9.0 AUXILIARY SYSTEMS

This chapter of the U.S. EPR Final Safety Analysis Report (FSAR) is incorporated by reference with supplements as identified in the following sections.

9.1 FUEL STORAGE AND HANDLING

This section of the U.S. EPR FSAR is incorporated by reference with the following supplements.

9.1.1 CRITICALITY SAFETY OF NEW AND SPENT FUEL STORAGE AND HANDLING

9.1.1.1 Design Bases

No departures or supplements.

9.1.1.2 Facilities Description

No departures or supplements.

9.1.1.3 Safety Evaluation

The U. S. EPR FSAR includes the following COL Item in Section 9.1.1.3:

> A COL applicant that references the U.S. EPR design certification will demonstrate that the design satisfies the criticality analysis requirements for the new and spent fuel storage racks, and describe the results of the analyses for normal and credible abnormal conditions, including a description of the methods used, approximations and assumptions made, and handling of design tolerances and uncertainties.

This COL Item is addressed as follows:

{The design and analyses for the new and spent fuel storage racks will be incorporated into a future revision of the U.S. EPR FSAR. This revision will be based on the analysis in UniStar Topical Report UN-TR-08-001, Spent and New Fuel Storage Analyses for U.S. EPR Topical Report, dated March 2008 (UniStar, 2008) an incorporate additional analyses to bound the site-specific conditions at NMP3NPP}.

9.1.1.4 References

{**UniStar, 2008.** Spent and New Fuel Storage Analyses for U. S. EPR Topical Report, UniStar Topical Report UN-TR-08-001, March 2008.}

9.1.2 NEW AND SPENT FUEL STORAGE

No departures or supplements.

9.1.2.1 Design Bases

No departures or supplements.

9.1.2.2 Facilities Description

9.1.2.2.1 New Fuel Storage

The U. S. EPR FSAR includes the following COL Item in Section 9.1.2.2.1:

> A COL applicant that references the U.S. EPR design certification will describe the new fuel storage racks, including a description of confirmatory structural dynamic and stress analyses.

This COL Item is addressed as follows:

{The design and analyses for the new and spent fuel storage racks will be incorporated into a future revision of the U.S. EPR FSAR. This revision will be based on the analysis in UniStar Topical Report UN-TR-08-001, Spent and New Fuel Storage Analyses for U.S. EPR Topical Report, dated March 2008 (UniStar, 2008) an incorporate additional analyses to bound the site-specific conditions at NMP3NPP}.

9.1.2.2.2 Spent Fuel Storage

The U. S. EPR FSAR includes the following COL Item in Section 9.1.2.2.2:

> A COL applicant that references the U.S. EPR design certification will describe the spent fuel storage racks, including a description of confirmatory structural dynamic and stress analyses and thermal-hydraulic cooling analyses.

This COL Item is addressed as follows:

{The design and analyses for the new and spent fuel storage racks will be incorporated into a future revision of the U.S. EPR FSAR. This revision will be based on the analysis in UniStar Topical Report UN-TR-08-001, Spent and New Fuel Storage Analyses for U.S. EPR Topical Report, dated March 2008 (UniStar, 2008) an incorporate additional analyses to bound the site-specific conditions at NMP3NPP}.

9.1.2.3 Safety Evaluation

No departures or supplements.

9.1.2.4 Inspection and Testing Requirements

No departures or supplements.

9.1.2.5 Instrumentation Requirements

No departures or supplements.

9.1.2.6 References

{**UniStar, 2008.** Spent and New Fuel Storage Analyses for U. S. EPR Topical Report, UniStar Topical Report UN-TR-08-001, March 2008.}

9.1.3 SPENT FUEL POOL COOLING AND PURIFICATION SYSTEM

No departures or supplements.

9.1.4 FUEL HANDLING SYSTEM

No departures or supplements.

9.1.5 OVERHEAD HEAVY LOAD HANDLING SYSTEM

No departures or supplements.

9.1.5.1 Design Basis

No departures or supplements.

9.1.5.2 System Description

9.1.5.2.1 General Description

No departures or supplements.

9.1.5.2.2 Reactor Building Polar Crane

No departures or supplements.

9.1.5.2.3 Fuel Building Auxiliary Crane

No departures or supplements.

9.1.5.2.4 Other Overhead Load Handling Systems

No departures or supplements.

9.1.5.2.5 System Operation

The U. S. EPR FSAR includes the following COL Item in Section 9.1.5.2.5:

> A COL applicant that references the U.S. EPR design certification will provide site-specific information on the heavy load handling program, including a commitment to procedures for heavy load lifts in the vicinity of irradiated fuel or safe shutdown equipment, and crane operator training and qualification.

This COL Item is addressed as follows:

Procedures

Administrative procedures to control heavy loads shall be developed prior to fuel load to allow sufficient time for plant staff familiarization, to allow NRC staff adequate time to review the procedures, and to develop operator licensing examinations. Heavy loads handling procedures address the following:

- Equipment identification.
- Required equipment inspections and acceptance criteria prior to performing lift and movement operations.
- Approved safe load paths and exclusion areas.
- Safety precautions and limitations.
- Special tools, rigging hardware, and equipment required for the heavy load lift.
- Rigging arrangement for the load.
- Adequate job steps and proper sequence for handling the load.

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 or spent fuel pool or on safe shutdown equipment. Paths are defined in procedures and equipment layout drawings. Safe load path procedures address the following general requirements.

- When heavy loads must be carried directly over the spent fuel pool, reactor vessel or safe shutdown equipment, procedures will limit the height of the load and the time the load is carried.
- When heavy loads could be carried (i.e., no physical means to prevent) but are not required to be carried directly over the spent fuel pool, reactor vessel or safe shutdown equipment, procedures will define an area over which loads shall not be carried so that if the load is dropped, it will not result in damage to spent fuel or operable safe shutdown equipment or compromise reactor vessel integrity.
- Where intervening structures are shown to provide protection, no load travel path is required.
- Defined safe load paths will follow, to the extent practical, structural floor members.
- When heavy loads movement is restricted by design or operational limitation, no safe load path is required.
- Supervision is present during heavy load lifts to enforce procedural requirements.

Inspection and Testing

Cranes addressed in U.S. EPR FSAR Section 9.1.5 are inspected, tested, and maintained in accordance with ASME B30.2 (ASME, 2005), with the exception that tests and inspections may be performed prior to use for infrequently used cranes. Prior to making a heavy load lift, an inspection of the crane is made in accordance with the above applicable standards.

Training and Qualification

Training and qualification of operators of cranes addressed in U.S. EPR FSAR Section 9.1.5 meet the requirements of ASME B30.2 (ASME, 2005), and include the following:

- Knowledge testing of the crane to be operated in accordance with the applicable ANSI crane standard.
- Practical testing for the type of crane to be operated.
- Supervisor signatory authority on the practical operating examination.
- Applicable physical requirements for crane operators as defined in the applicable crane standard.

Quality Assurance

Procedures for control of heavy loads are developed in accordance with Section 13.5. In accordance with Section 17.5, other specific quality program controls are applied to the heavy loads handling program, targeted at those characteristics or critical attributes that render the equipment a significant contributor to plant safety.

9.1.5.3 Safety Evaluation

No departures or supplements.

9.1.5.4 Inspection and Testing Requirements

No departures or supplements.

9.1.5.5 Instrumentation Requirements

No departures or supplements.

9.1.5.6 References

{**ASME, 2005.** Overhead and Gantry Cranes – Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist, ASME B30.2, American Society of Mechanical Engineers, 2005.}

9.2 WATER SYSTEMS

This section of the U.S. EPR FSAR is incorporated by reference with the following supplements.

9.2.1 ESSENTIAL SERVICE WATER SYSTEM

No departures or supplements.

9.2.1.1 Design Bases

{No departures or supplements.}

9.2.1.2 System Description

No departures or supplements.

9.2.1.3 Component Description

No departures or supplements.

9.2.1.4 Operation

No departures or supplements.

9.2.1.5 Safety Evaluation

No departures or supplements.

9.2.1.6 Inspection and Testing Requirements

No departures or supplements.

9.2.1.7 Instrumentation Requirements

No departures or supplements.

9.2.1.8 References

{**NRC, 1976.** Ultimate Heat Sink for Nuclear Power Plants (for Comment), Regulatory Guide 1.27, Revision 2, U. S. Nuclear Regulatory Commission, January 1976.}

9.2.2 COMPONENT COOLING WATER SYSTEM

No departures or supplements.

9.2.3 DEMINERALIZED WATER DISTRIBUTION SYSTEM

No departures or supplements.

9.2.4 POTABLE AND SANITARY WATER SYSTEMS (PSWS)

{The U.S. EPR FSAR describes the Potable and Sanitary Water System as a single system. While the function will remain the same, NMP3NPP classifies the system as two systems: the Potable Water System, and the Sanitary Waste Water System.

The Potable Water System delivers drinking quality water to various points throughout the plant, to individual components and for use as process water in other systems. Potable water is used for human consumption, sanitation and cleaning, and other domestic and process purposes inside the Nuclear Island (NI) and the Conventional Island (CI).

The Sanitary Waste Water System collects water discharged from water closets, urinals, showers, sinks and other sources of sanitary water and, with the exception of that from sources within the radiologically controlled area (RCA), directs it via the domestic waste water collection system through the sewage treatment plant for processing. The sanitary water from sources within the RCA is directed to the Liquid Radwaste System by the NI vents and drains.

9.2.4.1 Design Basis

The Potable Water System supplies potable water for human consumption, cleaning and other domestic purposes, plus process water to other systems, during periods of normal operation, shutdown, maintenance and construction. The Potable Water System provides potable water at a flow rate sufficient to meet demand and keep potable water pressure above connected equipment's or systems' pressures. Potable water supplied to, and equipment provided for, emergency eyewash stations and emergency showers complies with the requirements of ANSI Z358.1, Emergency Eyewash and Shower Equipment (ANSI, 2004).

The Sanitary Waste Water System conveys sanitary wastes from their point of collection, and provides necessary treatment of the non-radiologically contaminated waste water, during periods of normal operation, shutdown, maintenance and construction. Where piping for the Sanitary Waste Water System is buried, provisions are made to assure adequate separation from Potable Water System piping. Where local conditions prevent this separation, controls on layout and installation provide similar assurance of protection of potable water from contamination.}

9.2.4.2 System Description

9.2.4.2.1 General Description

The U.S. EPR FSAR includes the following COL Item in Section 9.2.4.2.1:

> A COL applicant that references the U.S. EPR design certification will provide site-specific details related to the sources and treatment of makeup to the PSWS along with a simplified piping and instrumentation diagram.

This COL Item is addressed as follows:

{Potable Water System

The Potable Water System is shown schematically in Figure 9.2-1. The source of potable water is city water provided by the town of Scriba. It provides potable-grade water throughout the plant, for human consumption, cleaning and sanitation, and other domestic and selected process purposes. The Potable Water System supplies water that meets the requirements of local, state and federal codes and specifications regarding potability. The system is designed to satisfy peak anticipated demand for potable water, including hot water, during all phases of plant operation.

The Potable Water System consists of ditribution piping and valves, water heaters, and instrumentation for system monitoring, operation and control.

Sanitary Waste Water System

The Sanitary Waste Water System is shown schematically in Figure 9.2-2.

Sanitary waste water or sanitary water is the term applied to the drainage from water closets, urinals, showers, bathroom/washroom sinks, kitchen and janitorial sinks, clothes washing and dish washing machines. Sanitary waste loading usually includes biological waste (including human sewage), soaps, cooking grease and food scraps. However, at NMP3NPP, the sanitary waste stream is processed in two different ways depending on the source, due to differing contaminants.

The following locations within the NI have sanitary waste streams that have the potential to contain radioactive material. However, because these particular waste streams do not contain biological waste, cooking grease or food scraps, it is acceptable to collect them in the NI vents and drains system and direct them to the Liquid Waste Management System for processing as potentially radioactive waste:

- Personnel decon showers and decon sinks in the Access Building.
- Contaminated laundry facility in the Radioactive Waste Processing Building.

U.S. EPR FSAR Section 9.3.3 provides a discussion of the NI vents and drains system. The Liquid Waste Management System is discussed in U.S. EPR FSAR Section 11.2.

The following locations within the NI have sanitary waste water streams that are directed to the Waste Water Treatment Facility, because they have no connections to systems with the potential to carry radioactive materials:

- Water closets, urinals, hand wash sinks and personnel showers in the following areas:
  - Non-radiologically controlled area (non-RCA) in the Access Building.
  - Non-RCA in the Safeguards Buildings.
- Sink and dishwasher in the kitchen in Safeguards Building 2.
- Hand wash sinks in the Emergency Power Generating Buildings 1 through 4.

The waste stream from each of these locations/components is collected by the Sanitary Waste Water System and flows to collection pits or tanks, from which it drains by gravity to the Waste Water Treatment Facility.

The Waste Water Treatment Facility takes sanitary waste water and puts it through a process of mechanical, biological and chemical processing to prepare it for discharge and disposal. The primary driver of the process is aerobic microbes that digest the sewage. Filtration and dewatering of solid material is followed by disinfection. The liquid effluent is then discharged into the Combined Wastewater Retention Basin. From the Retention Basin the wastewater is discharged into Lake Ontario. Dewatered sludge (solids) is transported off-site for disposal at a municipal landfill.

9.2.4.2.2 Component Description

Potable Water System

Piping and Valves

Branch connections to equipment, including hose bibs, or to other systems are individually isolable and are equipped with backflow preventers to prevent backflow and potential contamination of the Potable Water System. Connections to sinks or showers do not require backflow preventers, because there is an air gap between the potable water and the receiving drains. However, siphon breakers are installed where needed.

Water Heaters

Water heaters are provided for showers, wash and janitorial sinks, lunchroom, kitchen, laundry, and eyewash stations, and are sized, installed and controlled in such fashion as to supply on-demand hot water. Eyewash stations and emergency showers also include pre-set temperature control valves to deliver tepid water, per OSHA requirements.

Sanitary Waste Water System

Piping and Valves

Sanitary waste water piping is sized for peak anticipated loading during outage periods and as required to meet national and local plumbing code requirements.

Collection Pits and Tanks

Sanitary waste collection pits are concrete lined with steel. Tanks are constructed of steel.

Waste Water Treatment Facility

The Waste Water Treatment Facility is a separate building for the treatment of sanitary waste. It includes tanks for collection, pre-treatment, and sludge for holding purposes, macerating pumps, oil/water separator, aeration blowers, and clarifiers.

9.2.4.2.3 Operations

No departures or supplements.

9.2.4.3 Safety Evaluation

Potable Water System

The Potable Water System is non-safety related. With respect to compliance with Criterion 60 of Appendix A to 10 CFR 50 (CFR, 2008), the Potable Water System is not connected to any components or other systems that have the potential to carry radiological material, nor do any systems discharge to it. Further, under normal operating conditions, system pressure is maintained above the pressure of supplied components or systems, thus preventing backflow from that supplied component / system.

In addition, a backflow preventer and isolation valve are provided at “hard” connections to supplied components or systems, including hose bibs. These devices are on the potable water side of the connection to prevent backflow under abnormal, reversed differential pressure conditions.

At sinks or showers, an air gap between the potable water supply and the receiving drain prevents possible contamination from backflow. There are also siphon breakers where necessary on supply risers.

Site flooding is discussed in Section 2.4.10.

Sanitary Waste Water System

The Sanitary Waste Water System is non-safety related.

Sanitary waste water from decon showers, decon sinks and the laundry in the Access Building is directed to the Liquid Waste Management System, through the NI vents and drains system. Although drainage from showers, sinks and laundry is typically classified as sanitary water, the decon showers and sinks are used exclusively for radiological decontamination of personnel, and the laundry is used for personnel anti-contamination clothing and equipment (e.g., respirators). This does not result in biological waste loading, and is acceptable for forwarding to the Liquid Waste Management System.

With respect to compliance with Criterion 60 of Appendix A to 10 CFR 50 (CFR, 2008), sanitary waste piping in the Access Building leads from the non-RCA through the portion of the Sanitary Waste Water System that collects domestic waste water. This sanitary waste piping is completely separate from the NI vents and drains. Further, the portion of the Sanitary Waste Water System that collects domestic waste water in the Access Building, the Safeguards Buildings, and outside (underground) areas in the NI is not connected to any other system, so there is no potential for inadvertent introduction of radioactive material. The remainder of the Sanitary Waste Water System is outside the NI portion of the plant, and does not connect to any system or equipment that has the potential to carry/contain radiological contamination.

With respect to flood protection:

- The sanitary waste water collection pits or tanks are located at or below grade and in areas that are separated from safety-related SSCs. The drain lines from these pits or tanks are embedded in floor slabs and run underground outside the buildings. Inside the buildings, flooding from pits, tanks or broken sanitary lines will be effectively controlled by building floor drain systems that are designed to handle larger flows from, for example, the Fire Protection System (refer to U.S. EPR FSAR Section 9.3.3 for discussion of floor drains). Therefore, failures of the Sanitary Waste Water System, including failures of pits or tanks, will not jeopardize safety functions by flooding.

- The Waste Water Treatment Facility is physically separated and located down-grade from safety-related SSCs, in a separate building. In addition, buildings that house safety-related SSCs are constructed with ground floor slabs elevated above grade and with surrounding site drainage established to direct potential flood waters away, as described in Section 2.4.10. Therefore, failures of the Waste Water Treatment Facility, including failures of tanks, will not jeopardize safety functions by flooding.

9.2.4.4 Inspection and Testing Requirements

Potable Water System

Once the system is placed in service, periodic routine sampling of the water provides ongoing verification of potability.

Sanitary Waste Water System

The Sanitary Waste Water System, including the Waste Water Treatment Facility, is visually inspected to verify installation in accordance with design drawings and documents, and functionally tested to demonstrate proper system operation.

9.2.4.5 Instrumentation Requirements

Instrumentation includes pressure, level and flow as required for process automation, and for the visual and audible indication and alarms necessary for monitoring of system performance.

9.2.4.6 References

This section is added as a supplement to the U. S. EPR FSAR.

ANSI, 2004. Emergency Eyewash and Shower Equipment, ANSI Z358.1, American National Standards Institute, 2004.

CFR, 2008. Control of Releases of Radioactive Materials to the Environment, Title 10, Code of Federal Regulations, Part 50, Appendix A, General Design Criterion 60, U. S. Nuclear Regulatory Commission, 2008.}

9.2.5 ULTIMATE HEAT SINK

No departures or supplements.

9.2.5.1 Design Basis

{The UHS makeup support systems are schematically represented in Figure 9.2-3. Normal essential service water makeup provides up to 856 gpm (3240 lpm) of Lake Ontario water to each operating ESWS cooling tower basin to replenish ESWS inventory losses due to evaporation, blowdown, and drift during normal operations and shutdown/cooldown. ESWS cooling tower blowdown discharges up to 285 gpm (1079 lpm) of water from each operating ESWS coolding tower basin to the retention basin to maintain ESWS chemistry. This quanity is based on maintaining three cycles of concentration in the cooling tower basin, plus evaporative losses during the shutdown and cooldown.

During a design bases accident, the ESWS Cooling tower for one train has an evaporative loss of 571 gpm (2161 lpm) and blowdown is secured. The UHS system is sized for 943 gpm (3570 lpm) for each makeup train.

The ESWS makeup chemical treatment system provides a means for adding chemicals to the makeup water and to the normal ESWS makeup water. This is done to limit corrosion, scaling, and biological contaminants in order to minimize component fouling.}

9.2.5.2 System Description

The U. S. EPR FSAR includes the following COL Item in Section 9.2.5.2:

> A COL applicant that references the U.S. EPR design certification will provide site-specific information for the UHS support systems such as makeup water, blowdown and chemical treatment (to control biofouling).

This COL Item is addressed as follows:

{Section 9.2.5.2.1 through Section 9.2.5.2.4 are added as a supplement to the U. S. EPR FSAR.

9.2.5.2.1 Normal ESWS Makeup

Normal ESWS makeup water is provided to the ESWS cooling tower basins using Lake Ontario water. FSAR Section 9.2.9 provides additional discussion of the Raw Water Supply System (RWSS) that supplies water for the initial fill and makeup water for the ESWS under normal operation.

Normal ESWS makeup water is delivered from the Makeup Water Intake Structure onshore to the power block area in a single header from which four branch lines feed each of the four

ESWS divisions. Each ESWS division's normal makeup line ties into its ESWS emergency makeup line (i.e., UHS makeup water line) through a safety-related motor operated valve (MOV) in the ESWS pumphouse at the ESWS cooling tower basin. The tie-in point is inboard of (or downstream of) the UHS makeup water system isolation MOV. The safety-related normal makeup water isolation MOV ensures the integrity of the ESWS cooling tower basin and the UHS Makeup Water System by closing in the event of a design basis accident (DBA).

9.2.5.2.2 Blowdown

Blowdown from the ESWS cooling tower basins is a non-safety related function. The site-specific blowdown arrangement for each ESWS cooling tower basin is a line that runs from the ESWS pump's discharge piping to a header in the yard area where lines from two ESWS basins that are located on one side of the nuclear island merge into one. Similarly, lines from the ESWS cooling tower basins at the opposite end of the nuclear island merge into one line. These two lines then merge into a single blowdown line that runs to the waste water retention basin.

The connection at the ESWS pump discharge is made through a safety-related MOV that closes automatically in the event of a DBA to ensure ESWS integrity.

An alternative blowdown path is provided from the same pump discharge connection through a second safety-related MOV in case the normal path is unavailable.

Under normal operating conditions and shutdown/cooldown conditions, the normal blowdown valves automatically modulate blowdown flow from their ESWS trains to the retention basin to help ensure cooling water chemistry remains within established limits.

During a DBA, blowdown flow can be manually controlled from the main control room by adjustment of the safety-related MOV.

9.2.5.2.3 UHS Makeup Water System

Emergency makeup water for the ESWS is provided by the site-specific, safety related UHS Makeup Water System that draws water from Lake Ontario. Lake Ontario water enters the Intake Structure onshore through two safety-related intake tunnels. The forebay of the UHS Makeup Water Intake Structure onshore is safety related and is shared with the Circulating Water System and the Raw Water Supply System. The UHS Makeup Water portion of the Intake Structure onshore houses four bar screens and four dual-flow traveling screens that remove large debris and trash that may be entrained in the flow. Provisions are made for tempering of the intake water in the offshore shafts. The flow velocity in the intake system including the traveling water screens is less than 0.5 ft/sec which meets the EPA Rule 316(b) requirement and a fish return provision in the design is not necessary.

There are four independent UHS Makeup Water System trains, one for each of the ESWS divisions. Each train has one vertical turbine type wet pit pump, a discharge check valve, a self-cleaning strainer, and a pump discharge isolation MOV (all housed in the UHS Makeup Water portion of the Intake Structure onshore), plus the buried piping running up to and into the ESWS pumphouse at the ESWS cooling tower basin. The UHS Makeup Water System isolation MOV is located inside the ESWS pumphouse at the connection to the ESWS cooling tower basin.

In addition, each train has a surveillance test bypass that runs from just upstream of the isolation MOV at the ESWS cooling tower basin, through a safety-related MOV, to the blowdown line. The latter safety-related MOV is normally closed, and will go closed if open on receipt of an accident signal, providing assurance of the UHS Makeup Water System integrity.

Instrumentation and controls are provided for monitoring and controlling individual components and system functions.

The makeup pump, check valve, pump isolation MOV and strainer, as well as the associated power distribution and control panel for each ESW train are located in one of four separate rooms in the UHS Makeup Water portion of the Intake Structure above the probable maximum flood level. Internal flooding is addressed in FSAR Section 3.8.4 and 3E.4. Fire Hazards Analysis is addressed in FSAR Appendix B to Chapter 9.

A plan view and a cross section view of the site-specific Intake Structure onshore are shown in Figure 9.2-4 and Figure 9.2-5. Figure 9.2-6 shows the design of the UHS Discharge Diffuser. Pumphouse compartments for each UHS makeup pump has its own heating and ventilation system that is schematically shown in Figure 9.4-1. Safety related trench design for the buried UHS makeup piping is shown in Figure 9.2-8.

9.2.5.2.4 ESWS Makeup Water Chemical Treatment

The UHS Makeup Water System is normally in standby mode and its water is therefore stagnant. Specific chemistry requirements are defined to minimize corrosion, prevent scale formation, and limit biological and sedimentary fouling that could inhibit UHS Makeup Water flow. In addition, there are chemical additives used in the ESWS cooling towers to reduce scaling and corrosion, and to treat potential biological contaminants, which are added via the normal ESWS piping.

The treatment system consists of multiple skid-mounted arrangements, one for each division's ESWS cooling tower. Each skid contains the equipment, instrumentation, and controls to fulfill the system's function of both monitoring and adjusting water chemistry. The root valves at the connections of chemical addition and sample lines to normal ESWS piping are safety-related as necessary to ensure the integrity of UHS during and following a DBA.

The specific chemicals and addition rates are determined by periodic water chemistry analyses.

The source of UHS Makeup Water System is Lake Ontario and water treatment is required to control zebra and quagga mussels at the offshore intake cribhouses and at the Intake Structure onshore. A non-oxidizing moluscicide is selected to control the mussels and prevent macrofouling. Suitable chemicals that may be applied include quaternary ammonium compounds and filming amines. These treatment chemicals are applied at the intakes twice per year for 24 to 48 hours for each treatment. Because the moluscicides are not consumed within the intake tunnels, these applications also treat the forebay and traveling screens at the screenhouse as well as downstream piping and components.

Facilities for injection are located near the screenhouse at the Intake Structure at the shore. Small diameter tubing is routed through the intake tunnels to deliver chemical to the offshore intake cribhouses. Provisions are also made to divert chemical directly to the forebay at the entrances of the intake tunnels to the screenhouse. This provides localized treatments if needed due to warmer conditions that may favor zebra mussel growth within the screenhouse. Instrumentation is provided to monitor and adjust the water chemistry.

A backup method for chemical injection at intakes involves use of a specially equipped boat anchored near the offshore intake cribhouse. Divers can install temporary injection tubing from the boat to the intake for chemical injection.

An oxidizing biocide is selected to control microbiological growth in service water piping to control fouling, microbiological deposits, and microbiological-related corrosion in service water piping. Sodium hypochlorite solution is injected intermittently near the UHS pumps.

All components of the chemical treatment systems are constructed of materials compatible with the chemicals utilized in the treatment system.

9.2.5.3 Component Description

9.2.5.3.1 Normal ESWS Makeup Isolation Valves

The normal ESWS Makeup Water System isolation valves are safety-related MOVs designed to ASME Section III, Class 3 requirements.

9.2.5.3.2 UHS Makeup Water Intake Structure Bar Grating & Trash Rake and Traveling Screens

The UHS portion of the Intake Structure onshore houses four bar screens (bar grating and trash rake) and four dual-flow traveling screens. They prevent debris from passing into the UHS Makeup Water system pumps, and subsequently into the Component Cooling Water System heat exchangers, as well as the intercoolers, lube oil coolers, and water jackets of the emergency diesel generators. A screenwash system consists of a screenwash pump for each dual flow traveling water screen to provide high pressure spray to remove debris. The traveling screens are non-safety-related but have a large enough face area that potential blockage to the point of preventing the minimum required flow through them is not a concern.

9.2.5.3.3 UHS Makeup Water System Pumps

There are four vertical turbine pumps, each rated at 950 gpm (3596 lpm). Each pump is driven by an electric motor, and is equipped with a discharge check valve and motor operated isolation valves. They are designed to ASME Section III, Class 3 requirements.

9.2.5.3.4 UHS Makeup Water System Isolation Valves

The UHS Makeup Water System isolation valves are safety-related MOV's designed to ASME Section III, Class 3 requirements. For each train there are the pump isolation MOV, the UHS Makeup Water System isolation MOV at the ESWS cooling tower basin, and the UHS Makeup Water System bypass isolation MOV.

9.2.5.3.5 UHS Makeup Water System Self Cleaning Strainers

Each makeup water train has a self-cleaning strainer. A bypass path is available that is normally isolated by two isolation valves. This bypass also contains a self-cleaning strainer. The strainers are designed to ASME Section III, Class 3 requirements.

The strainers remove debris from the process flow that is not trapped by the bar screens and the traveling screens.

9.2.5.3.6 UHS Makeup Water System Piping

The UHS Makeup Water System piping and fittings are designed to ASME Section III, Class 3 requirements.

9.2.5.3.7 Chemical Treatment System Isolation Valves

The valves at the chemical treatment system connections to the normal ESWS or the Ultimate Heat Sink Makeup Water System piping are safety-related to assure normal or Ultimate Heat Sink Makeup Water System integrity in the event of a DBA. The valves comply with the requirements of ASME Section III, Class 3 and are constructed of materials compatible with chemicals injected, as are the piping branches from the safety-related piping to which they connect.

9.2.5.3.8 Chemical Treatment System Components

The components of the chemical treatment system upstream of the safety-related MOV are non-safety-related. The components of the chemical treatment system at the offshore intake cribhouses and at the Intake Structure onshore are nonsafety- related. The components include metering pumps, pipes, chemical storage tanks, control valves, and sampling valves and lines.

All of these components are constructed of materials compatible with the chemicals utilized in the treatment system.

9.2.5.3.9 ESWS Cooling Tower Blowdown System Isolation Valves

The valves that isolate blowdown are safety-related MOVs at the branch connection on the ESWS pump discharge to assure ESWS integrity in the event of an accident. The valves and the branch connections up to the valves are carbon steel, and designed to ASME Section III, Class 3 requirements.

9.2.5.3.10 ESWS Cooling Tower Blowdown System Piping, Valves and Fittings

The ESWS Cooling Tower Blowdown System components downstream of the MOV are non-safety-related. They are made of carbon steel materials.

9.2.5.4 System Operation

9.2.5.4.1 Normal Operating Conditions

The normal ESWS makeup is supplied by the RWSS from Lake Ontario water. The two operating ESWS divisions have the normal makeup MOVs open, while the two standby divisions' normal makeup MOVs are closed.

Blowdown from each train is aligned to the waste water retention basin with the flow rate controlled by the manual adjustment of the safety-related motor operated blowdown isolation valve.

The UHS Makeup Water System for each division is in standby with the UHS Makeup Water System Isolation MOV at the ESWS cooling tower basin closed and the pump isolation MOV closed. The bypass line's MOV is also closed.

Periodic surveillance testing is conducted to demonstrate system operability of the redundant trains, and includes addition of chemicals as necessary to maintain the water chemistry within the prescribed limits.

9.2.5.4.2 Abnormal Operating Conditions

On receipt of an accident signal, the normal ESWS makeup isolation MOVs that are open will close; those that are closed will remain closed. In addition, the ESWS cooling tower blowdown isolation valves will close and any open safety-related valves in the chemical treatment and test bypass system will close. None of those safety-related valves can be opened until the accident signal is cleared. Subsequent action is manually initiated from the main control room or locally based on operators' judgment resulting from prevailing conditions and indications. This includes applying the UHS Makeup Water System to any and/or all ESWS cooling tower basins, as well as blowdown from any and/or all ESWS cooling tower basins.

9.2.5.5 Safety Evaluation

Normal ESWS makeup is a non-safety-related function, and thus requires no safety evaluation with respect to design basis events. Similarly, the cooling tower blowdown and the chemical treatment are non-safety-related functions and require no safety evaluation. However, the connections to safety-related piping through which these functions are made and the accompanying isolation valves are safety-related, which ensures the integrity of the safety-related piping in the event of a DBA.

The UHS Makeup Water System function is to provide reliable makeup to the ESWS cooling tower basinswithin 72 hours after receipt of an accident signal, to ensure that sufficient makeup flow is provided so that the ESWS can fulfill its design requirement of shutdown decay heat removal for a minimum of 30 days following a DBA.

This function is assured because the UHS Makeup Water System:

- Is designed, procured, constructed and operated in accordance with the criteria for ASME Section III, Class 3 safety-related systems, structures and components, and Seismic Category I requirements, including the tie-in piping and isolation valves for makeup, chemical addition, and sampling.
- Has four equivalent and completely independent (physically and electrically) trains, any two of which are capable of providing the required worst case makeup flow and a single failure will not compromise the UHS safety related functions.
- Has an UHS Makeup Water Intake Structure onshore which is designed and built for protection against seismic and missile hazards.
- Has bar heaters at the offshore intake cribhouses to eliminate frazil ice.
- Has each UHS Makeup Water System pump installed such that its function is protected against the worst case low water event.
- has seismically qualified and installed (buried) piping runs from the Intake Structure onshore to the individual ESWS cooling tower basins.
- Is treated to meet specific limits on system water chemistry in order to prevent potentially detrimental fouling of stagnant piping sections and surfaces.
- Is periodically performance tested and sampled to confirm operability and verify system water chemistry requirements.

- Has bar screens large enough to preclude the occurrence of their being blocked to the extent that minimum required flow of water cannot be maintained.

- Has a traveling water screen system including screenwash, in the pump intake bay for each UHS makeup pump to ensure that debris does not block the pump intake.

In addition, reconciliation of the site-specific climatology data has demonstrated that the ESWS cooling tower performance maintains the ESWS temperature below the required 95º F (35° C). Refer to Section 2.4.7 for a discussion of fire effects on the UHS.

9.2.5.6 Inspection and Testing Requirements

The UHS Makeup Water System components, including the safety-related motor operated isolation valves for makeup and blowdown, and the safety-related isolation valves for chemical treatment and sampling, are procured and fabricated in accordance with the quality requirements for safety-related ASME Section III, Class 3 systems, structures and components to ensure compliance with approved specifications and design documents.

Installation of individual components and overall system construction are inspected to verify the as-built condition is in accordance with approved drawings. Performance testing upon completion of construction verifies the system's ability to perform its design safety function.

Finally, periodic surveillance testing of the system, including the safety-related isolation valves, provides continuing assurance of the system's ongoing capability to perform its design function. Surveillance testing includes system performance tests and inspection of individual components, as appropriate to their importance to system function and their tendency to degrade due to their operational conditions and environment.

9.2.5.7 Instrumentation Applications

Instrumentation is applied to the UHS Makeup Water System and Blowdown System to the extent necssary to monitor essential component conditions and verify real time system performance. This includes limit switches that provide remote position indication for valves. It also includes pressure, temperature, and differential pressure sensors that provide local and remote display of system pressure, temperature, and flow. In addition, temperature and amperage sensors will be used for indirect flow indication and direct indication of compenent status.

System performance can also be assessed using level indication on the cooling tower basins.}

9.2.5.8 References

No departures or supplements.

9.2.6 CONDENSATE STORAGE FACILITIES

No departures or supplements.

9.2.7 SEAL WATER SUPPLY SYSTEM

No departures or supplements.

9.2.8 SAFETY CHILLED WATER SYSTEM

No departures or supplements.

9.2.9 RAW WATER SUPPLY SYSTEM

The U. S. EPR FSAR includes the following COL Item in Section 9.2.9:

> The RWSS and the design requirements of the RWSS are site-specific and will be addressed by the COL applicant.

This COL Item is addressed as follows:

{Raw water is the term usually applied to untreated water. At NMP3NPP, the Raw Water Supply System (RWSS) supplies raw water drawn from Lake Ontario directly to the points of use, which comprises the floor wash header, plant demineralized water, essential service water, and fire protection systems. The municipal water supply provides water to the potable and sanitary water systems as described in Section 9.2.4. Raw water pumped from Lake Ontario passes through strainers before being supplied to the demineralized water treatment system, fire protection system water storage tank, floor wash header, and Essential Service Water Cooling Tower Structure (ESWCT) basins. This encompasses the plant water demands, with the exception of potable and sanitary water, Circulating Water System makeup, and UHS makeup during emergency conditions.

Section 9.2.9.1 through 9.2.9.7 are added as a supplement to the U. S. EPR FSAR.

9.2.9.1 Design Basis

No cross connections exist between raw Lake Ontario water supplied to the usage points and any system with the potential to carry radioactive material. This design requirement satisfies Criterion 60 of Appendix A to 10 CFR 50 (CFR, 2008).

Raw water from Lake Ontario passes through strainers before it is supplied to the demineralized water treatment system, floor wash header, the fire protection system water storage tanks, and the essential service water system (except under emergency operating conditions) during periods of normal power operation, shutdown, maintenance and construction. The emergency makeup to essential service water is provided by a dedicated, safety-related system. The UHS Makeup Water System is discussed in Section 9.2.5

9.2.9.2 System Description

Raw water is distrubuted to the connected systems through non-safety-related piping. The raw water suppy system is a non-safety-related, non-seismic system that provides all of the water for plant use, with the exception of Circulating Water System Makeup, potable and sanitary water, and ESWS makeup under emergency conditions.

The raw water supply system supplies water for initial fill and makeup to the following systems:

- Essential service water during all but emergency conditions.
- Demineralized water.
- Fire protection.

The raw water water supply system is schematically represented in Figure 9.2-7.

The raw water supply system pumps provide the motive force to deliver water from Lake Ontario through the strainers and distribute it to the demineralized water system, fire protection system water storage tanks, and essential service water system for their initial fill, and as needed for makeup. Emergency makeup to the ESWS is provided by the dedicated UHS makeup water system, described in Section 9.2.5. Makeup to the potable and sanitary water systems is provided by the municipal water supply as described in Section 9.2.4.

9.2.9.3 Component Descriptions

Raw Water Piping and Valves

Raw water flows from the intake structure to the supplied systems through non-safety-related underground piping. The piping and valves which connect the system components to each other and to the supplied systems are made of materials compatible with the lake water.

Raw Water Pumps

These are vertical wet pit pumps located in the intake structure. Each pump is equipped with a discharge check valve and discharge isolation valve. Each pump is sized to deliver 50% of the total required intermittent and continuous flows.

Raw Water Strainers

An automatic, self-cleaning strainer is located at the discharge of each raw water pump. The strainers remove particulate material from the raw water before it is pumped to the supplied systems. The backwash flows from the strainers discharge to the retention basin.

9.2.9.4 Safety Evaluation

The raw water supply system provides no safety-related function. Therefore, no safety evaluation is required with respect to plant design basis events.

There is no connection between raw water and components or other systems that have the potential to carry radiological contamination. This complies with Criterion 60 of Appendix A to 10 CFR 50 (CFR, 2008).

With respect to potential flooding caused by failures of piping or components, the raw water delivery piping is located remote from any safety related systems or equipment, except for the lines connecting to the ESWS cooling tower basins. Failures other than at the tower basin connections will not adversely impact safety functions because the plant storm water controls are designed to divert surface water flow. The connections to the tower basins are made through safety-related motor operated valves, thereby assuring basin integrity under accident conditions. Potential leakage from the raw water lines in the essential service water pump houses is controlled, collected and routed away by the floor drains in those structures. These floor drain lines include check valves where necessary to prevent possible backflow from causing flooding that could adversely affect the safety related equipment.]

9.2.9.5 Inspection and Testing Requirements

Visual inspections are conducted during construction to verify that the as-built condition is in accordance with design documents. Pressure testing and functional testing are conducted during post-construction pre-commissioning and startup, as necessary to confirm system integrity and proper operation of individual components and the total system. Portions of the system are demonstrated with in-service leak testing where such method does not jeopardize other systems/equipment and is sufficient to demonstrate proper operation.

Ongoing system operation provides continuing demonstration of the system's functionality.

9.2.9.6 Instrumentation Requirements

Instrumentation includes sensing and display of various parameters as necessary to automate system function, and to provide for local and remote system monitoring, including alarms. These parameters include flows, essential service water makeup flow, demineralized water system feed flow, strainer differential pressures, and pump discharge pressures. Valve position indication for selected valves and pump power on/off indication are also provided.

9.2.9.7 References

CFR, 2008. Control of Releases of Radioactive Materials to the Environment, Title 10, Code of Federal Regulations, Part 50, Appendix A, General Design Criterion 60, U. S. Nuclear Regulatory Commission, 2008.}

Figure 9.2-1—{Potable Water System}

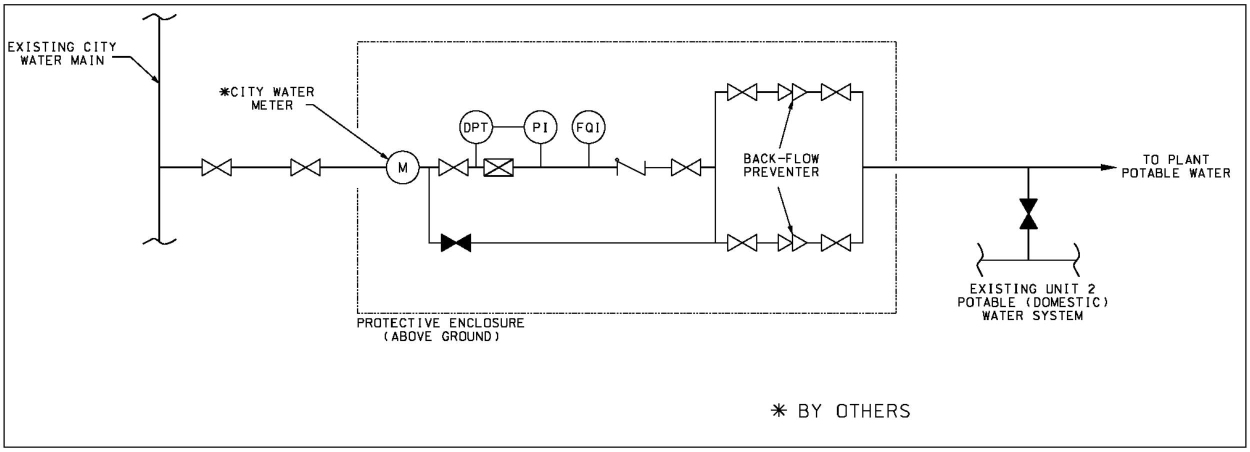


Figure 9.2-2—{Sanitary Waste Water System}

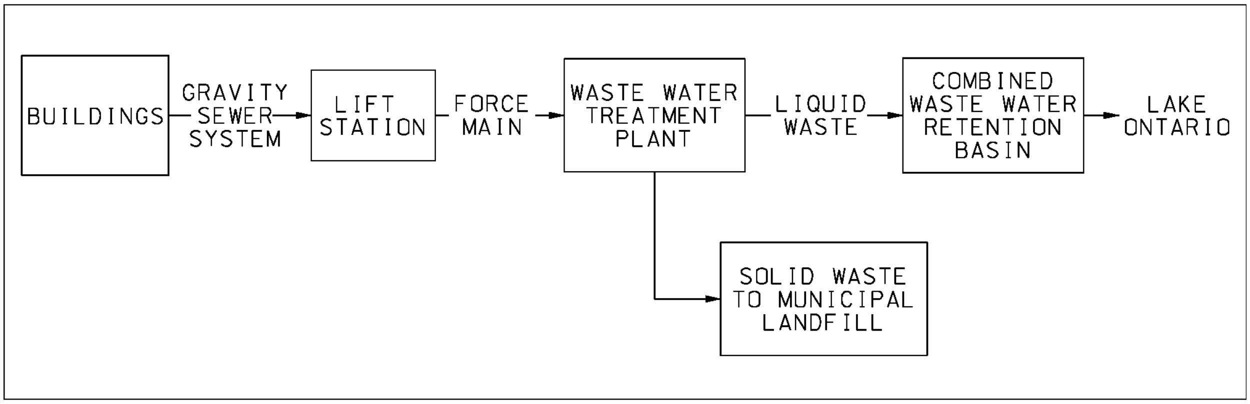


Figure 9.2-3—{Normal Makeup, UHS Makeup, Blowdown & Chemical Treatment}

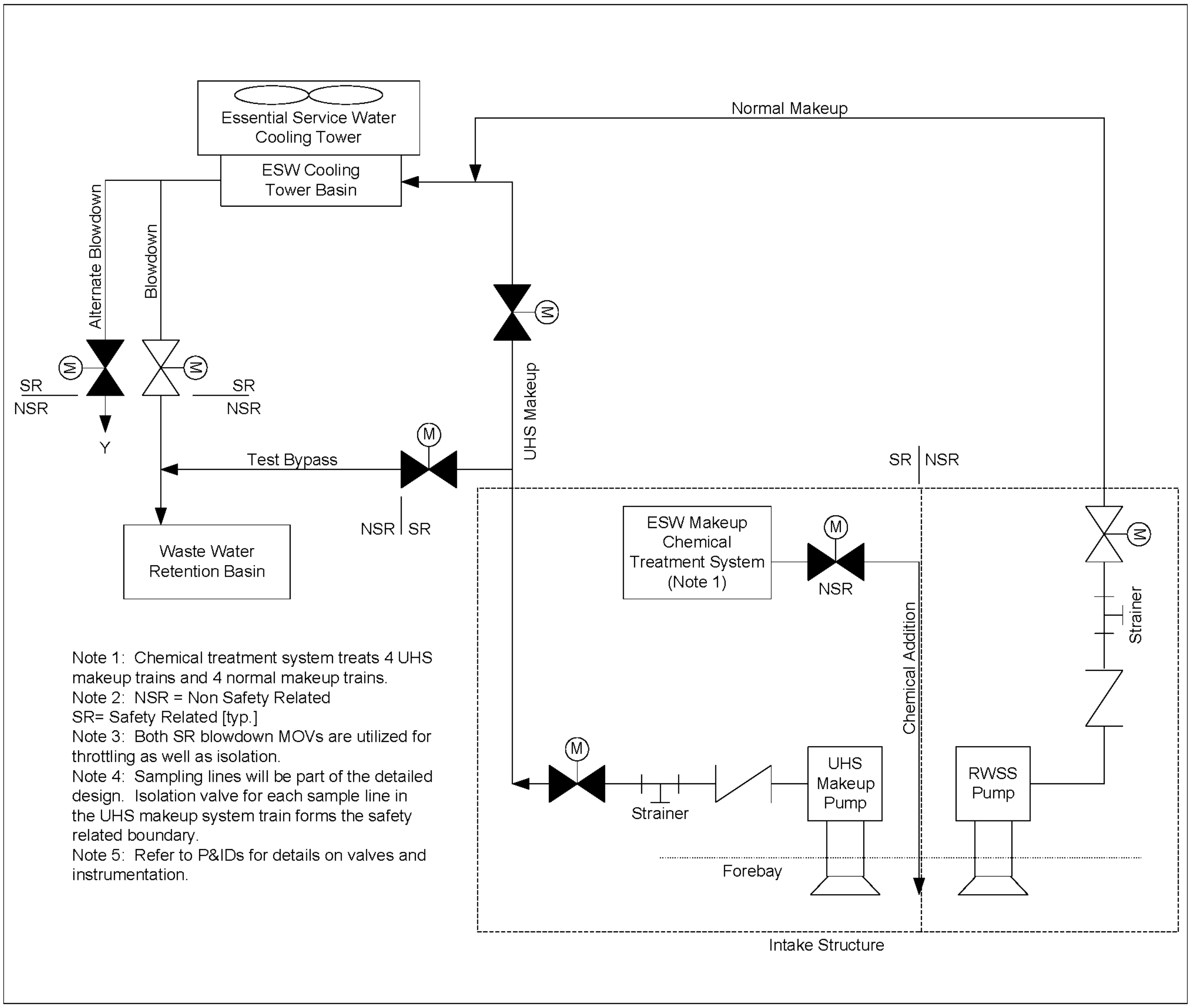


Figure 9.2-4—{UHS Makeup Water Intake Structure - Plan View}

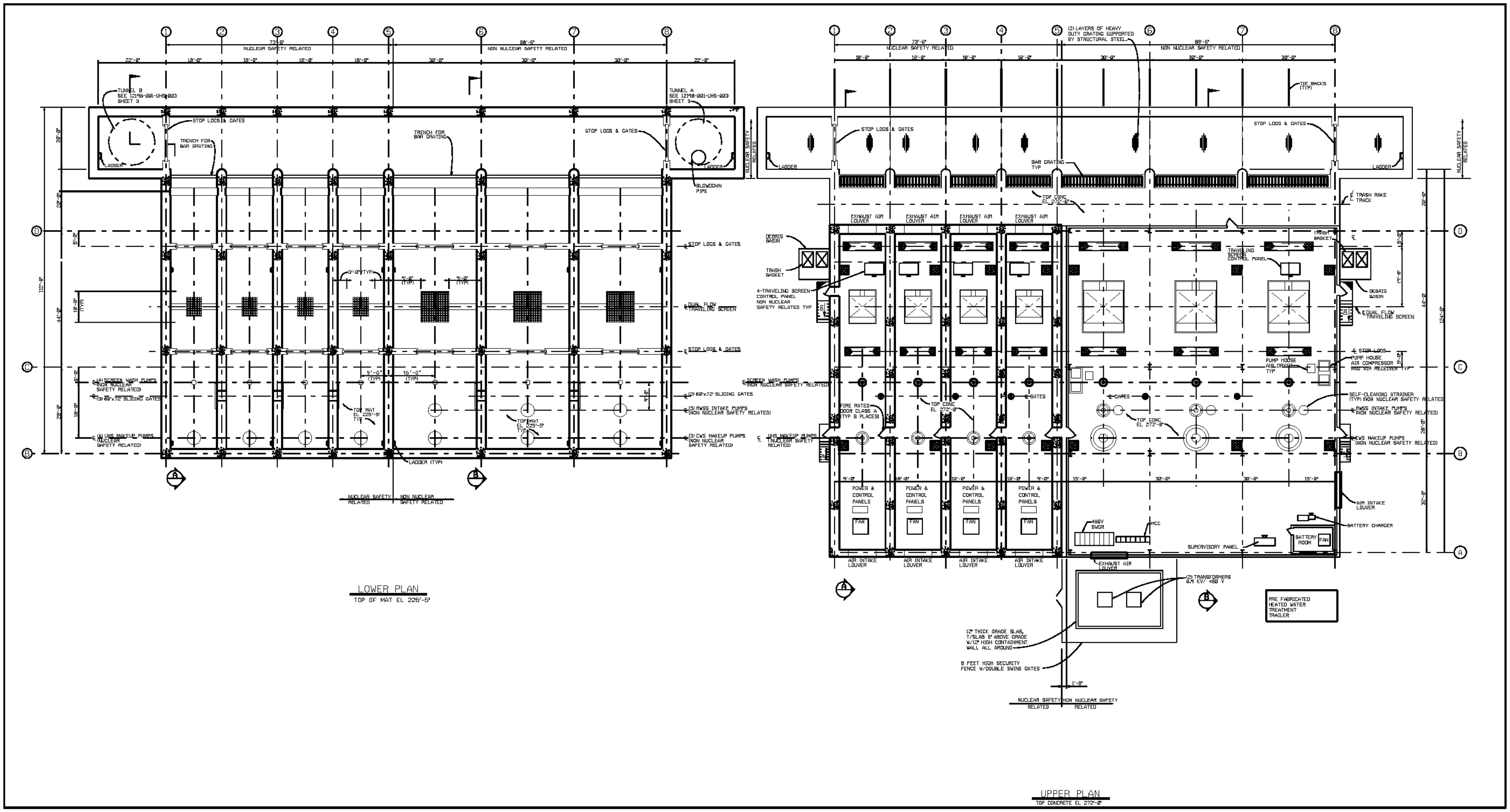


Figure 9.2-5—{UHS Makeup Water Intake Structure - Section View}

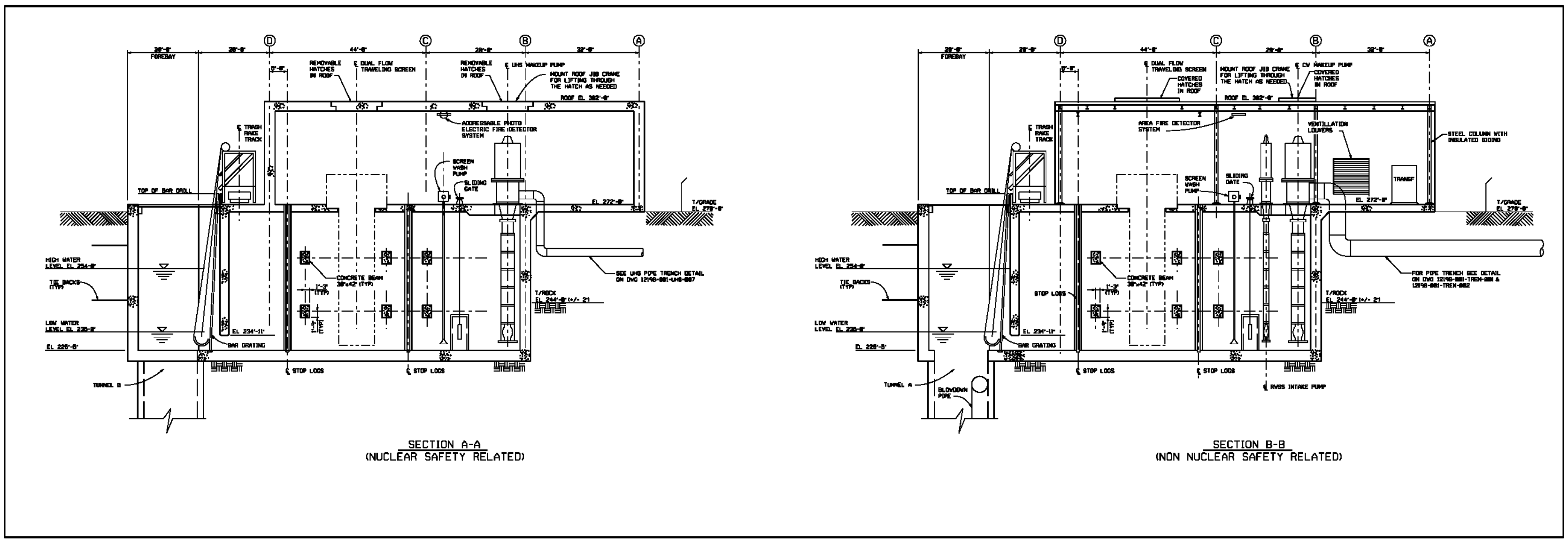


Figure 9.2-6—{UHS Discharge Diffuser}

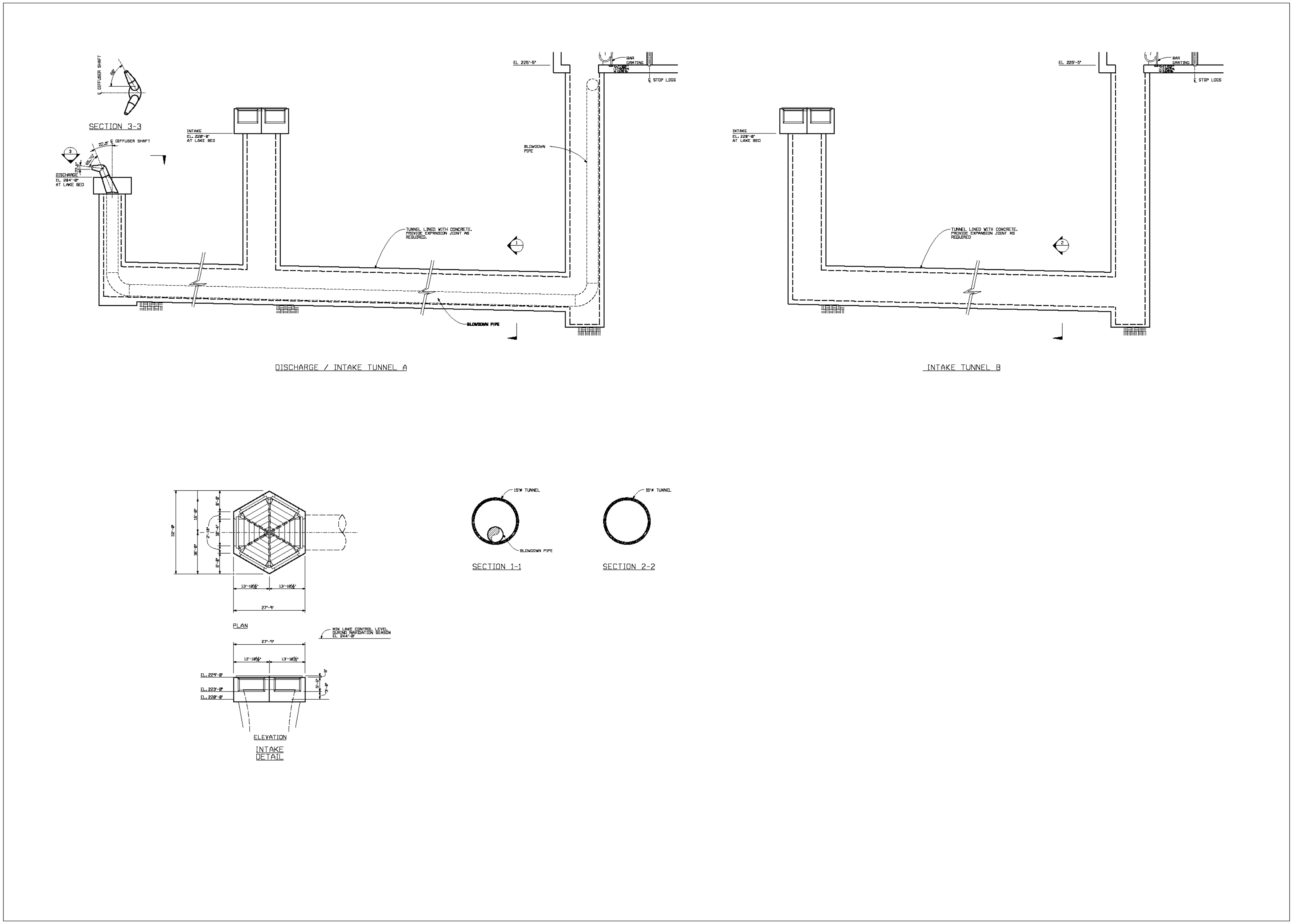


Figure 9.2-7—{Raw Water Supply}

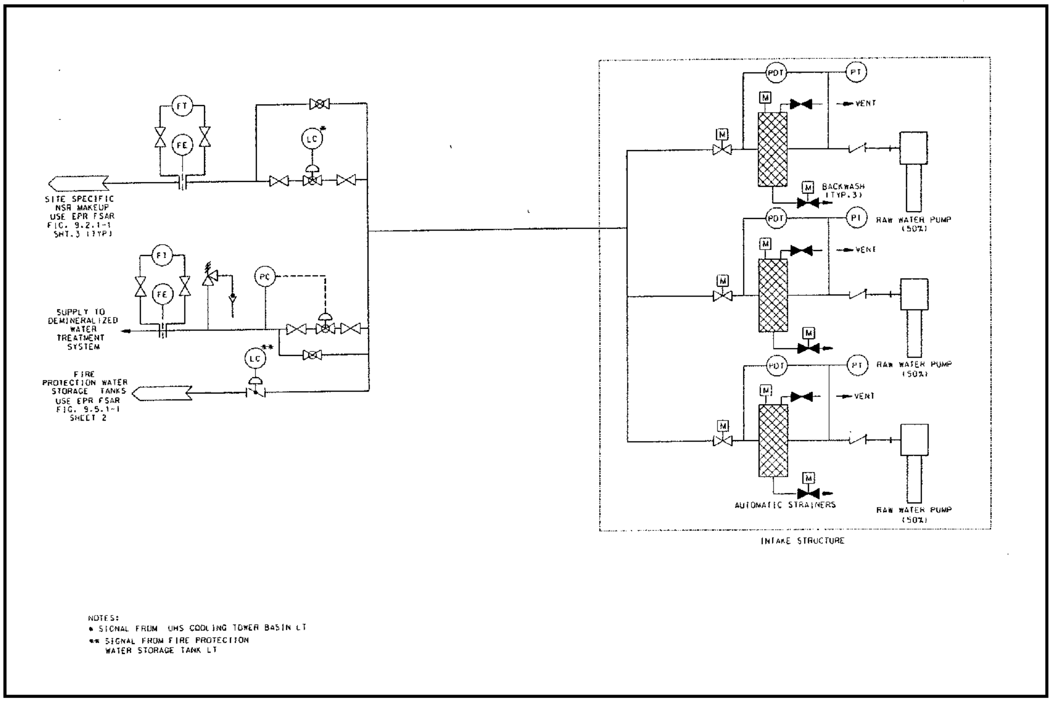
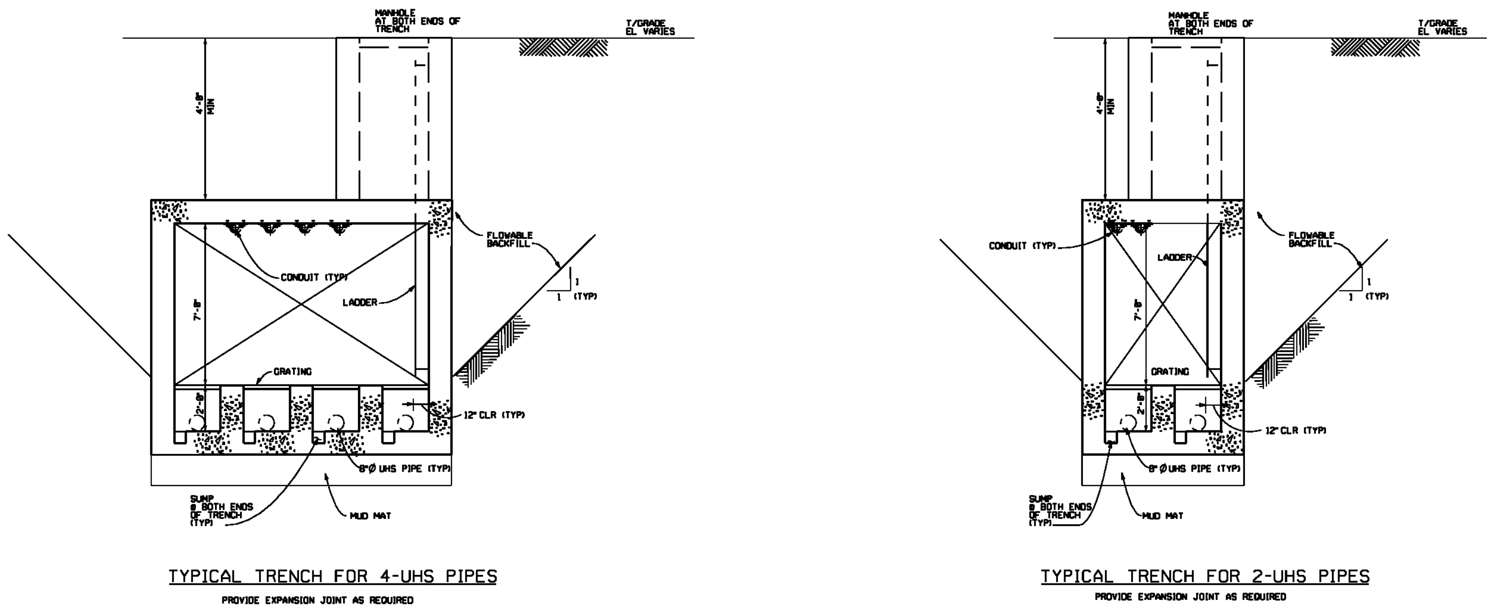


Figure 9.2-8—{Encasement Structure}



9.3 PROCESS AUXILIARIES

This section of the U.S. EPR FSAR is incorporated by reference.

9.4 AIR CONDITIONING, HEATING, COOLING AND VENTILATION SYSTEMS

This section of the U.S. EPR FSAR is incorporated by reference with the following supplements. {Section 9.4.15 has been added as a supplement to the U.S. EPR FSAR.}

9.4.1 MAIN CONTROL ROOM AIR CONDITIONING SYSTEM

No departures or supplements.

9.4.1.1 Design Bases

The U.S. EPR FSAR includes the following conceptual design information in Section 9.4.1.1:

> The CRACS provides adequate protection against radiation [[and hazardous chemical releases]] to permit access to and occupancy of the control room under accident conditions (GDC 19). [[The control room occupancy protection requirements meet the guidance of RG 1.78.]]
>
> The CRACS maintains habitability of the CRE areas during a site radiological contamination event [[or toxic contamination of the environment]] (Refer to Section 6.4).
>
> The CRACS outside air intake is capable of detecting radiation and smoke [[and toxic chemicals]] (see Section 6.4.2.4). Associated monitors actuate alarms in the MCR.
>
> [[Upon actuation of the plant toxic gas alarm signal, the outside air intake dampers close automatically and the CRE air is automatically diverted in the recirculation mode without outside air.]]

This conceptual design information is addressed as follows:

{The evaluation of the NMP3NPP toxic chemicals in Section 2.2.3 did not identify any credible toxic chemical accidents that exceeded the limits established in Regulatory Guide 1.78 (NRC, 2001). No specific provisions are required to protect the operators from an event involving a release of a toxic gas. As a result, toxic gas detectors and isolation are not required and will not be provided at NMP3NPP.}

9.4.1.2 System Description

9.4.1.2.1 General Description

The U.S. EPR FSAR includes the following conceptual design information in Section 9.4.1.2.1 and associated Figure 9.4.1-2:

> Sensors on the outside air inlet protect against [[toxic gas (refer to Section 6.4.2.4) and]] radiological intrusion.

The conceptual design information is addressed as follows:

{The evaluation of the NMP3NPP toxic chemicals in Section 2.2.3 did not identify any credible toxic chemical accidents that exceeded the limits established in Regulatory Guide 1.78 (NRC, 2001). No specific provisions are required to protect the operators from an event involving a release of a toxic gas.}

9.4.1.2.2 Component Description

{The results of the NMP3NPP toxic chemicals evaluation in Section 2.2.3 did not identify any toxic chemicals that exceeded the limits established in Regulatory Guide 1.78. As a result, toxic gas detectors and isolation are not required and will not be provided at NMP3NPP.}

9.4.1.2.3 System Operation

The U.S. EPR FSAR includes the following conceptual design information in Section 9.4.1.2.3:

> [[During a toxic gas accident event, the CRACS is placed in full recirculation mode without any outside air makeup (refer to Section 6.4.2.2.]]
>
> *[[Operation During a Toxic Gas Event*
>
> Outside air is continuously monitored for toxic gas by the toxic gas sensors located at the air intakes. Upon detection of a toxic gas condition, audible and visual alarms are actuated in the MCR.]]
>
> *Operation during External Fire, Smoke [[or Toxic Gas Release]]*
>
> In the event of an external fire, [[external toxic gas release,]] smoke, or excessive concentration of CO or CO_2, outside air to the CRACS is isolated manually or automatically and the system operates in full recirculation mode without fresh air.

The conceptual design information is addressed as follows:

{The evaluation of the NMP3NPP toxic chemicals in Section 2.2.3 did not identify any credible toxic chemical accidents that exceeded the limits established in Regulatory Guide 1.78 (NRC, 2001). No specific provisions are required to protect the operators from an event involving a release of a toxic gas.}

9.4.1.3 Safety Evaluation

No departures or supplements.

9.4.1.4 Inspection and Testing Requirements

No departures or supplements.

9.4.1.5 Instrumentation Requirements

No departures or supplements.

9.4.1.6 References

{**NRC, 2001.** Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release, Regulatory Guide 1.78, Revision 1, U. S. Nuclear Regulatory Commission, December 2001.}

9.4.2 FUEL BUILDING VENTILATION SYSTEM

No departures or supplements.

9.4.3 NUCLEAR AUXILIARY BUILDING VENTILATION SYSTEM

No departures or supplements.

9.4.4 TURBINE BUILDING VENTILATION SYSTEM

No departures or supplements.

9.4.5 SAFEGUARD BUILDING CONTROLLED-AREA VENTILATION SYSTEM

No departures or supplements.

9.4.6 ELECTRICAL DIVISION OF SAFEGUARD BUILDING VENTILATION SYSTEM (SBVSE)

No departures or supplements.

9.4.7 CONTAINMENT BUILDING VENTILATION SYSTEM

No departures or supplements.

9.4.8 RADIOACTIVE WASTE BUILDING VENTILATION SYSTEM

No departures or supplements.

9.4.9 EMERGENCY POWER GENERATING BUILDING VENTILATION SYSTEM

No departures or supplements.

9.4.10 SWITCHGEAR BUILDING VENTILATION SYSTEM

No departures or supplements.

9.4.11 ESSENTIAL SERVICE WATER PUMP BUILDING VENTILATION SYSTEM

No departures or supplements.

9.4.12 MAIN STEAM AND FEEDWATER VALVE ROOM VENTILATION SYSTEM

No departures or supplements.

9.4.13 SMOKE CONFINEMENT SYSTEM

No departures or supplements.

9.4.14 ACCESS BUILDING VENTILATION SYSTEM

No departures or supplements.

9.4.15 {UHS MAKEUP WATER INTAKE STRUCTURE VENTILATION SYSTEM

This section is added as a supplement to the U.S. EPR FSAR.

The UHS Makeup Water Intake Structure consists of four (4) independent UHS makeup water pumphouses. The UHS Makeup Water Intake Structure Ventilation System is comprised of four independent heating and ventilation (HV) systems, one for each pumphouse. Each UHS makeup water pumphouse's HV system is independent and is not connected to any of the other UHS makeup water pumphouse HV system. The UHS Makeup Water Intake Structure Ventilation System provides an environment suitable for the operation of that division's makeup water system pump (refer to Section 9.2.5).

9.4.15.1 Design Bases

The UHS Makeup Water Intake Structure Ventilation System is safety related and operates both during normal and the accident conditions to provide suitable environment for personnel access and the pump, pump motor and the associated equipment that are required to operate during the accident conditions. The UHS Makeup Water Intake Structure Ventilation System complies with the general design criteria (GDC) indicated below:

- The UHS Makeup Water Intake Structure Ventilation System maintains acceptable temperature limits to support the operation of the UHS makeup water pumps that are required to operate during the design basis accident conditions. The UHS Makeup Water Intake Structure Ventilation System maintains a minimum temperature of 50°F (10°C) and a maximum temperature of 104°F (40°C).

- The UHS Makeup Water Intake Structure Ventilation System and its components are located inside UHS Makeup Water Intake Structure that is designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods and external missiles (GDC 2).

- The UHS Makeup Water Intake Structure Ventilation System and its components are appropriately protected against the dynamic effects and designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing and postulated accidents. The components of the UHS Makeup Water Intake Structure Ventilation System remain functional and perform their intended safety functions following a postulated hazard, such as fire, internal missile, or pipe break (GDC 3 and GDC 4).

- UHS Makeup Water Intake Structure Ventilation System can perform the safety functions, assuming a single active component failure coincident with the loss of off-site power.

- The active components of the UHS Makeup Water Intake Structure Ventilation System are capable of being tested during plant operations.

- The quality group classification of the components of the UHS Makeup Water Intake Structure Ventilation System is in accordance with the Regulatory Guide 1.26 and seismic design of the system components meets the guidance of Regulatory Guide 1.29.

- The power supply and control functions of the UHS Makeup Water Intake Structure Ventilation System are designed in accordance with Regulatory Guide 1.32.

9.4.15.2 System Description

9.4.15.2.1 General Description

A drawing of the UHS Makeup Water Intake Structure Ventilation System is shown in Figure 9.4-1**.**

Each division of the UHS Makeup Water Intake Structure Ventilation System functions to maintain the temperature in its associated UHS makeup water pumphouses within the range of minimum and maximum design temperatures during plant normal, abnormal, and accident conditions. Each division of the UHS Makeup Water Intake Structure Ventilation System consists of supply air system and an exhaust air system. The supply air system consists of missile protected outside air intake, supply air fan, ductwork, electric duct heater, control dampers, duct accessories and instrumentation and controls. The exhaust air system consists of a missile protected exhaust air outlet, and the backdraft damper.

9.4.15.2.2 Components Description

Supply Air Fan

The supply air fan is a vane axial type with an electric motor driver. The supply air fan capacity is based on room heat loads and room inside and outside design temperatures. Fan performance is rated in accordance with ANSI/AMCA-210-1999 (ANSI, 1999), ANSI/AMCA-211-1987 (ANSI, 1987), and ANSI/AMCA-300-1985 (ANSI, 1985).

Ductwork and Duct Accessories

The supply/return air duct is constructed of galvanized steel and is structurally designed for fan shut off pressure. The system is safety related therefore, the ductwork and duct accessories are designed to remain intact and functional during and after a safe shutdown earthquake (SSE) event. The ductwork and duct accessories meet the design, construction and testing requirements of ASME AG-1-2003 (ASME, 2003).

Electric Duct Heater

Electric duct heater is safety related and is provided to maintain the temperature in the pumphouse within the design temperature range. The duct heater meets the design, construction and testing requirements of ASME AG-1-2003 (ASME, 2003).

Control Dampers

The outside and the return air control dampers are safety related. These dampers modulate to maintain a set temperature downstream of the supply air fan. The control dampers meet the design, construction and testing requirements of ASME AG-1-2003 (ASME, 2003).

9.4.15.2.3 System Operation

Normal Plant Operation

During normal plant operation, the UHS makeup water pumps are not in operation, except for the performance of periodic surveillance tests. Each division of the UHS Makeup Water Intake Structure Ventilation System functions to maintain the temperature in its associated UHS makeup water pumphouse within the design limit for starting and operating the UHS makeup water system pump. Each UHS makeup water pumphouse temperature is monitored and is indicated locally in the pumphouse. The high and low temperature for each UHS makeup water pumphouse is annunciated in the main control room.

Abnormal Operating Conditions

The UHS Makeup Water System is comprised of four independent divisions and generally two out four are required for the UHS Makeup Water System to perform its funciton. If one division of the UHS Makeup Water Intake Structure Ventilation System fails, the other three divisions of the UHS Makeup Water Intake Structure Ventilation System remain available to support the operation of their associated divisions of the UHS Makeup Water System.

Loss of Off-Site Power

In the event of loss of off-site power (LOOP) the UHS Makeup Water Intake Structure Ventilation System will continue to operate. The power is supplied from the class 1E emergency power supply system (EPSS).

Plant Accident Conditions

The UHS Makeup Water Intake Structure Ventilation System is safety related and is required to operate during design basis accident conditions. The UHS Makeup Water Intake Structure Ventilation System maintains design temperature in each division's UHS makeup water pumphouse during plant accident conditions.

9.4.15.3 Safety Evaluation

Below are the safety evaluations that correspond to the safety design bases:

- The UHS Makeup Water Intake Structure Ventilation System has sufficient cooling and heating capacity to maintain each of the UHS makeup water pumphouses within the design temperature range of 50°F (10°C) to 104°F (40°C) when the outside design temperatures for winter and summer are 1.6°F (-17°C) and 88.5°F (31.4°C) respectively.
- The UHS Makeup Water Intake Structure Ventilation System is safety related Seismic Category I and is located inside the UHS Makeup Water Intake Structure that is designed to withstand the effects of earthquakes, tornadoes, hurricanes, floods, external missiles and other appropriate natural events.
- If a division of the UHS Makeup Water Intake Structure Ventilation System is not available due to fire, internal missile, or the pipe break then the other three divisions of the UHS Makeup Water Intake Structure Ventilation System remain available to support their division of the UHS Makeup Water System.
- If a division of the UHS Makeup Water Intake Structure Ventilation System due to failure of an active component coincident with the loss of off-site power, then the other divisions of the UHS Makeup Water Intake Structure Ventilation System remain available to support their division of the UHS Makeup Water System. Each division of the UHS Makeup Water Intake Structure Ventilation System is backed up by Class 1 E Diesel Power and is available if required.
- The UHS Makeup Water Intake Structure Ventilation Systems initially tested per the program given in Section 14.2.
- The UHS Makeup Water Intake Structure Ventilation System is safety related. The safety related components quality group classification, electrical classification and the seismic category are provided in Chapter 3.
- The power supplies to electrical components and the controls for the UHS Makeup Water Intake Structure Ventilation System is from a Class 1E system.

9.4.15.4 Inspection and Testing Requirements

Refer to Section 14.2 for initial plant startup test program. Initial in-place testing of components of the UHS Makeup Water Intake Structure Ventilation System is performed in accordance with ASME AG-1-2003 (ASME, 2003) and ASME N510-1989 (ASME, 1989).

9.4.15.5 Instrumentation Requirements

Instrumentation includes sensing and display of various parameters as necessary to automate system function, and to provide for local and remote system monitoring in the main control room including alarms. These parameters include pumphouse temperature supply air fan flow and pressure and pumphouse high and low temperature alarms.

9.4.15.6 References

ANSI, 1985. Reverberant Room Method for Sound Testing of Fans, ANSI/AMCA-300-1985, American National Standards Institute/Air Movement and Control Association International, Inc.,1985.

ANSI, 1987. Certified Ratings Program-Product Rating Manual for Fan Air Performance, ANSI/AMCA-211-1987, American National Standards Institute/Air Movement and Control Association International, Inc.,1987.

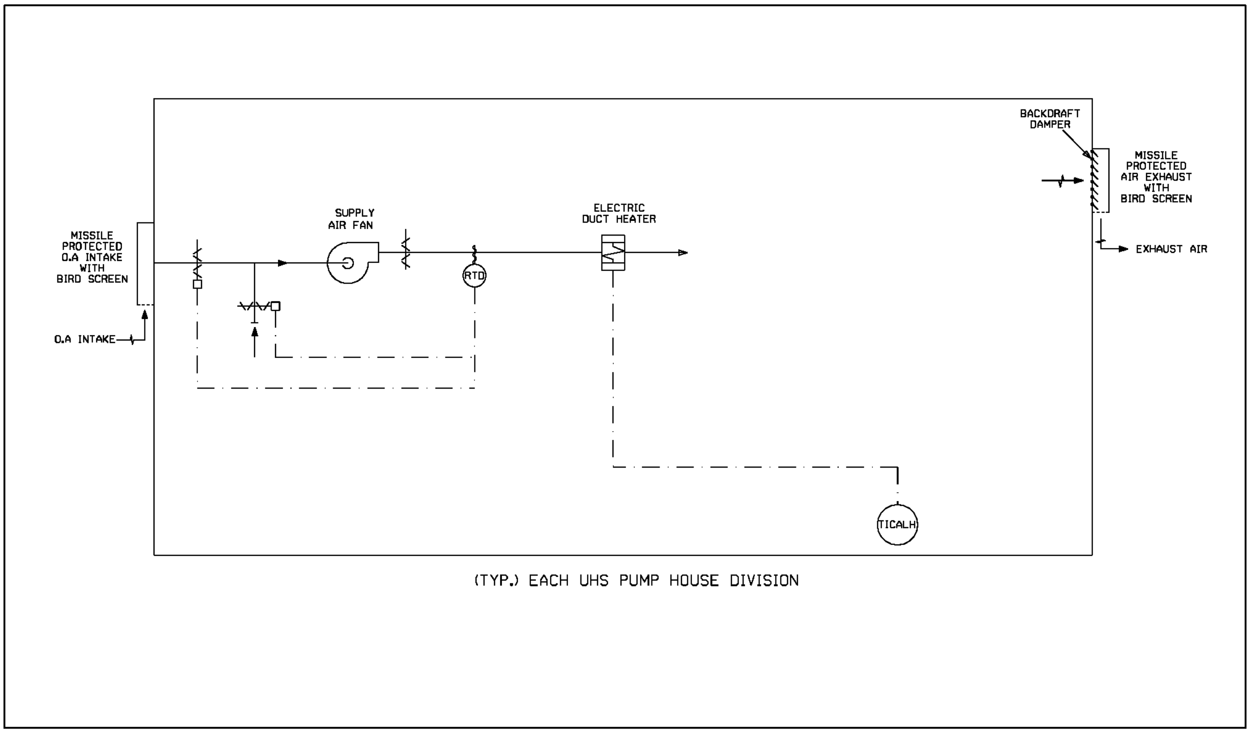
ANSI, 1999. Laboratory Methods of Testing Fans for Aerodynamic Performance Rating, ANSI/AMCA-210-1999, American National Standards Institute/Air Movement and Control Association International, Inc.,1999.

ASME, 1989. Testing of Nuclear Air-Treatment Systems, ASME N510-1989, American Society of Mechanical Engineers, 1989.

ASME, 2003. Code on Nuclear Air and Gas Treatment, ASME AG-1, American Society of Mechanical Engineers, 2003.

ASME, 2004. ASME Boiler and Pressure Vessel Code, Section III, Class 3, 2004 Edition, no Addenda, American Society of Mechanical Engineers, 2004.}

Figure 9.4-1—{UHS Makeup Water Intake Structure Ventilation System}



9.5 OTHER AUXILIARY SYSTEMS

This section of the U.S. EPR FSAR is incorporated by reference with the following supplements.

9.5.1 FIRE PROTECTION SYSTEM

No departures or supplements.

9.5.1.1 Design Basis

Appendix 9B of this COL FSAR supplements Appendix 9A of the U.S. EPR FSAR.

9.5.1.2 System Description

9.5.1.2.1 General Description

For all aspects of the site specific Fire Protection Program (FPP), the same codes and standards and applicable edition years apply for fire protection as listed in Section 9.5.1.7 of the U.S. EPR FSAR.

Table 9.5-1 provides supplemental information for select items/statements in U.S. EPR FSAR Table 9.5.1-1 identified as requiring COL Applicant input. The supplemental information is in a column headed {NMP3NPP Supplement} and addresses {NMP3NPP} conformance to the identified requirement of Regulatory Guide 1.189 (NRC, 2007).

Plant Fire Prevention and Control Features

Plant Arrangement

{The site building layout is shown in Figure 2.1-1.} Details of the arrangement of the Turbine Building, Switchgear Building, Auxiliary Power Transformer Area, Generator Transformer Area (the remaining power block structures) and non-power block structures are provided in Appendix 9B of this COL application.

Architectural and Structural Features

Details of the architectural/structural design features for the remainder of the power block and balance of plant structures/areas are provided in Appendix 9B of this COL application.

Electrical System Design and Electrical Separation

Details of the electrical system design/separation for the remainder of the power block and balance of plant structures/areas are provided in Appendix 9B of this COL application.

Fire Safe Shutdown Capability

The remainder of the plant is separated from portions of the facility containing fire safe shutdown systems or components by appropriately rated fire barriers and/or distance. These remaining areas do not contain fire safe shutdown systems or components. This is detailed in Appendix 9B of this COL application.

Ventilation System Design Considerations

Details of the ventilation system for the remainder of the power block and balance of plant structures are provided in Appendix 9B of this COL application.

Smoke confinement/smoke control is not provided in other structures/areas of the plant.

Fire Detection and Alarm System

Details of the fire detection and alarm system for the remainder of the power block and balance of plant structures are provided in Appendix 9B of this COL application.

Fire Water Supply System

{Suction storage tank makeup is supplied from the raw water system which ultimately draws suction from theLake Ontario. The fire protection water supply is treated to potable quality to help prevent occurrence of biological fouling or corrosion.} The rate of makeup flow to the fire water storage tanks is sufficient to refill the minimum fire protection volume in one tank within eight hours.

In addition, the highest sprinkler system demand is for the Turbine Building and is {2400 gpm at 161 psig}. The highest standpipe system demand is for the Containment Building and is {1250 gpm at 176 psig}.

Automatic Fire Suppression Systems

Details of the automatic fire suppression systems for the remainder of the power block and balance of plant structures are provided in Appendix 9B of this COL application.

In addition, automatic sprinkler systems, designed and installed in accordance with National Fire Protection Association (NFPA) 15 (NFPA, 2007a), are provided for the following buildings:

- {Turbine Building under operating deck and skirt areas
- SBO Diesel Tank Rooms
- SBO Auxiliary Equipment Rooms
- Switchgear Building Diesel Engine Rooms
- Auxiliary Boiler Equipment Room
- Warehouse Building
- Central Gas Supply Building
- Fire Protection Building
- UHS Makeup Water Intake Structure}

Automatic single or double interlock preaction sprinkler systems designed and installed in accordance with NFPA 13 (NFPA, 2007b) are provided in the following areas:

- Turbine Generator and Exciter bearings
- Switchgear Building Cable Spreading Rooms
- Switchgear Building Low- and Medium-Voltage Distribution Board Rooms
- Switchgear Building Cable Distribution Division Rooms
- Switchgear Building Battery Rooms

- Switchgear Building Battery Charger Rooms
- Switchgear Building I&C Control / Protection Panel Rooms
- {Ultimate Heat Sink Electrical Building}

Fixed deluge water spray systems designed and installed in accordance with NFPA 15 are provided for the following hazards.

- Hydrogen seal oil unit
- Turbine Building Lube oil drain trenches
- Auxiliary Power Transformers
- Generator Transformers

Manual Fire Suppression Systems

Details of the manual fire suppression systems for the remainder of the power block and balance of plant structures are provided in Appendix 9B of this COL application.

9.5.1.3 Safety Evaluation – Fire Protection Analysis

Appendix 9B addresses the fire protection analysis for the remaining power block and balance of plant structures.

In addition, the plant will maintain an integrated fire hazards analysis (FHA) and supporting evaluations that demonstrate that the plant can:

- achieve and maintain post-fire safe shutdown conditions for a fire in any fire area of the plant, including alternative shutdown fire areas,
- maintain safe plant conditions and minimize potential release of radioactive material in the event of a fire during any plant operating mode,
- detail the plant fire prevention, detection, suppression, and containment features, for each fire area containing structures, systems and components (SSCs) important to safety, and
- achieve and maintain these safe conditions with due consideration of plant fire risk as characterized in the plant-specific fire probabilistic risk assessment (Fire PRA).

9.5.1.4 Inspection and Testing Requirements

The FPP includes procedures for testing fire protection features and systems and includes criteria to ensure design and system readiness. This includes installation and acceptance testing, periodic testing, quality assurance oversight of testing, and proper test documentation.

All fire protection features and systems will be surveilled, inspected, tested, and maintained in accordance with applicable codes and standards of the NFPA including start-up and acceptance tests. The frequency of follow-up inspections and tests will also follow NFPA requirements and ALARA guidelines.

All surveillance, inspection, testing and maintenance is conducted and documented in accordance with approved plant procedures and is performed by qualified personnel.

9.5.1.5 Fire Probabilistic Risk Assessment

No departures or supplements.

9.5.1.6 Fire Protection Program

No departures or supplements.

9.5.1.6.1 Fire Prevention

Governance and control of FPP attributes is provided through policies, procedures, and the {UniStar Nuclear} Quality Assurance Program Description. Procedures are in place for FPP impacting activities including:

- In-situ and transient combustibles.
- Ignition sources.
- Hot Work.
- Annunciator response and pre-fire plans.
- Surveillance, inspection, testing, and maintenance (as applicable) of:
    - Passive fire barriers including opening protectives (i.e., fire doors, fire dampers, and through penetration seal systems).
    - Fire protection water supply system.
    - Automatic and manual fire suppression systems and equipment.
    - Automatic and manual fire detection/fire alarm system equipment.
    - Fire brigade and fire response equipment.

9.5.1.6.2 Fire Protection Program

The FPP organization is shown in Figure 9.5-1. The ultimate responsibility for the FPP rests with the {Chief Nuclear Officer, UniStar Nuclear Operating Services}. The responsibilities, lines of authority, training and qualifications by title/position are detailed in administrative procedures and the {UniStar Nuclear} Quality Assurance Program Description. Key positions are described below. The qualifications required for key positions are provided in Section 9.5.1.6.3.

The {On-site Engineering Manager} has the overall responsibility for development and ongoing assessment of the FPP. A qualified fire protection engineer (FPE) is delegated the responsibility to administer and implement the FPP through procedures governing fire prevention, combustible material control, ignition source control, automatic and manual fire suppression systems, manual fire response equipment, evaluation of work for impact on the FPP, pre-fire planning, and identification of fire protection training requirements for plant personnel including general employees, fire brigade, and contract employees/contractors. The FPE is assisted through the assignment of responsibility for individual portions of the FPP to various departments as defined in administrative procedures.

The {Operations Shift Supervisor} has the responsibility for ensuring that fire safety and administration of applicable fire protection controls are maintained for all modes of plant operation. In the event of a fire in the plant, the {Operations Shift Supervisor} is the incident command authority for coordinating fire response and plant operational/shutdown activities unless and until relieved under the Emergency Plan.

Quality assurance oversight of the FPP rests with the Quality and Performance Improvement organization in accordance with the {UniStar Nuclear} Quality Assurance Program Description.

9.5.1.6.3 Fire Protection Training and Personnel Qualifications

Fire Protection Engineer

No departures or supplements.

Fire Brigade Members

No departures or supplements.

Fire Protection System Operation, Testing, and Maintenance

Personnel who perform operation of or surveillance, inspection, test, and/or maintenance activities on fire-protection related structures, systems, or components are trained in the specific activities they are required to perform. Training is conducted through one or more of the following: factory or shop training on individual equipment, recognized apprentice and/or journeyman training courses, training coursework on equipment of similar type or experience-based training and qualification on fire systems in general. All personnel who perform fire protection related maintenance will be trained in conformance to plant procedures and in fire protection feature/system impairment procedures.

Training of the Fire Brigade

No departures or supplements.

General Employee Training

This training is required for all personnel who are granted unescorted plant access. General employee training curriculum provides an overview of the requirements of the FPP including: general fire hazards within the plant, the defense-in-depth objectives of the FPP, and an introduction to the FPP procedures that govern employee actions including appropriate steps to be taken upon discovering a significant fire hazard, actions to be taken upon discovering a fire or hearing/seeing a fire alarm, and combustible material and ignition source controls.

Fire Watch Training

Fire Watch – Hot Work

This training is required for all plant and/or contract personnel assigned duties as a fire watch for hot work. Hot work fire watch training includes training on hot work permitting, hot worker safety, requirements for inspection and authorization for hot work, emergency communication/notification, transfer of fire watch responsibilities, post-work inspection requirements, and hot work recordkeeping requirements. All fire watches are trained in the selection, limitations, and use/application of hand portable fire extinguishers.

Fire Watch – Compensatory Measures

This training is required for all plant and/or contract personnel assigned duties as a fire watch compensating for the inoperability or impairment of a given fire protection system or feature. Compensatory measure fire watch training includes training on impairment procedures, safety functions of fire protection related systems and features and how these functions are degraded, plant features typically being compensated for, emergency communication/notification, transfer of fire watch responsibilities, restoration from compensatory fire watch, and recordkeeping requirements. All compensatory measure fire watches are trained in the selection, limitations, and use/application of hand portable fire extinguishers.

9.5.1.6.4 Fire Brigade Organization, Training, and Records

Fire Brigade equipment including personal protective equipment for structural firefighting is provided for the plant fire brigade. Each fire brigade member is equipped with a helmet (with face shield), turnout coat, turnout pants, footwear, gloves, protective hood, personal alert safety system (PASS) device, and self-contained breathing apparatus (SCBA). All equipment will conform to appropriate NFPA standards. The plant maintains an adequate inventory of firefighting equipment to ensure outfitting of a full complement of brigade members with consideration of the possibility of sustained fire response operations (multiple crews).

SCBAs are required to be worn for interior fire response activities and at similar times when fire/response activities may involve a risk of chemical, particulate, and/or radiological material inhalation exposure.

Other types of fire response equipment are distributed and/or cached at various locations throughout the plant to support response by the plant fire brigade and/or off-site response agencies. The types of equipment provided include fire hose (2-1/2 and 1-1/2 inch diameter), combination and specialty hose nozzles, portable smoke removal equipment, spill control and absorbent materials, supplemental hand portable fire extinguishers, aqueous film-forming foam (AFFF) supply and foam eductors, and other specialty tools.

The plant has procedural controls in place to govern the response to fires. This includes fire annunciator response procedures and pre-fire plans which provide direction for the Control Room to determine: the need to initiate plant safe shutdown, the actions to take to effect shutdown, the mobilization and response of Control Room operators, and the mobilization and response of the plant Fire Brigade to effect fire-fighting activities. These procedures are utilized, in conjunction with the Emergency Plan, to determine when conditions necessitate:

- Requesting support of off-site emergency response resources.
- The declaration and escalation of the fire occurrence as a plant emergency.
- The notification of local, state, and federal governmental agencies.

9.5.1.6.5 Quality Assurance

The {UniStar Nuclear} Quality Assurance Program Description has appropriate provisions to govern the quality attributes of the FPP. The FPP conforms to the applicable provisions of 10 CFR 50, Appendix B (CFR, 2008) and with the quality assurance guidance in Regulatory Guide 1.189 (NRC, 2007).

Audits of the FPP will be performed at the recommended frequencies by an audit team staffed and led by qualified QA and technical auditors.

Additional details of the quality assurance program are provided in Section 17.5.

9.5.1.7 References

{**CFR, 2008.** NRC Appendix B.

NFPA, 2007a. Standard for Water Spray Fixed Systems for Fire Protection, NFPA 15, National Fire Protection Association, 2007.

NFPA, 2007b. Standard for the Installation of Sprinkler Systems, NFPA 13, National Fire Protection Association, 2007.

NRC, 2007. Fire Protection for Nuclear Power Plants, Revision 1, Regulatory Guide 1.189, Revision 1, U. S. Nuclear Regulatory Commission, March 2007.}

9.5.2 COMMUNICATION SYSTEM

No departures or supplements.

9.5.2.1 Design Basis

No departures or supplements.

9.5.2.2 System Description

No departures or supplements.

9.5.2.3 System Operation Communications Stations

The U. S. EPR FSAR includes the following COL Item in Section 9.5.2.3:

> The COL applicant referencing the U.S. EPR certified design will identify additional site-specific communication locations necessary to support effective communication between plant personnel in all vital areas of the plant during normal operation, as well as during accident conditions.

This COL Item is addressed as follows:

{The UHS Makeup Water Intake Structure pumphouse contains safety related equipment and is a site-specific vital area of the plant. Communication equipment will be provided in this area to support effective communication between plant personnel during normal operation, as well as during accident conditions. This location will contain equipment to allow use of the plant digital telephone system, PA and alarm system, and sound powered system. A portable wireless communication system will also be provided for use by fire brigade and other operations personnel required to achieve safe plant shutdown.

All the communication subsystems are available for use during normal operation of the plant. Except for the sound-powered system, the communication subsystems are powered from the Class 1E Emergency Power Supply System (EPSS), which is supported by the emergency diesel generators to provide backup power. Hence all the communication subsystems are expected to be available for use during all accident conditions. However, all communications equipment is categorized as non-safety related, and is not relied upon to mitigate an accident. The sound-powered system does not require an external power source.}

9.5.2.4 Inspection and Testing Requirements

No departures or supplements.

9.5.2.5 References

No departures or supplements.

9.5.3 LIGHTING SYSTEM

No departures or supplements.

9.5.4 DIESEL GENERATOR FUEL OIL STORAGE AND TRANSFER SYSTEM

No departures or supplements.

9.5.5 DIESEL GENERATOR COOLING WATER SYSTEM

No departures or supplements.

9.5.6 DIESEL GENERATOR STARTING AIR SYSTEM

No departures or supplements.

9.5.7 DIESEL GENERATOR LUBRICATING SYSTEM

No departures or supplements.

9.5.8 DIESEL GENERATOR AIR INTAKE AND EXHAUST SYSTEM

No departures or supplements.

Table 9.5-1—{Fire Protection Program Compliance with Regulatory Guide 1.189}
(Page 1 of 7)

R.G. Section	Regulatory Guide 1.189 "C. Regulatory Position"[1]	Compliance[2]	U.S. EPR Comment	NMP3NPP Supplement
C.1	Fire Protection Program	Compliance		The Fire Protection Program (FPP) is consistent with the requirements of Regulatory Guide 1.189 and SRP 9.5-1. Details of the FPP are provided in this COL application.
C.1.1	Organization, Staffing, and Responsibilities	Compliance		The FPP organization is shown in Figure 9.5-1. The responsibilities, lines of authority, training and qualifications by title/position are detailed in administrative procedures and the UniStar Nuclear Quality Assurance Program Description.
C.1.2	Fire Hazards Analysis	Compliance	See Fire Protection Analysis Appendix 9A	Appendix 9A of the U.S. EPR FSAR provides the technical analysis for the nuclear island and demonstrates that the EPR has the ability to achieve and maintain safe-shutdown and to minimize the release of radioactive materials to the environment. Appendix 9B is an analysis detailing fire hazards and fire protection attributes for the remainder of the plant. Other structures not listed will be confirmed as not posing fire/explosion risk to the plant using NFPA 80A criteria.
C1.3	Safe Shutdown Analysis	Compliance		The plant will develop and maintain an integrated, detailed site-specific FHA and will have detailed procedures and training to ensure fire-safe shutdown and other fire safe conditions required to minimize radioactive material release are achieved and maintained.
C.1.4	Fire Test Reports and Fire Data	Compliance		If untested barrier configurations are determined necessary during detailed design, they will be evaluated consistent with RG 1.189 requirements.
C.1.5	Compensatory Measures	Compliance		The FPP will apply compensatory measures consistent with RG 1.189 recommendations and standard industry practice whenever fire protection features are degraded and/or inoperable. Compensatory measures will be applied when necessary to accomplish repair or modification or as a result of findings during inspection or surveillance. Fire watches, temporary fire barriers, or backup suppression capability will be implemented, as applicable. Where an uncommon type of compensatory measure is warranted, an evaluation of the alternative will be conducted prior to implementation. Such evaluation will incorporate fire risk insights as applicable.
C.1.6	Fire Protection Training and Qualifications	Compliance		The FPP Organization is shown in Figure 9.5-1.
C.1.6.1	Fire Protection Staff Training and Qualifications	Compliance		The responsibilities, lines of authority, training and qualifications by title/position are detailed in administrative procedures and the UniStar Nuclear Quality Assurance Program Description.
C.1.6.2	General Employee Training	Compliance		General employee training includes instruction on actions to take upon discovery of a fire, hearing a fire alarm, and proper fire preventative and protective administrative controls and actions.

Table 9.5-1—{Fire Protection Program Compliance with Regulatory Guide 1.189}
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R.G. Section	Regulatory Guide 1.189 "C. Regulatory Position"[1]	Compliance[2]	U.S. EPR Comment	NMP3NPP Supplement
C.1.6.3	Fire Watch Training	Compliance		Fire watch training includes instruction on responsibilities, actions, and records for oversight of hot work and when serving as compensatory measure for degraded fire protection feature.
C.1.6.4	Fire Brigade Training and Qualifications	Compliance		The fire brigade will have at least five members available on each shift above the minimum shift complement for safe operation/shutdown. The brigade is trained and equipped to respond to fire-related emergencies.
C.1.6.4.1	Qualifications	Compliance		The fire brigade will be under the direction of the Shift Supervisor. A Fire Brigade Leader is assigned and qualified to command response to fire emergencies. A minimum of three operations staff members including one licensed operator will be assigned to the shift fire brigade. Fire brigade members are required to be physically fit and undergo an annual physical examination for initial and continuing brigade membership.
C.1.6.4.2	Instruction	Compliance		Fire brigade members are trained in nuclear facility fire response strategy and tactics by qualified trainers using both classroom and hands-on instruction. The training curriculum is detailed in an administrative procedure. Refresher training is structured to ensure that the entire curriculum is repeated every two years.
C.1.6.4.3	Fire Brigade Practice	Compliance		Brigade practice sessions are scheduled to ensure that each member attends at least one session per year.
C.1.6.4.4	Fire Brigade Training Records	Compliance		Brigade training records will be retained for a minimum of three years.
C.1.7	Quality Assurance	Compliance		The UniStar Nuclear Quality Assurance Program Description Section V has appropriate provisions to govern the quality attributes of the fire protection program. The FPP conforms to the applicable provisions of 10 CFR 50, Appendix B and with the quality assurance guidance in RG 1.189.
C.1.7.1	Design and Procurement Document Control	COL Applicant	Note 3	Design and Procurement Document Control shall be in accordance with Section V of the UniStar Nuclear Quality Assurance Program Description. Fire protection quality requirements are included in plant configuration control processes.
C.1.7.2	Instructions, Procedures, and Drawings	COL Applicant	Note 3	The FPP provides instruction and procedures to control fire prevention and firefighting; design, installation, inspection, test, maintenance and modification of fire protection features/systems; and appropriate administrative controls in accordance with Section V of the UniStar Nuclear Quality Assurance Program Description.
C.1.7.3	Control of Purchased Material, Equipment, and Services	COL Applicant	Note 3	The FPP provides procedures to control procurement of fire protection related items to ensure proper evidence of quality in accordance with Section V of the UniStar Nuclear Quality Assurance Program Description.

Table 9.5-1—{Fire Protection Program Compliance with Regulatory Guide 1.189}
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R.G. Section	Regulatory Guide 1.189 "C. Regulatory Position"[1]	Compliance[2]	U.S. EPR Comment	NMP3NPP Supplement
C.1.7.4	Inspection	Compliance		The FPP includes procedures for independent inspection of fire protection-related activities including installation and/or maintenance of features including FP systems, emergency lighting and communication, cable routing, and fire barriers and opening protectives in accordance with Section V of the UniStar Nuclear Quality Assurance Program Description.
C.1.7.5	Test and Test Control	Compliance		The FPP includes procedures for testing fire protection features and systems and includes criteria to ensure design and system readiness. This includes installation and acceptance testing, periodic testing, quality assurance oversight of testing, and proper test documentation in accordance with Section V of the UniStar Nuclear Quality Assurance Program Description.
C.1.7.6	Inspection, Test, and Operating Status	Compliance		Fire protection features and systems are provided with suitable marking and labeling to indicate acceptance and readiness for operation in accordance with Section V of the UniStar Nuclear Quality Assurance Program Description.
C.1.7.7	Non-conforming Items	Compliance		The FPP includes procedures for identification and control of items that do not conform to specified requirements, are inoperable or otherwise unsuitable. This includes tagging or labeling, notification and dispositioning of the nonconforming item in accordance with Section V of the UniStar Nuclear Quality Assurance Program Description.
C.1.7.8	Corrective Action	Compliance		The plant has an administrative procedure to ensure that proper corrective actions are taken for conditions adverse to fire protection including root cause analysis when appropriate in accordance with Section V of the UniStar Nuclear Quality Assurance Program Description.
C.1.7.9	Records	Compliance		The FPP includes provisions for preparing and maintaining retrievable records that demonstrate conformance to fire protection requirements in accordance with Section V of the UniStar Nuclear Quality Assurance Program Description.
C.1.7.10	Audits	Compliance		The FPP requires that audits be performed at the appropriate periodicity by qualified fire protection and QA personnel to verify that the program is being properly implemented and that compliance to fire protection requirements is being met in accordance with Section V of the UniStar Nuclear Quality Assurance Program Description.
C.1.7.10.1	Annual Fire Protection Audit	Compliance		An annual audit will be performed consistent with R.G. 1.189.
C.1.7.10.2	24-Month Fire Protection Audit	Compliance		A biennial audit will be performed consistent with R.G. 1.189 and Section V of the UniStar Nuclear Quality Assurance Program Description.

Table 9.5-1—{Fire Protection Program Compliance with Regulatory Guide 1.189}
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R.G. Section	Regulatory Guide 1.189 "C. Regulatory Position"[1]	Compliance[2]	U.S. EPR Comment	NMP3NPP Supplement
C.1.7.10.3	Triennial Fire Protection Audit	Compliance		A triennial audit will be performed consistent with R.G. 1.189 and Section V of the UniStar Nuclear Quality Assurance Program Description. Independent auditors will be used to perform triennial audits.
C.1.8	Fire Protection Program Changes/Code Deviations	COL Applicant	Note 3	Compliance - If program changes or deviations are required, the plant will use risk-informed, performance-based methodologies consistent with R.G. 1.174 to evaluate and justify changes/deviations.
C.1.8.1	Change Evaluations	COL Applicant	Note 3	Compliance - FPP program changes will be evaluated consistent with 10 CFR 50.59 and the applicable change processes in 10 CFR 52.
C.1.8.5	10 CFR 50.72 Notification and 10 CFR 50.73 Report	COL Applicant	Note 3	Compliance - the plant will report fire events and any fire protection program deficiencies consistent with 10 CFR 50.72 and 10 CFR 50.73.
C.1.8.7	Fire Modeling	COL Applicant	Note 3	Compliance - If fire models are used to evaluate changes, the plant will apply models consistent with R.G. 1.189 including limitations on their use and adequate verification and validation (as required).
C.2	Fire Prevention	Compliance		The FPP includes procedures to ensure minimization of fire hazards in areas important to safety for anticipated operating conditions and to ensure fire safety as part of facility modifications.
C.2.1	Control of Combustibles	Compliance		The FPP includes procedures to control transient combustibles consistent with the Fire Hazards Analysis and good fire prevention practices.
C.2.1.1	Transient Fire Hazards	Compliance		The FPP includes procedures to control transient combustibles consistent with the Fire Hazards Analysis and good fire prevention practices.
C.2.1.2	Modifications	Compliance		The FPP includes procedures to ensure that fire prevention and fire safety practices are maintained and that the facility fire safety design basis is not negatively impacted.
C.2.1.3	Flammable and Combustible Liquids and Gases	Compliance		The FPP includes procedures to ensure flammable and combustible liquids and gases are handled properly and consistent with the facility design basis.
C.2.1.4	External/Exposure Fire Hazards	Compliance		The FPP includes procedures to ensure that any adjacent or external facilities to areas important to safety are evaluated consistent with NFPA 80A and for impact on the facility Fire Hazards Analysis.
C.2.2	Control of Ignition Sources	Compliance		The FPP includes procedures for control of ignition sources. The facility design follows recognized codes, standards, and practices to minimize ignition hazards.
C.2.2.1	Open Flame, Welding, Cutting, and Grinding (Hot Work)	Compliance		The FPP includes procedures for issuance of hot work permits and to control the designation of fixed weld shop areas or similar.

Table 9.5-1—{Fire Protection Program Compliance with Regulatory Guide 1.189}
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R.G. Section	Regulatory Guide 1.189 "C. Regulatory Position"[1]	Compliance[2]	U.S. EPR Comment	NMP3NPP Supplement
C.2.2.2	Temporary Electrical Installations	Compliance		The FPP includes procedures to monitor and control the use of temporary electrical installations for routine and outage related maintenance consistent with recognized standards and practices.
C.2.2.3	Other Sources	Compliance		The FPP includes procedures to monitor and control other non-routine ignition hazards such as temporary heating, leak testing, tar kettles, heat guns, and similar devices/operations.
C.2.3	Housekeeping	Compliance		The FPP includes procedures for routine housekeeping and monitoring areas important to safety for prompt removal of combustibles.
C.2.4	Fire Protection System Maintenance and Impairments	Compliance		The FPP includes procedures to ensure fire protection features and systems are maintained in accordance with applicable reference standards and other regulatory guidance. Fire system and feature impairments are controlled by a permit system authorized by a qualified individual.
C.3.5	Manual Firefighting Capabilities	Compliance		See below
C.3.5.1	Fire Brigade	Compliance		The Fire Brigade consists of at least five members available on each shift above the minimum shift complement for safe operation/shutdown. The brigade is trained and equipped to respond to fire-related emergencies.
C.3.5.1.1	Fire Brigade Staffing	Compliance		The Fire Brigade consists of at least five members available on each shift above the minimum shift complement for safe operation/shutdown. The on-duty Shift Supervisor is not a member of the fire brigade.
C.3.5.1.2	Equipment	Compliance		The Fire Brigade is suitably outfitted and equipped for interior structural firefighting activities. PPE and related fire brigade equipment conforms with and is maintained per recognized standards. This includes turnout gear and self-contained breathing apparatus and equipment including hoses, nozzles, smoke ejectors, and other specialized equipment. Equipment maintenance and inspection is performed per plant procedure.
C.3.5.1.3	Procedures and Prefire Plans	Compliance		The Fire Brigade and fire response activities are conducted in accordance with annunciator response procedures, pre-fire plans, and related fire response procedures which address strategies and tactics typical to nuclear power plant fire response.
C.3.5.1.4	Performance Assessment/Drill Criteria	Compliance		The Fire Brigade will drill at least quarterly. At least one annual drill will be unannounced and one drill will be on a back shift. Drills will be scheduled to ensure that all brigade members participate in minimum of two drills per year. Drills are based on prepared drill and tabletop guides and will be critiqued by knowledgeable plant staff to ensure that fire response objectives are being met. An independent reviewer will be included at least once every three years.

Table 9.5-1—{Fire Protection Program Compliance with Regulatory Guide 1.189}
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R.G. Section	Regulatory Guide 1.189 "C. Regulatory Position"[1]	Compliance[2]	U.S. EPR Comment	NMP3NPP Supplement
C.3.5.2	Off-site Manual Firefighting Resources	Compliance		Off-site fire department response is governed through a mutual aid agreement with off-site fire departments. The off-site fire departments are included in pertinent training on the hazards of the facility and participate in a minimum of one drill per year on-site.
C.3.5.2.1	Capabilities	Compliance		The off-site fire department equipment is compatible with the plant equipment and/or adapters are provided and available when required.
C.3.5.2.2	Training	Compliance		The off-site fire departments are included in pertinent training on the hazards of and response within the facility including radiological and operational hazards; site access/security; and roles, responsibilities and authorities including command and response structure.
C.3.5.2.3	Agreement/Plant Exercise	Compliance		The plant will establish written mutual aid agreements with off-site fire departments to provide response support to the fire brigade. Said agreements will address authorities and command responsibilities and will provide for periodic participation/joint training including annual drills and participation in radiological emergency response plan exercises.
C.4.1.7	Communications	Compliance		The Fire Brigade will utilize portable radios for communications during fire response. This system is arranged to not conflict with other site radio communications and to provide reliable, comprehensive coverage for the site. The radio system is the primary means of communication for fire brigade operations. Secondary communications are available to the fire brigade via the plant primary and wireless telephone systems and by the plant public address system.
C.5.5	Post-Fire Safe-Shutdown Procedures	COL Applicant	Note 3	Compliance - The plant will have detailed procedures and training to ensure fire-safe shutdown and other fire-safe conditions required to minimize radioactive material release are achieved and maintained.
C.5.5.1	Safe-Shutdown Procedures	COL Applicant	Note 3	Compliance - See C.5.5
C.5.5.2	Alternative/Dedicated Shutdown Procedures	COL Applicant	Note 3	Compliance - See C.5.5
C.5.5.3	Repair Procedures	COL Applicant	Note 3	Compliance - Consistent with the U.S. EPR FSAR, the plant does not permit repairs to achieve hot or cold shutdown conditions; procedures are not required.
C.6.1.6	Alternative/Dedicated Shutdown Panels	Compliance		The FPP includes procedures to control transient combustibles consistent with the Fire Hazards Analysis and good fire prevention practices.

Table 9.5-1—{Fire Protection Program Compliance with Regulatory Guide 1.189}
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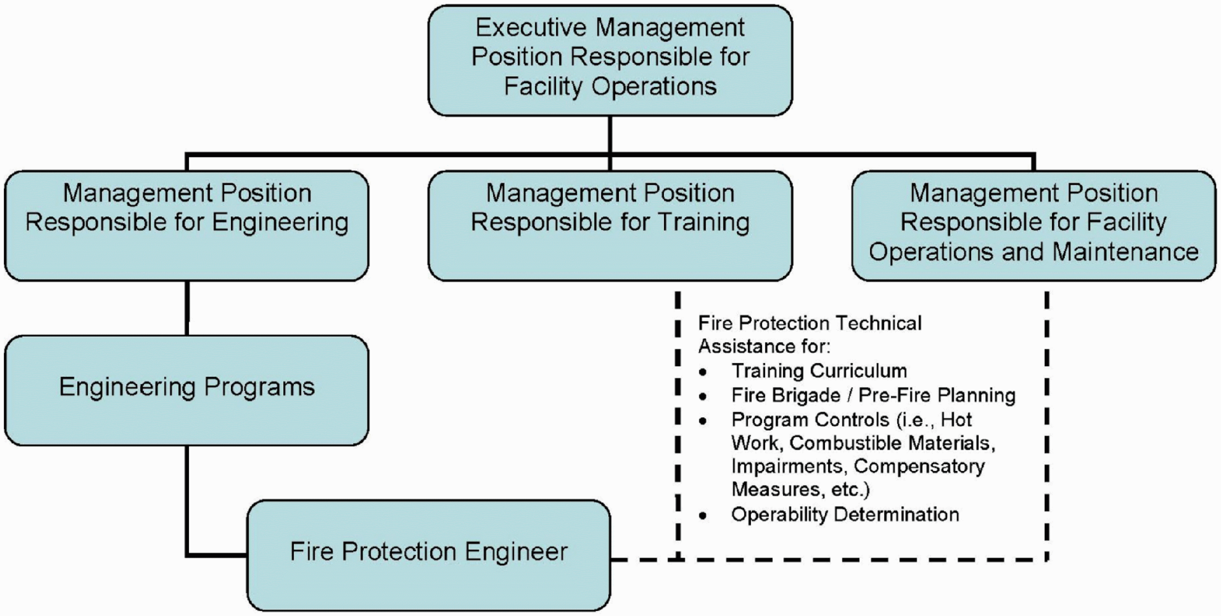
R.G. Section	Regulatory Guide 1.189 "C. Regulatory Position"[1]	Compliance[2]	U.S. EPR Comment	NMP3NPP Supplement
C.6.2.4	Independent Spent Fuel Storage Areas	COL Applicant	Note 3	Compliance – No Independent Spent Fuel Storage Areas are planned for the plant at this time and are not included in this COL application.
C.6.2.6	Cooling Towers	COL Applicant	Note 3	Compliance - Essential Service Water Cooling Towers are addressed in Appendix 9A. The Cooling Tower Structure is addressed in Appendix 9B.
C.7.6	Nearby Facilities	COL Applicant	Note 3	Compliance - Appendix 9A of the U.S. EPR FSAR provides the technical analysis for the nuclear island and related power block structures and demonstrates that the EPR has the ability to achieve and maintain safe-shutdown and to minimize the release of radioactive materials to the environment. FSAR Appendix 9B of this COL application provides an analysis of fire hazards and details fire protection attributes for the remainder of the plant.
C.8.4	Applicable Industry Codes and Standards	Compliance		The FPP will conform to the codes and standards and applicable edition years listed in Section 9.5.1.7 of the U.S. EPR FSAR.
C.8.6	Fire Protection Program Implementation Schedule	Compliance		The required elements of the FPP are fully operational prior to receipt of new fuel for buildings storing new fuel and adjacent areas that could affect the fuel storage area at the plant. Other required elements of the FPP described in FSAR Section 9.5.1 are fully operational prior to initial fuel loading at.

Notes:

1. The scope of the Regulatory Position presented in this compliance comparison table is abbreviated, due to the depth of detail contained within the Regulatory Position Appendix C itself. The user should refer to Regulatory Guide 1.189 directly for the text portion of each section addressed by the table.
2. The U.S. EPR compliance to the regulatory positions delineated in Regulatory Guide 1.189, "Fire Protection for Nuclear Power Plants," is as indicated by the following definitions: COL Applicant – The COL Applicant will address the subject regulatory position. Compliance – The U.S. EPR design supports compliance with the subject regulatory position.
3. A COL Applicant that references the U.S. EPR design certification will submit site specific information to address the Regulatory Position.

Figure 9.5-1—{Fire Protection Organization}



9A FIRE PROTECTION ANALYSIS

Appendix 9A of the U.S. EPR FSAR is incorporated by reference with the following supplement.

The information in U.S. EPR FSAR Appendix 9A – the fire protection analysis of the nuclear island – is supported by additional information provided in Appendix 9B. Appendix 9B provides the fire protection analysis of the remaining power block and balance of plant structures.

Figures 9A-98 through 106 in the U.S. EPR FSAR are identified as conceptual information for the Access Building. These figures and the corresponding fire area parameters in Table 9A-2 of the U.S. EPR FSAR for the Access Building are applicable to the plant.