)
- Hose station(s) (Reference 203)
- Portable fire extinguishers (Reference 202)
- Yard hydrants (Reference 205)

Fire Protection Adequacy Evaluation

A fire in these areas is detected by a fire detector which produces an audible alarm locally with both visual and audible alarms in the main control room and security central alarm station. Fire is extinguished by operation of manual hose streams, portable extinguishers, and yard hydrants.

The combustible materials in this fire area are listed in DCD Table 9A-3 and primarily consist of the cable insulation for wiring associated with the water pumps and relevant equipment. There are no significant concentrations of combustible materials. This is a light hazard fire area and the rate of the fire growth is expected to be slow. Three-hour fire barriers provide adequate separation from adjacent fire areas for containment of a fire.

Fire Protection System Integrity

An evaluation of the consequences of a break in a fire protection line is not required because there are no safety functional components in this fire zone.

Safe Shutdown Evaluation

There are no safe shutdown components in this fire area. No safe shutdown evaluation is required.

9A.3.3.2 Diesel Generator Fuel Oil Storage Tank Areas

Fire Detection and Suppression Features

- Portable fire extinguishers (Reference 202)
- Yard hydrants (Reference 205)

Fire Protection Adequacy Evaluation

This fire area shall meet the requirements of National Fire Protection Standard (NFPA) 30 (Reference 206).

The tanks are contained within a diked area, a minimum of 30.5 m (100 ft) from permanent plant buildings. The fire is extinguished by operation of yard hydrants or portable extinguishers.

Combustible materials in this fire area are listed in DCD Table 9A-3 and consist primarily of the diesel fuel oil. This is a high hazard fire area and the rate of fire growth is expected to be fast. Concrete dike barriers provide adequate separation from adjacent fire areas/tank and the fire is contained within the fire area. The containment system is designed to hold the entire volume of oil, the fire hose, and the volume of water from a ten minute discharge.

Fire Protection System Integrity

An evaluation of the consequences of inadvertent operation of an automatic suppression system and the consequences of a break in a fire protection line is not required because there are no safety functional components in this fire zone.

Safe Shutdown Evaluation

There are no safe shutdown components in this fire area. No safe shutdown evaluation is required.

9A.3.3.3 Freshwater RWS Pumphouse

Fire Detection and Suppression Features

- Fire detectors (Reference 207)
- Hose station(s) (Reference 203)
- Portable fire extinguishers (Reference 202)
- Yard hydrants (Reference 205)

Fire Protection Adequacy Evaluation

A fire in these areas will be detected by a fire detector. Upon a detector activating, an audible alarm will sound locally with both visual and audible alarms being activated in the main control room and the security central alarm station. The fire is extinguished by operation of manual hose streams, portable extinguishers, and yard hydrants.

Combustible materials in this fire area primarily consist of the cable insulation for wiring associated with the pumps and relevant equipment. There are no significant concentrations of combustible materials. This is a light hazard fire area, and the rate of the fire growth is expected to be slow. Three-hour fire barriers provide adequate separation from adjacent fire areas for containment of a fire.

Fire Protection System Integrity

An evaluation of the consequences of a break in a fire protection line system is not required because there are no safety functional components in this fire zone.

Safe Shutdown Evaluation

There are no safe shutdown components in this fire area. No safe shutdown evaluation is required.

9A.3.3.4 Hydrogen Storage Tank Area

Fire Detection and Suppression Features

- Portable fire extinguishers (Reference 202)
- Yard hydrants (Reference 205)

Fire Protection Adequacy Evaluation

A fire in this area is extinguished by operation of yard hydrants or portable fire extinguishers.

Flammable materials in this fire area are listed in DCD Table 9A-3 and consist primarily of hydrogen. This is a high hazard fire area and the rate of fire growth is expected to be fast, but localized to the trailer. The hydrogen storage tank is outside, a minimum of 9.1 m (30 ft) from permanent plant buildings. Their location is also in accordance with the requirements of NFPA 55 (Reference 201), and the hydrogen storage tank therefore poses no threat to any adjacent buildings, structures, and components.

Fire Protection System Integrity

An evaluation of the consequences of inadvertent operation of an automatic suppression system and the consequences of a break in a fire protection line is not required because there are no safety functional components in this fire zone.

Safe Shutdown Evaluation

There are no safe shutdown components in this fire area. No safe shutdown evaluation is required.

9A.3.3.5 Makeup Water Pumphouse

Fire Detection and Suppression Features

- Fire detectors (Reference 207)
- Hose station(s) (Reference 203)
- Portable fire extinguishers (Reference 202)
- Yard hydrants (Reference 205)

Fire Protection Adequacy Evaluation

A fire in these areas will be detected by a fire detector. Upon a detector activating, an audible alarm will sound locally with both visual and audible alarms being activated in the main control room and the security central alarm station. The fire is extinguished by operation of manual hose streams, portable extinguishers, and yard hydrants.

The combustible materials in this fire area primarily consist of the cable insulation for wiring associated with the water pumps, batteries, and relevant equipment. There are no significant concentrations of combustible materials. This is a light hazard fire area, and the rate of the fire growth is expected to be slow. Three-hour fire barriers provide adequate separation from adjacent fire areas for containment of a fire.

Note that the battery room is unclassified per IEEE 484, Section 5.1 (Reference 209), since the building HVAC system design limits the hydrogen accumulation in the area to less than 2 percent by volume.

Fire Protection System Integrity

An evaluation of the consequences of a break in a fire protection line system is not required because there are no safety functional components in this fire zone.

Safe Shutdown Evaluation

There are no safe shutdown components in this fire area. No safe shutdown evaluation is required.

9A.3.3.6 Mechanical Draft Cooling Towers

Fire Detection and Suppression Features

- Portable fire extinguishers (Reference 202)
- Yard hydrants (Reference 205)

Fire Protection Adequacy Evaluation

A fire in this area is extinguished by operation of yard hydrants or portable extinguishers.

Combustible materials in this fire area consist primarily of electrical wiring cable insulation for the cooling tower fans. This is a moderate to high hazard fire area, and the rate of fire growth is expected to be high, depending on the type of materials to be used to construct the cooling tower. The mechanical draft cooling towers are located outside and pose no threat to any adjacent buildings, structures, and components.

Final design and material selection for the cooling towers, structural fiberglass type in particular, will determine the additional fire protection requirements as necessary per the requirements of NFPA 214 (Reference 208).

Fire Protection System Integrity

An evaluation of the consequences of a break in a fire protection line is not required because there are no safety functional components in this fire zone.

Safe Shutdown Evaluation

There are no safe shutdown components in this fire area. No safe shutdown evaluation is required.

9A.3.3.7 Service Water System Cooling Towers

Fire Detection and Suppression Features

- Portable fire extinguishers (Reference 202)
- Yard hydrants (Reference 205)

Fire Protection Adequacy Evaluation

A fire in this area is extinguished by operation of yard hydrants or portable extinguishers.

Combustible materials in this fire area are listed in DCD Table 9A-3 and consist primarily of the cooling tower fans. This is a low hazard fire area and the rate of fire growth is expected to be slow. The mechanical draft cooling tower is located outside and poses no threat to any adjacent buildings, structures, and components.

Final design of the cooling towers will determine the additional fire protection requirements as necessary per the requirements of NFPA 214 (Reference 208).

Fire Protection System Integrity

An evaluation of the consequences of a break in a fire protection line is not required because there are no safety functional components in this fire zone.

Safe Shutdown Evaluation

There are no safe shutdown components in this fire area. No safe shutdown evaluation is required.

9A.3.3.8 Substations

Fire Detection and Suppression Features

- Fire detectors (Reference 207)
- Portable fire extinguishers (Reference 202)
- Water deluge (Reference 204)
- Yard hydrants (Reference 205)

Fire Protection Adequacy Evaluation

A fire in these areas will be detected by a fire detector. Upon a detector activating, an audible alarm will sound locally with both visual and audible alarms being activated in the main control room and the security central alarm station.

Combustible materials in these fire areas consist primarily of the cable insulation for the switchgear and control equipment, and the transformer oil. This is a high hazard fire area, and the rate of fire growth is expected to be fast.

Final design of the substations will determine the additional fire protection requirements as necessary per the requirements of NFPA 850 (Reference 210). In case the transformers contain more than 1893 liters (500 gallons) of oil, an automatic water spray deluge system, in accordance with NFPA 15 (Reference 204), will be designed to be activated by a linear heat detector (Reference 207).

Fire Protection System Integrity

An evaluation of the consequences of inadvertent operation of an automatic suppression and the consequences of a break in a fire protection line system is not required because there are no safety functional components in this fire zone.

Safe Shutdown Evaluation

There are no safe shutdown components in this fire area. No safe shutdown evaluation is required.

9A.3.3.9 Switchyard Relay Houses

Fire Detection and Suppression Features

- Fire detectors (Reference 207)
- Hose stations (Reference 203)
- Portable fire extinguishers (Reference 202)

Fire Protection Adequacy Evaluation

A fire in these areas will be detected by a fire detector. Upon a detector activating, an audible alarm will sound locally with both visual and audible alarms being activated in the main control room and the security central alarm station. The fire is extinguished by operation of a hose station or portable extinguishers.

Combustible materials in these fire areas consist primarily of cable insulation and batteries. There is no significant concentration of a combustible material in the area. This is a low hazard fire area, and the rate of fire growth is expected to be slow.

Fire Protection System Integrity

An evaluation of the consequences of a break in a fire protection line system is not required because there are no safety functional components in this fire zone.

Safe Shutdown Evaluation

There are no safe shutdown components in this fire area. No safe shutdown evaluation is required.

9A.3.3.10 Transformer Areas

Fire Detection and Suppression Features

- Fire detectors (Reference 207)
- Portable fire extinguishers (Reference 202)
- Water deluge (Reference 204)
- Yard hydrants (Reference 205)

Fire Protection Adequacy Evaluation

A fire in these areas is detected by a fire detector which produces an audible alarm locally with both visual and audible alarms in the main control room and security central alarm station. A linear heat fire detector system also actuates a deluge system design in accordance with NFPA 15 (Reference 204).

Combustible materials in these fire areas are listed in DCD Table 9A-3 and consist primarily of transformer oil. Each of these is a high hazard fire area and the rate of fire growth is expected to be fast. Three-hour fire barriers provide adequate separation from adjacent fire areas/transformers and the fire is contained within the fire area. The containment system is designed to hold the entire volume of oil, the fire hose, and the volume of water from a 10-min discharge of the water spray system.

Fire Protection System Integrity

An evaluation of the consequences of inadvertent operation of an automatic suppression system and the consequences of a break in a fire protection line is not required because there are no safety functional components in this fire zone.

Safe Shutdown Evaluation

There are no safe shutdown components in this fire area. No safe shutdown evaluation is required.

9A.3.3.11 Administrative Building

The administrative building is located outside the protected area.

The building can be used during construction and later adopted for use during startup and operation.

The administrative building does not contain primary or secondary systems within, and is not essential in preserving the integrity of the plant operations in case of a fire.

9A.4 REFERENCES

Add the following information at the end of DCD Subsection 9A.4:

201. National Fire Protection Association, “Standard for the Storage, Use, and Handling of Compressed Gasses and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks,” NFPA 55, 2005.

202. National Fire Protection Association, “Standard for Portable Fire Extinguishers,” NFPA 10, 2007.

203. National Fire Protection Association, “Standard for the Installation of Standpipe and Hose Systems,” NFPA 14, 2007.

204. National Fire Protection Association, “Standard for Water Spray Fixed Systems for Fire Protection,” NFPA 15, 2007.

205. National Fire Protection Association, “Standard for the Installation of Private Fire Service Mains and Their Appurtenances,” NFPA 24, 2007.

206. National Fire Protection Association, “Flammable and Combustible Liquids Code,” NFPA 30, 2003.

207. National Fire Protection Association, “National Fire Alarm Code,” NFPA 72, 2007.

208. National Fire Protection Association, “Standard on Water-Cooling Towers,” NFPA 214, 2005.

209. Institute of Electrical and Electronics Engineers (IEEE), “IEEE Recommended Practice for Installation Design and Implementation of Vented Lead-Acid Batteries for Stationary Applications,” Document Number IEEE Std 484-2002.

210. National Fire Protection Association, “Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations,” NFPA 850-2005.

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

212. National Fire Protection Association, “Standard Methods of Tests of Fire Endurance of Building Construction and Materials,” NFPA 251, 2006.